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Earnings management and the readability of explanatory notes: accounting information manipulation

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Abstract

Objective: This study aims to verify the relationship between the readability level of explanatory notes and earnings management among companies listed in [B]³ between 2010 e 2018.

Method: An econometric method was used. Readability was the dependent variable, and earnings management was the primary independent variable, in addition to control variables, analyzed through panel data regression with fixed effects controlled by year and sector.

Results: The results show no statistically significant relationship between the readability levels of explanatory notes and earnings management levels, even when compared to companies that most frequently use earnings management. The results are robust, considering that additional results present coefficients in the same direction and significance.

Contributions: This study contributes to the accounting literature as it studies this relationship in a Portuguese-speaking emergent market. Additionally, it supports the understanding of users of accounting information regarding the ease of reading explanatory notes to support decision-making.

Keywords: ease of reading; earning management; obfuscation.

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1. Introduction

The international harmonization of accounting standards has led to significant changes in the parameters for preparing and disclosing accounting information, especially in countries where local standards were more at odds with the standards used in more economically developed centers. Due to the managers' discretionary power, as well as the amount of information required, especially among narrative disclosures, accounting communication has become the focus of attention of several regulatory bodies (Securities and Exchange Commission – SEC, European Financial Reporting Advisory Group – EFRAG, International Accounting Standards Board – IASB, the Brazilian Securities and Exchange Commission – *CVM*, Accounting Pronouncements Committee – *CPC*, and Guidance Committee for the Disclosure of Information to the Market - Codim, etc.). For example, after the Brazilian accounting standards converged to the international standards (International Financial Reporting Standards - IFRS), the disclosure of information provided in explanatory notes that was not previously required increased significantly, also increasing the volume and content of the reports issued (Antunes, Grecco, Formigoni & Neto, 2012).

Peleias (2017) notes that the disclosure of accounting information is a factor that contributes to reducing the level of information asymmetry and increasing users' confidence due to transparency, mainly through non-financial information. Such information benefits users by describing a company's financial and non-financial performance since managers have the opportunity to explain some of the reasons underlying a company's performance (Hassan, Abbas & Garas, 2019).

Based on the fact that accounting regulations, in effect after harmonization, enable managers to act with discretion by making accounting choices and by how information is reported, further research is needed to study the aspects related to the behavior of administrators to opportunistically provide information or manage results (Libby, Bloomfield & Nelson, 2002).

Motivations for earnings management can be explained from different perspectives, with the opportunistic view being the most discussed in the accounting literature since 1970, based on Watts and Zimmerman's studies. From this perspective, managers are motivated to make accounting choices that produce effects in line with their expectations while disclosing information that mainly transmits positive performance and conceals negative news (Bakar & Ameer, 2011).

Earnings management may involve the use of managerial discretion in making accounting choices (accruals), in making operational decisions (real), and in selecting criteria to present statements (disclosure) (Martinez, 2013). According to the Agency Theory (Jensen & Meckling, 1976), one of the leading causes of agency problems is information asymmetry between principals and agents, preventing external users from adequately assessing the managers' competence and efforts.

By applying discretion, managers may use accounting narratives to meet their interests or obtain social legitimacy by choosing the statements' level of readability (Hassan, Abbas & Garas, 2019). This method is called impression management. Impression management has already been identified through information obfuscation, the use of more complex language, emphasis on good news, the use of metaphors, choosing convenient benchmarks, focus on future expectations, concealing information, and adopting a rhetoric and persuasive speech (Clatworthy & Jones, 2003; Merkl-Davies & Brennan, 2007; Ajina, Laouiti & Msolli, 2016; Bushee, Gow & Taylor, 2018).

Previous studies have linked the readability of accounting reports in English with earnings management practices (Ajina, Laouiti & Msolli, 2016; Lo, Ramos & Rogo, 2017). The results of such studies indicate that companies adopting earnings management present narrative statements that are more difficult to read. However, such results cannot be generalized to different contexts due to the different legal and economic conditions between countries and the characteristics of each language (Moreno & Casasola, 2015).

The Portuguese language is known to have a more complex structure than English. For this reason, it potentially makes it easier to obfuscate information, especially when there is an intention to conceal data unfavorable to the composition of a company's performance or the performance of its managers. Additionally, Machado (2018, p. 72) reinforces the need for specific studies in emerging markets, considering that "theories corroborated by research in developed countries may have limited applicability in emerging markets." Brito (2016) states that emerging markets face inefficiency, insufficient regulations, and poor infrastructure. Therefore, companies in such a market will likely provide less relevant and lower-quality information to users than those in developed markets. Based on this context, the following research problem arises: **What is the relationship between earnings management levels and the readability of the explanatory notes of companies listed in [B]³?**

By influencing the decision-making processes of various groups, accounting information generates important implications of an economic nature. Hence, it is necessary to identify the factors that motivate differences in the readability levels of explanatory notes (Silva, 2017; Hasan, 2018). Therefore, this paper seeks to contribute to the accounting literature by relating aspects concerning disclosure and the readability of accounting information with the earnings management practice. Both are impacted by the process of harmonization with international standards, which increased the need for disclosure of information in explanatory notes and concomitantly provided managers with greater discretion to make accounting choices, directly or indirectly affecting the companies' reports.

This study aims to verify the relationship between the level of readability of explanatory notes and earnings management practices among companies listed in [B]³. Hence, multiple linear regressions will be performed to identify potential associations between accruals-based earnings management (Modified Jones - Dechow, Sloan & Sweeney, 1995) or real (Discretionary Expenses - Roychowdhury, 2006) and impression management (adapted Flesch - Martins, Ghiraldelo, Nunes & Oliveira Junior, 1996).

By analyzing the relationship mentioned above, we highlight the importance of explanatory notes' readability and the factors influencing it to help mitigate the risks imposed on users associated with earnings management and information obfuscation. Furthermore, the results reported here are expected to support information for the accounting regulation process regarding aspects related to readability, considering that narrative disclosures have become one of the main attention points of regulatory bodies in recent years.

The need to issue accounting reports with improved readability levels is accentuated due to an increase in different types of users of accounting information, such as, for example, the growth of small investors in the financial market between 2013 and 2019, reported by the Brazilian Association of Financial and Capital Market Entities (Anbima). According to Borges (2020), such investor presents varied levels of education, knowledge, and experience regarding the analysis of financial statements. Therefore, more readable information can help the decision-making process and resource allocation. Another point worth mentioning is the increase in the complexity of international trade relations between companies that, in theory, now share similar parameters for preparing and disclosing accounting information; however, adjusted to their local contexts, as it occurs in Brazil, where there is one accounting statement not provided for in international standards and unknown by other countries.

2. Theoretical Reference

2.1 Accounting information readability

Some studies use the term readability in the same sense of understandability; however, measurements differ, and using the term with such a meaning is not recommended (Smith & Taffler, 1992). The difficulty in understanding a document depends not only on the text's syntactic and linguistic complexity but also on the readers' skills and characteristics. Some people may easily understand different types of text, while others find them difficult; hence, adaptation to the particular characteristics of the target audience is required (Castilhos, 2016).

Note that readability refers to a text's inherent quality of being read quickly and easily. Therefore, readability is a property of the narrative's complexity. Understandability, in turn, is related to the readers' ability to understand a given text and, therefore, depends on each reader's characteristics (Smith & Taffler, 1992). In this sense, readability can be translated in terms of a reading difficulty scale, in which texts as rated as more difficult to read when compared to others, being described as the quality that determines the ease of reading a text. Readability is one of the characteristics of text clarity, which is essential for quick and easy communication, through the use of short sentences and easy-to-understand words (Borges & Rech, 2018). Peleias (2017) presents some readability concepts found during his research (Table 1):

Table 1
Readability concepts

Authors (Year)	Definition
Klare (1963)	Users' ease of understanding or comprehending a written text according to its style.
McLaughlin (1969)	Related to the difficulty some people experience when reading and understanding a text's excerpts and the full text.
Gibson and Shroeder (1990)	Quality of writing that results in easy and fast communication.
Chall (1978, apud Jones and Shoemaker, 1994)	The total sum, including interactions, of all those elements within a written material which influence readers' level of success in reading.
DuBay (2004)	It is what makes a text easier to read than others.
Fernandes and Silva (2009)	It does not provide a readability definition; instead, it presents a definition of understandability.
Cunha and Silva (2009)	The quality of writing, which determines how easy to read a text is.
Fakhfakh (2013)	It is a relevant characteristic of writing techniques and communication theories. It concerns how easy a text is to read and be understood.

Source: Peleias (2017).

Given these concepts, Peleias (2017, p. 23) formulates his definition to apply in his research and the accounting field: "readability is the quality of writing linked to the quality of accounting information, the objective of which is to facilitate reading and understanding financial statements, resulting in easier and faster communication of accounting information to its users."

The expectations of users of financial statements may change, given strategies intended to reduce the readability of financial reports and obfuscate information, both in confirming past events and observing present results or future estimates (Cruz Junior, 2018). With such information in hand, managers have the incentive to obfuscate information when a company's performance does not meet expectations, a case when the market's reaction may be less complete when the information provided is less easily extracted from financial statements (Bloomfield, 2002; Li, 2008).

Because of the global movement aimed at improving the disclosure of qualitative information, in 2014, the CPC issued Technical Guidance 07 – *Evidenciação na Divulgação dos Relatórios Contábil-Financeiros de Propósito Geral* [Disclosure in the Dissemination of General Purpose Accounting and Financial Reports]. The OCPC 07 points out that a large volume of information in the explanatory notes causes an increase in transaction costs, impairing decision-making by financial market agents and raising questions regarding the statement's relevance.

The Obfuscation Hypothesis (Courtis, 1998), which suggests that managers are not neutral in presenting reports, is essential for constructing the Incomplete Disclosure Hypothesis presented by Bloomfield (2002). According to this hypothesis, market users are expected to make decisions based on less complete information if the costs of extracting information from the statements are higher than the expected benefits. This hypothesis confirms that managers have more incentives to make it challenging for users to identify information that could negatively affect their companies' stock prices. (Laksmana, Tietz & Yang, 2012.

Recent studies indicate that the statements' readability can affect the quality of information, impacting factors such as increased agency costs, search for information in external sources, the presence of earnings management, low persistence of earnings, low quality of analysts' forecasts, and decreased value-relevance through weak market reactions to annual reports (Li, 2008; Asay, Elliott & Rennekamp, 2017; Lo et al., 2017). Thus, there is a need to understand the factors affecting how companies determine the accounting reports' readability levels (Rodrigues, 2012).

2.2 Earnings management and managerial opportunism

Earnings management refers to the purposeful intervention in the process of preparing external financial statements (Shipper, 1989); i.e., it occurs when managers use discretion in the reporting of financial statements (Healy & Whalen, 1999). As Watts and Zimmerman (1990) mentioned, accounting standards enable managers to make discretionary decisions, allowing them to use their business knowledge to choose accounting procedures, methods, and estimates to record information and influence financial reports. Earnings management does not constitute accounting fraud, as earnings management operates within the limits of the legislation applied to accounting. Thus, company managers explore the aspects where accounting standards give them a certain degree of discretion in choosing how to report results (Martinez, 2001).

The motivations for earnings management are explained from two main perspectives: the opportunistic and the efficiency perspectives. The opportunistic view has been discussed in the accounting literature since 1970, based on Watts and Zimmerman's research, culminating in the positive approach to accounting research. From this perspective, earnings management is considered an opportunistic process in which managers' primary objective is to maximize utility. Therefore, considering conflicts of interest between owners and managers (Jensen & Meckling, 1976), managers' choices are subject to investigation regarding the explanation of performance aspects (Ajina et al., 2016).

As for the perspective of efficiency, Gabriel (2018) argues that managers can make accounting choices to increase the informative value of results and, consequently, reduce agency costs. To reduce these costs, managers can produce more non-financial information and make these disclosures easier for different users, such as creditors and investors, to understand. The ease of reading annual reports is crucial, as they complete the companies' financial information with more details to ground decision-making.

In his literature review on earnings management in Brazil, Martinez (2013) states that this phenomenon goes beyond the quantitative disclosure of accounting information, involving managerial discretion when making accounting choices (recognition and measurement), operational decisions, and selecting criteria to present statements (disclosure).

An important aspect regarding earnings management through accounting choices concerns that managers can influence changes in earnings by discretionally increasing or decreasing accruals. Meanwhile, earnings management through operational decisions involves business-related activities in a company. Roychowdhury (2006) defines management by operational decisions as deviations from normal operational practices, motivated by the managers' desire to mislead the users of information regarding specific financial reporting goals. Such a practice is mentioned in the international literature as real earnings management (Roychowdhury, 2006; Gunny, 2010).

Cupertino (2013) considers that knowing that detecting manipulation by real activities is more complex than that performed by accruals management, managers structure transactions to achieve the desired level of profits. Thus, earnings management by operational decisions occurs when managers manipulate the company's operating activities to increase or reduce earnings for the current period (Gunny, 2010). Note that, although apparently showing results in the short term, management based on operational decisions may reduce a company's value, as actions taken to increase profits in the current period may harm cash flow in the future (Roychowdhury, 2006).

The literature presents opportunistic management behavior through earnings management from different aspects. For example, Baker, Collins, and Reitenga (2003) show that the structure of executive compensation is related to opportunistic behavior in the measurement of discretionary accruals. In addition, the above authors showed that, in previous periods, the granting of stock options used in compensation management motivated a discretionary reduction in accruals.

Ali and Zhang (2015) show that a CEO's tenure is related to earnings management. Their study shows that, at the beginning of a CEO's mandate, the company reports overestimated results compared to the end of the mandate. The authors consider that this behavior can be explained by an attempt among recently hired CEOs to favor the market's perception of their capacity. Consistent with the literature addressing the horizon problem, the above study also shows that, precisely in the last year of the mandate, there is a tendency to overestimate the company's results.

Finally, Godfrey, Mather, and Ramsay (2003) analyzed earnings and impression management jointly. These authors note that there is an increase in profits through earnings management practices when changing CEOs; at the same time in which impression management occurs to favor the image of managers through graphics in financial reports.

2.3 Earnings management and readability

Some studies highlight impression management as an extension of the literature on earnings management. For Rodrigues (2012), this type of management corresponds to an attempt to control the users' perception of information through dissemination methods, such as graphics and illustrations, in annual reports. This type of management may also come from information obfuscation, by emphasizing specific themes to the detriment of others, or by using more complex language in the textual presentation (Bushee, Gow & Taylor, 2018).

As a result of his study, Li (2008) reports that companies tend to produce more difficult-to-read annual reports when they have lower earnings and profitability. Furthermore, bad news tends to be hidden, and one of the ways of concealing bad news is by decreasing the readability of narrative reports (Zurel, 2014).

Lo et al. (2017) verified the relationship between the readability of annual reports and variation in earnings management in 26,967 companies-year registered with the SEC between 2000 and 2012. The authors used the study by Li (2008) as a basis for determining their study design; hence, they used the same readability index and control variables. Upon observation of the discussion and management analysis section of the annual report (MD&A), Lo et al. (2017) concluded that companies suspected of practicing earnings management to exceed the previous year's earnings present more complex annual reports.

Ajina et al. (2016) found evidence that companies that manage their earnings tend to make annual reports less readable. The above study's sample consisted of 163 companies listed on the French stock exchange between 2010 and 2013, with the readability of yearly reports measured by the FOG index and earnings management measured through discretionary accruals, according to the models by Dechow et al. (1995) and Raman and Shahrur (2008). A correlation was also found between the FOG index (readability) and some financial indicators used as control variables: ownership dispersion, profitability, leverage, and company size.

Managers can manage results through accruals and real activities, in addition to the balance sheet or cash flow management. However, the above study focuses on the first two, as they are directly related to the interests of managers (Lo et al., 2017). Companies can also manipulate the content and presentation of narrative information through impression management (Ajina et al., 2016).

Studies present some explanations relating the readability level to the companies' financial performance and divide them into obfuscation and ontology. In the first group, managers try to hide poor performance using more complex sentences, while ontology claims that poor performance is naturally more difficult to communicate (Li, 2008; Bloomfield, 2008; Lo et al., 2017). In this study, we used the aspect concerning the obfuscation hypothesis, which is based on the intervention of managers to influence the statements, making them more complex.

Thus, based on the opportunistic perspective, we assume that managers practicing earnings management in a quest to maximize their utility tend to obfuscate their actions by disclosing complex narrative reports (Ajina et al., 2016; Lo et al., 2017). Hence, the following hypothesis is presented:

H1: Companies with a higher earnings management index in a given year present annual reports with low readability.

In summary, a negative association between earnings management and readability levels may occur for two complementary reasons: both derived from the opportunistic perspective. The first relates to the notion that readability level potentially represents a mechanism by which managers can influence users' impressions regarding their performance. Therefore, low readability would be associated with the same incentives that explain earnings management: utility maximization. Another explanation from the opportunistic perspective for this association would be that earnings management involves using accounting practices that the users can identify. Hence, reducing the level of readability would be a way of obfuscating the methods by which earnings management was practiced.

Note that studies conducted in Brazil to address readability can be subdivided into four groups: i) those examining only the annual reports' readability level (Zobaran, 2019; Miranda et al., 2018); ii) those seeking to highlight a relationship between readability and other variables – determinants (Borges & Rech, 2018; Peleias, 2017; Borges, 2020; Holtz & Santos, 2020); iii) those seeking to verify changes in the readability level after the OCPC 07 was implemented (Silva, 2017; Gomes et al., 2018; Cruz Junior, 2018); and finally, iv) those comparing and treating readability and understandability as distinct concepts (Telles, 2018). This study falls into the second group, as it observes the relationship between readability and earnings management. Although Rocha and Mont-Mor (2022) present a similar proposition, the report object of analysis used in the previously mentioned study was a press release, the characteristic of which is a less standardized structure than that of explanatory notes.

3. Method

3.1 Study design

This is a descriptive study based on a documental analysis with a quantitative approach, using panel data regression analysis to test the hypotheses regarding the relationship between earnings management and financial statements' readability.

Exploratory studies were performed on bibliographic sources to identify the current state of the art and provide an overview of the subject addressed here. Therefore, Ajina et al. (2016) and Lo et al. (2017) ground this study's development with the econometric model adapted according to the Brazilian literature and data availability in Brazil. Additionally, based on several studies addressing readability, this study adopts control variables presented as characteristics that may influence the readability of financial statements, as discussed in the following subsections.

3.2 Population and sample

This study's population comprises open companies listed on [B]³. This market was chosen due to the absence of empirical evidence regarding the research problem proposed here in the emerging market scenario (Hassan et al., 2019). Initially, 310 companies headquartered in Brazil with an active registration at [B]³ and CVM were identified.

The timeframe chosen comprises 2010 to 2018. The initial period is characterized by different disclosure requirements, with the mandatory adoption of IFRS and the review of accounting pronouncements by the CPC (Borges & Rech, 2018). The initial sample had 400 companies listed on [B]³ in 2018; those that did not present all the necessary data to be included in this study were removed from the sample. A total of 232 companies were identified with missing data in at least one variable in the company-year observations and were excluded from the sample. Additionally, the software used to convert the original files of the explanatory notes from PDF to DOCX could not convert some of the files. For this reason, the explanatory notes of 47 companies failed to be converted, and these companies were also removed from the sample. Thus, 121 companies with 1,089 observations remained in the sample.

3.3 Data collection

The quantitative information required to compose the econometric model is provided in the companies' financial statements and was collected using the Economática software. In addition, narrative information was collected on the website of Professor Tatiana Albanez (https://www.tatianaalbanez.com), which provides various data on Brazilian companies, among which all the explanatory notes were obtained directly from the website of the Brazilian Securities and Exchange Commission (CVM) in PDF format. Elements that cannot be measured for readability were removed, such as headers, footnotes, single-line paragraphs, titles, tables, charts, and graphics (Li, 2008).

This study used the Pylinguistics program (Castilhos, 2016), free, open-source software for natural language analysis in English and Portuguese, to determine readability indices. This software features an accuracy of 97.33% in the processing and syntactic analysis of texts in Portuguese by using Natural Language Processing based on specific neural networks to analyze texts in Portuguese.

Based on an extensive literature review, the characteristics of companies that can influence the statements' readability level were identified and were used as control variables. For example, companies showing results below the expected (profitability), growth (market-to-book), or larger-scale operations (size) tend to present more complex reports, therefore, are more challenging to read (Li, 2008; Rutherford, 2003). Meanwhile, companies that need to meet greater transparency requirements (listed on the new market), or audited by companies that require high-quality levels (big four), or with less information asymmetry because they have been listed on the stock market for longer (publicly traded), are expected to present easier to read annual reports (Li, 2008; Silva, 2017; Borges and Rech, 2018).

Table 2 briefly presents the variables adopted here, their calculation method, and the previous studies supporting their use.

Table 2
Study variables

Variable	Acronym	Calculation method	Previous Studies
Readability	Leg	Adapted Flesch index (Martins et al., 1996)	Telles (2018)
Accrual-based earnings management	GRA	Modified Jones (Dechow et al., 1995)	Lo et al. (2017), Hasan (2018) and Gabriel (2018)
Real Earnings Management	GRR	Expense management (Roychowdhury, 2006)	Lo et al. (2017)
Profitability	ROA	Ratio of net income to total assets	Li (2008); Ajina et al. (2016) and Hesarzadeh, Bazrafshan and Rajabalizadeh (2019).
Corporate Governance	GC	Dummy, assumes 1 for companies in the new market and 0 otherwise.	Silva (2017) e Borges and Rech (2018).
Audit	BigFour	Dummy, assumes 1 for companies audited by a Big Four and 0 otherwise.	Silva (2017); Borges and Rech (2018) and Hesarzadeh et al. (2019).
Time since the company went public	TCA	Difference between the year of observation and the year the company was registered on the Brazilian Stock Exchange.	Li (2008); Silva (2017); Lo et al. (2017); Hasan (2018); Borges and Rech (2018) and Hesarzadeh et al. (2019).
Market-to-Book	MtB	Ratio between market value plus total liabilities and total assets.	Li (2008), Lo et al. (2017), Hasan (2018)
OCPC 07	OCPC	Dummy, assumes 1 for observation after OCPC 07 (2014) and 0 otherwise.	Silva (2017) e Gomes, Ferreira and Martins (2018).
Company's size	Tam	Natural logarithm of total assets.	Li (2008); Lo et al. (2017); Hasan (2018); Borges and Rech (2018); Hasan (2018) and Hesarzadeh et al. (2019).

Source: developed by the authors (2022).

3.4 Data analysis

As previously mentioned, the dependent variable, Readability, was measured using the adapted Flesch index (Martins et al., 1996). The Flesch index, adapted to Portuguese by Martins et al. (1996), considers that the Portuguese language has, on average, larger words with more syllables than English. Thus, the original index would not reveal a parameter adequate to the context of the language assessed here, requiring the addition of 42 points in the final score for texts in Portuguese (Castilhos, 2016; Telles, 2018).

Note that in this study, readability is understood as the quality that determines the ease of reading a text, not to be confused with the concepts of complexity and understandability, which also depend on readers' intrinsic characteristics and the way one decodes a given text (Borges, 2020). According to Martins et al. (1996), texts with indices between 0 and 25 are considered very difficult to read; between 25 and 50, reasonably difficult; 50 and 75, easy; and between 75 to 100 are considered very easy to read.

The independent variable Earnings Management was measured using two different methods: 1) the Modified Jones model (Dechow et al., 1995) for accruals management, with total accruals measured by the Cash Flow approach, and; 2) the discretionary expenditure method (Roychowdhury, 2006) for real management.

The relationship between Earnings Management and Readability is expected to be negative, as managers who most frequently manipulate via accounting or operational decisions are expected to increase the level of readability difficulty, obfuscating their actions in narrative reports and decreasing readability levels (Ajina et al., 2016; Lo et al., 2017). To test the study hypotheses, the multiple linear regression model grounded the ordinary least squares method, as indicated by Lo et al. (2017) and also adopted by Ajina et al. (2016). Equations (1) and (2) demonstrate the model adopted.

$$Leg_{it} = \beta_0 + \beta_1 GRA_{it} + \beta_2 ROA_{it} + \beta_3 GC_{it} + \beta_4 BigFour_{it} + \beta_5 TCA_{it} + \beta_6 MtB_{it} + \beta_7 OCPC_{it} + \beta_8 Tam_{it} + \varepsilon_{it} \quad (1)$$

$$Leg_{it} = \beta_0 + \beta_1 GRR_{it} + \beta_2 ROA_{it} + \beta_3 GC_{it} + \beta_4 BigFour_{it} + \beta_5 TCA_{it} + \beta_6 MtB_{it} + \beta_7 OCPC_{it} + \beta_8 Tam_{it} + \varepsilon_{it} \quad (2)$$

Where each variable corresponds to company *i* in period *t*, where Leg refers to the Readability level; GRA refers to the Accrual-based Earnings Management level; GRR, Real Results-based Management level; ROA, is the Profitability Index; GC is a dummy for the Corporate Governance level; BigFour is a dummy for the accounting firms; TCA, Time since the company went public; MtB, the market-to-book ratio; OCPC, dummy for observations pre- or post-OCPC 07; Tam, Company Size; and ε is the regression residual.

Similar to previous studies (Li, 2008; Lo et al., 2017), we adopted the estimation of coefficients through panel data regression by fixed effects controlled by sector and year. Cupertino (2013) notes that after the IFRS was implemented in Brazil, the level of accruals manipulation decreased, while management by operational decisions increased, though both may co-occur. Since companies can concomitantly or complementarily use accruals management and management by operational activities, an econometric model similar to the one tested in the study above is proposed below, though it incorporates both types of manipulations; after all, the omission of one of the variables may impact the results:

$$Leg_{it} = \beta_0 + \beta_1 GRA_{it} + \beta_2 GRR_{it} + \beta_3 ROA_{it} + \beta_4 GC_{it} + \beta_5 BigFour_{it} + \beta_6 TCA_{it} + \beta_7 MtB_{it} + \beta_8 OCPC_{it} + \beta_9 Tam_{it} + \varepsilon_{it} \quad (3)$$

Additionally, a dummy variable (GR+) was included in models 1 and 2 to verify whether the companies that most frequently use earnings management behave differently regarding readability compared to the other companies. The value 1 was assigned to companies with earnings management in the upper quartile relative to the median (percentile above 75%).

$$Leg_{it} = \beta_0 + \beta_1 GR_{it} + \beta_2 GR + {}_{it} + \beta_3 GR_{it} * GR + {}_{it} + \beta_4 ROA_{it} + \beta_5 GC_{it} + \beta_6 BigFour_{it} + \beta_7 TCA_{it} + \beta_8 MtB_{it} + \beta_9 OCPC_{it} + \beta_{10} Tam_{it} + \varepsilon_{it} \quad (4)$$

4. resentation of Results

4.1 Descriptive statistics

Table 3 presents information regarding this study's variables to facilitate an understanding of their behavior. Measures of central tendency (mean), dispersion (standard deviation), and range (minimum and maximum values) are presented:

Table 3
Descriptive statistics

Variable	Mean	Standard deviation	Minimum	Maximum
Leg	16.6534	4.5816	0.8774	39.4554
GRA	0.0599	0.0671	0.0009	0.3620
GRR	0.0210	0.0295	0.0002	0.1926
ROA	0.1263	0.1298	-1.6019	0.4661
TCA	16.4628	8.7420	1	32
MtB	1.3834	0.9466	0.3501	12.2986
Tam	21.9951	1.7508	16.5465	27.5258

Note: Binary variables were omitted.
Legend: Leg = Readability; GRA = Accrual-based earnings management; GRR = Real-based earnings management; ROA = Return on assets; TCA = Time since the company went public; MtB = Market-to-Book; Tam = Company size.

Source: developed by the authors (2022).

The dependent variable "Leg" presented a mean of 16.65 points on the Flesch scale adapted to Portuguese (Martins et al., 1996), revealing that the explanatory notes of the companies listed in [B][3] have, on average, texts considered "very difficult" to read. The lowest score for this variable was 0.88, and the highest was 39.46, reinforcing that texts are classified as "difficult" or "very difficult" to read. These results are similar to those found in Brazilian studies, such as Silva (2017), Borges and Rech (2018) and Borges (2020), and also studies addressing samples from abroad, such as Li (2008), Ajina et al. (2016) and Lo et al. (2017).

As for the primary dependent variables measuring the level of earnings management (GRA and GRR), evidence of outliers was identified, and, therefore, the winsorization procedure was adopted for these variables. The standard deviation presents values close to the mean, which indicates that there may be dispersion in the observations, reflected in the distance between the minimum and maximum values.

The binary variables, not reported in the table, presented the following information: 44% of the company-year observations are listed on the New Market; Big Four companies audited 77% of the explanatory notes; and 56% of explanatory notes were issued after OCPC 07 (2014).

In addition to the descriptive statistics, a correlation matrix was performed to measure the relationship between the variables, as shown in Table 4. This test seeks to identify the degree of association between the studied variables through Pearson's correlation.

Table 4
Correlation Matrix

Variable	Leg	GRA	GRR	ROA	GC	Big Four	TCA	MtB	OCPC	Tam
Leg	1.000									
GRA	-0.063*	1.000								
GRR	0.002	0.152*	1.000							
ROA	0.063*	-0.377*	-0.071*	1.000						
GC	0.119*	-0.040	-0.006	0.068*	1.000					
BigFour	0.214*	-0.184*	-0.032	0.251*	0.249*	1.000				
TCA	-0.074*	0.007	-0.023	-0.116*	-0.618*	-0.226*	1.000			
MtB	0.092*	0.084*	0.056	-0.108*	0.091*	0.034	-0.061*	1.000		
OCPC	0.004	0.015	-0.011	-0.179*	0.025	-0.082*	0.256*	-0.062*	1.000	
Tam	0.215*	-0.228*	-0.146*	0.177*	0.043	0.420*	0.089*	-0.113*	0.042	1.000

Note: *Significant correlation at 5%
Legend: Leg = Readability; GRA = Accrual-based earnings management; GRR = Real-based earnings management; ROA = Return on Assets; GC = Corporate Governance; BigFour = Auditing firm; TCA = Time since the company went public; MtB = Market-to-Book; OCPC = OCPC 07 (2014); Tam = Company size.

Source: developed by the authors (2022).

A low correlation is found between the accrual and real earnings management levels and the readability index. the latter being a non-significant relationship. This result suggests that changes in the earnings management level due to operational decisions would not significantly change the readability of the explanatory notes of the same observation in the sample. Nonetheless, an increase in the earnings management level due to accounting choices could be related to decreased readability.

All the variables representing characteristics of the company-year observations (profitability, corporate governance, auditing firm, time since went public, market-to-book, and size) showed a low significant correlation with the readability index, indicating that these factors are associated with the ease of reading the explanatory notes; however, they do not present a linear relationship.

4.2 Multivariate statistics

Initially, tests for violation of statistical assumptions were performed, as shown in Table 5, assuming that the residuals have a normal distribution based on the Central Limit Theorem.

Table 5
Violation test of statistical assumptions

Assumptions (Null hypothesis)	Test Performed	Model 1	Model 2	Model 3
Incorrect specification	F	0.000	0.000	0.000
Homoscedasticity	Wald	0.000	0.000	0.000
No serial autocorrelation	Wooldridge	0.000	0.000	0.000
Cross-sectional independence	Pesaran	0.517	0.608	0.511

Source: developed by authors (2022).

The Wald test was used to verify the assumption of homoscedasticity, and the Wooldridge test for serial non-autocorrelation. The null hypothesis was rejected in both tests so that the presence of heteroscedasticity and serial autocorrelation was identified for all models proposed relative to the sample assessed. Therefore, robust statistical tests were required for these characteristics, and the "Sandwich" estimator proposed by Huber-White (Huber, 1967; White, 1980) was chosen for this study. None of the variables presented a multicollinearity relationship (factor greater than 10) in the three models tested in this study through the VIF test.

Table 6
Earnings management and readability

Variables	Predicted sign	Coefficient (Standard-Error)				
		Model 1		Model 2		Model 3
Constant		3,1308 (2,219)	3,730 (2,222)	2,6083 (2,241)	2,4694 (2,275)	2,5680 (2,251)
GRA	–	0,5567 (2,102)	-3,213 (7,459)	–	–	0,2344 (2,132)
GRR		–	–	7,2405 (4,086)	-10,952 (23,979)	7,1914 (4,130)
GR+		–	-1,1818 (0,617)	–	0,5175 (0,528)	–
GR * GR+		–	9,0219 (8,203)	–	12,3789 (24,620)	–
ROA	+	0,7748 (1,057)	0,9060 (1,053)	0,8241 (1,024)	0,9526 (1,026)	0,8598 (1,066)
GC	+	0,4764 (0,372)	0,4701 (0,371)	0,5003 (0,373)	0,5164 (0,371)	0,5016 (0,374)
BigFour	+	1,0512 (0,372)*	1,0939 (0,372)*	1,003 (0,373)*	0,9555 (0,366)*	1,0052 (0,373)*
TCA	+	-0,0484 (0,023)*	-0,0501 (0,023)*	-0,0488 (0,023)*	-0,502 (0,023)*	-0,0488 (0,023)*
MtB	–	0,5878 (0,130)*	0,5562 (0,129)*	0,5944 (0,130)*	0,5954 (0,130)*	0,5935 (0,131)*
OCPC	+	0,8718 (0,601)	0,9181 (0,603)	0,8920 (0,601)	0,9051 (0,598)	0,8942 (0,600)
Tam	–	0,4717 (0,099)*	0,4534 (0,100)*	0,4883 (0,101)*	0,4980 (0,101)*	0,4893 (0,100)*
Adjusted R^2:		0,1209	0,1236	0,1228	0,1250	0,1228
Fixed effects according to		Sector and Year		Sector and Year		Sector and Year

Note: *Significant correlation at 5%
Legend: Leg = Readability; GRA = Accrual-based earnings management; GRR = Real-based earnings management; GR+ = Earnings management above the upper quantile of the median; ROA = Return on Assets; GC = Corporate Governance; BigFour = Auditing firm; TCA = Time since the company went public; MtB = Market-to-Book; OCPC = OCPC 07 (2014); Tam = Company size.

Source: developed by the authors (2022).

The p-significance test found in the analysis of models 1 and 2, which individually test each type of earnings management, indicates that we cannot reject the null hypothesis that the estimated coefficient is equal to zero. That is, the evidence found is not sufficiently strong to indicate a relationship between the earnings management level and the ease of reading the explanatory notes.

Including the dummy variable (GR+) in models 1 and 2 to verify the behavior of the companies that most frequently manage earnings showed no statistical significance for the GR+ variable nor the interaction of this variable with the Earning Management variable (GRA or GRR). Therefore, no evidence was found that companies that most frequently adopt earnings management behave differently from other companies.

The third test proposed in this study sought to verify the relationship between the two types of earnings management and the readability of explanatory notes, considering that managers may concomitantly (complementarily) adopt accounting choices and operational decisions to manage earnings. Similar to the results presented in the previous models, model 3 reports equal relationships, both for the main independent variables and control variables, with no change in sign or statistical significance.

The relationships between the control variables and readability evidenced by this model's coefficients are consistent with Pearson's correlations in the correlation matrix. Regarding the companies' characteristics, statistical significance (5%) was found for the variables representing the auditing company group, time since the company went public, market-to-book, and company size. Concerning the Profitability and Corporate Governance variables, we cannot state that these influence the level of readability.

Regarding the sector, we used the financial sector as a comparison parameter (not including its dummy variable to avoid perfect multicollinearity). The coefficients of all the remaining sectors were positive, indicating that companies in the financial sector tend to present explanatory notes that are more difficult to read. This result may be due to specific regulatory agency requirements for this sector or vocabulary, expressions, or information needs inherent to the financial activity. On the other hand, the basic materials sector presents the highest coefficient, resulting in a greater easiness of reading. Nonetheless, the difference per sector would correspond to approximately 1 point in the Flesch index, on average, meaning that the classification of reading difficulty would not change.

Different tests were performed as a robustness analysis with the following characteristics: 1) box cox transformation in the dependent variable (Leg) to reach the normal distribution of the residuals; 2) using earnings management variables without winsorization; and 3) using the dependent variable according to the Flesch index measured by Microsoft Word. The results of all the tests revealed that the sign and significance of the coefficients of each significant variable in Table 6 had the same direction as previously reported, confirming the robustness of this study's findings.

5. Discussion of Results

This study proposed the hypothesis "Companies with a higher earnings management index in a given year present annual reports with lower readability." Three different econometric models were used to analyze this relationship, involving both earnings management through accounting choices (accrual) and operational choices (real). However, no statistically significant association was found between this study's main variables, i.e., Readability and Earnings Management, when analyzing data from the companies listed in [B][3]. Therefore, no evidence was found to support the research hypothesis proposed here.

Such a fact gives rise to the need to broaden horizons on topics involving the readability of accounting narratives. More specifically, regarding the relationship between earnings management and readability, current literature presents arguments based on the opportunistic perspective (Ajina et al., 2016; Lo et al., 2017) under the premise that individuals act opportunistically for their benefit, depending on the conditions in which they are inserted. Therefore, those elaborating financial statements are seen as individuals with interests that diverge from those of other users, and their actions would seek personal benefits, increasing agency costs (Jensen and Meckling, 1976).

However, not confirming the hypothesis tested in this study raises questions about the motivations of those preparing financial statements and the possibility of discussing it from different perspectives. For example, when it comes to earnings management from the perspective of efficiency, Jiraporn, Miller, Yoon, & Kim (2008) note that managers may use accounting method choices to mitigate distorted information due to the application of "accounting principles" (Generally Accepted Accounting Principals) that do not reflect the economic context of a given company's business. Still, from the efficiency perspective, Scott (2003) explains that the opportunistic actions of managers can be limited through remuneration and internal control contracts, motivating them to select accounting procedures that reduce capital and contractual costs, to minimize the firms' risk.

As this study was based on Ajina et al. (2016) and Lo et al. (2017), it did not analyze earnings management from the efficiency perspective. Therefore, there is an opportunity to discuss and analyze the management of good and bad earnings management and its relationship with the readability of explanatory notes.

Still, on the possibility of choices during the accounting information disclosure process, Hesarzadeh et al. (2019) argue that readability measured by indices (e.g., Flesch or Gunning) can be composed of companies' intrinsic factors and part of the managers' choices. That said, and based on studies addressing readability and accounting information quality, the authors above divide readability into two parts: innate readability and discretionary readability. Discretionary readability can be measured using readability regression residuals that include intrinsic factors as explanatory variables, similar to earning quality and earnings management models.

Following the measurement of readability according to Brazilian studies and Ajina et al. (2016) and Lo et al. (2017), this study did not distinguish between innate and discretionary readability. Therefore, studying the relationship between earnings management and discretionary readability may present different results from those found here and possibly help explain the potential reasons for refuting the research hypothesis.

Note that the behavior of those preparing statements can be influenced by what users expect from such information, as the institutional theory advocates. The institutional approach enables understanding the organizations' motivations to adopt policies and choices that traditional models cannot always explain. The factors determining the adoption of these policies may be related to external factors (Dias Filho & Machado, 2004). Thus, organizations may assume one or another stance due to what is considered to be better or more appropriate, following the efficiency and legitimacy perspectives.

In the same sense, we assume that managers are aware that the level of readability may influence users' decisions. According to the efficient market hypothesis (Fama, 1970), the market impartially reflects the information available to economic agents. More recently and within the context of readability, Asay et al. (2017) found that an increased difficulty in reading statements leads to the search for information from external sources, increasing transaction costs. Therefore, those elaborating explanatory notes would be less motivated to increase the difficulty of reading statements since market agents have other sources of information available.

This subsection presented some possible approaches that give rise to discussions regarding the relationship between earnings management and the readability of the explanatory notes based on the refutation of the hypothesis proposed in this study and the current literature on the subject. However, note that these points currently require further research on the Brazilian context to test what was discussed here; hence, more studies are needed.

In this sense, Rocha and Monte-Mor (2022) recently presented a paper at a conference highlighting the relationship between readability and the readability of Brazilian companies' press releases. Their results indicate a negative and significant relationship; that is, greater earnings management practice is related to reports' low readability. The divergence between the study previously mentioned and what was reported here in the previous section may be explained by the use of different reports. A press release provides managers with greater freedom compared to explanatory notes. Hence, perhaps financial statement developers face greater difficulty implementing textual manipulations in explanatory notes.

6. Final Considerations

This study aimed to verify the relationship between the level of readability of explanatory notes and earnings management practices under the hypothesis that "companies with a higher earnings management index in a given year present annual reports with low readability." Hence, companies listed in [B][3] between 2010 and 2018 were included in the sample, excluding those without all the necessary data in the period under analysis.

An econometric model of multiple linear regression based on the studies by Ajina et al. (2016) and Lo et al. (2017) was used to perform this analysis. It was adapted for the Brazilian context, given its particularities and the specific objectives proposed. Similar to the previous studies, the coefficients were estimated using panel data regression by fixed effects controlled by sector and year.

The results indicate no evidence supporting the research hypothesis, as it was impossible to identify a statistically significant relationship between readability and earnings management in the three econometric models tested to analyze this relationship. Note that publicly traded companies have large organizational structures so that different people or groups of people may perform the processes involving operational and accounting decisions and the preparation of statements. Therefore, from an opportunistic perspective, these processes may lead to results aligned with the interests of each group.

By not finding a result favorable to the research hypothesis in the light of the opportunistic perspective (Ajina et al., 2016; Lo et al., 2017), the motivations of those preparing financial statements are questioned from different perspectives. As an alternative, based on the efficiency perspective, managers can use discretion to make accounting choices intended to mitigate distortions caused by applying standards that do not reflect the economic context of a given company's business (Jiraporn et al., 2008). Additionally, the discussion proposed in this study raises the possibility of finding different results if discretionary readability were considered (Hesarzadeh et al., 2019). Discretionary readability was not analyzed here, nor did the studies grounding the adopted econometric model (Ajina et al., 2016; Lo et al., 2017).

As for the companies' characteristics, the variables that represent the group of auditing firms, time since the company went public, market-to-book and company size are statistically significant (5%). Thus, among the analyzed variables, only these influenced the easiness of reading the explanatory notes in the sample analyzed here.

As a limitation, we emphasize that this study comprises the study of publicly traded companies listed in [B][3]. Therefore, the results cannot be extrapolated to other scenarios like privately held companies, different timeframes, or different economic environments. Furthermore, the readability factors analyzed here are not based on ontological or semantic aspects; therefore, one cannot make inferences about the texts' understandability.

This study's results are expected to support the accounting regulation process by providing information about readability and the behavior of those preparing financial statements. It presents evidence that the managers' potential opportunistic behavior may not lead to a variation in the degree of readability of explanatory notes, making them less prone to textual manipulations and, consequently, less information bias. As for external users who rely on annual reports to assess the companies' current performance and prospects, these results may influence the perception of investors, financial analysts, and creditors and expand the elements of analysis in decision-making by suggesting greater reliability of the informational content of explanatory notes and making them a source of information with greater reliability potential regarding the events it intends to communicate and provide further clarification.

Additionally, this study is expected to contribute to improving the knowledge about readability in the Brazilian accounting context. However, this study does not exhaust the discussion on this topic. Hence, based on the results, research limitations, and gaps in the Brazilian context, future studies are suggested, applying methodologies to explore the characteristics discussed in section 5, such as analysis of good and bad earnings management and its association with the readability of explanatory notes; and the relationship between earnings management and discretionary readability.

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Appendix A

Table 7

How readability progressed over time

Year	Mean Readability	Standard deviation
2010	16.1424	5.1279
2011	16.7616	4.7446
2012	16.8752	4.4765
2013	16.7635	4.4652
2014	16.7833	4.5451
2015	16.6566	4.4033
2016	16.4375	4.3247
2017	16.9075	4.8382
2018	16.5532	4.3478
Total	16.6534	4.5816

Source: developed by the authors (2022).

Appendix B

Table 8

Robustness Tests box cox on the dependent variable (Leg)

Variables	Predicted sign	Coefficient (Standard Error)	
		Model 1	Model 2
Constant		-2,6696 (0,441)*	-2,7734 (0,446)*
GRA	–	0,1279 (0,460)	–
GRR		–	1,5868 (0,890)
ROA	+	0,1742 (0,231)	0,1842 (0,224)
GC	+	0,1044 (0,0810)	0,1096 (0,081)
BigFour	+	0,2306 (0,081)*	0,2201 (0,081)*
TCA	+	-0,0106 (0,005)*	-0,0108 (0,005)*
MtB	–	0,1287 (0,129)*	0,1301 (0,028)*
OCPC	+	0,1936 (0,132)	0,1980 (0,131)
Tam	–	0,1027 (0,022)*	0,1063 (0,022)*
Adjusted R^2		0,1216	0,1236
Fixed effects according to		Sector and Year	Sector and Year

Note: *Significant correlation at 5%
Legend: Leg = Readability; GRA = Accrual-based earnings management; GRR = Real-based earnings management; ROA = Return on Assets; GC = Corporate Governance; BigFour = Auditing firms; TCA = Time since the company went public; MtB = Market-to-Book; OCPC = OCPC 07 (2014); Tam = Company size.

Source: developed by the authors (2022).

Appendix C

Table 9

Robustness tests without winsorization

Variables	Predicated sign	Coefficient (Standard Error)	
		Model 1	Model 2
Constant		4,6150 (2,036)*	4,5269 (2,018)*
GRA	–	0,0000 (0,000)	–
GRR		–	0,0000 (0,000)
ROA	+	0,8653 (1,129)	0,6827 (1,014)
GC	+	0,4735 (0,371)	0,4703 (0,372)
BigFour	+	1,0502 (0,372)*	1,0600 (0,372)*
TCA	+	-0,0486 (0,024)*	-0,048 (0,024)*
MtB	–	0,5688 (0,140)*	0,5920 (0,130)*
OCPC	+	0,8791 (0,602)	0,8430 (0,604)
Tam	–	0,4655 (0,100)*	0,4681 (0,100)*
Adjusted R^2		0,1210	0,1215
Fixed effects according to		Sector and Year	Sector and Year

Note: *Significant correlation at 5%

Legend: Leg = Readability; GRA = Accrual-based earnings management; GRR = Real-based earnings management; ROA = Return on Assets; GC = Corporate Governance; BigFour = Auditing firms; TCA = Time since the company went public; MtB = Market-to-Book; OCPC = OCPC 07 (2014); Tam = Company size.

Source: developed by the authors (2022).

Appendix D

Table 10

Robustness tests with Flesch index measured in Microsoft Word

Variables	Predicated sign	Coefficient (Standard Error)	
		Model 1	Model 2
Constant		26,7942 (1,462)*	26,8870 (1,449)*
GRA	–	-0,0000 (0,000)	–
GRR		–	0,0000 (0,000)
ROA	+	-1,6134 (0,780)*	-1,4482 (0,713)*
GC	+	0,0614 (0,2450)	0,060 (0,245)
BigFour	+	0,7330 (0,273)*	0,7420 (0,274)*
TCA	+	-0,0357 (0,0157)*	-0,0356 (0,016)*
MtB	–	0,3902 (0,101)*	0,3718 (0,096)*
OCPC	+	0,6706 (0,441)	0,6689 (0,441)
Tam	–	0,3633 (0,0719)*	0,3592 (0,072)*
Adjusted R^2		0,1312	0,1315
Fixed effects according to		Sector and Year	Sector and Year

Note: *Significant correlation at 5%
Legend: Leg = Readability; GRA = Accrual-based earnings management; GRR = Real-based earnings management; ROA = Return on Assets; GC = Corporate Governance; BigFour = Auditing firms; TCA = Time since the company went public; MtB = Market-to-Book; OCPC = OCPC 07 (2014); Tam = Company size.

Source: developed by the authors (2022).