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Readability in the earnings releases of Brazilian Publicly-Held Companies

ABSTRACT

Objective: Explore the determinants of readability in the earnings releases of publicly traded Brazilian companies.

Method: The study was carried out in the entities belonging to the Brazil Broad-Based Index (IBrA) between 2010 and 2019, with quarterly documents. Financial and accounting data were collected in the Economática database, while company reports (releases) were collected manually on the companies' investor relations websites (IRs) for the entire analysis period. Readability was estimated using the Fog index and the extent of the reports, according to Li (2008). In addition, two econometric models were estimated on panel data with Fixed Effects.

Originality/Relevance: In examining a report (release of results) until then, underexplored and that has its particularities, in addition to a broad and quarterly sample, this work differs from the previous ones.

Results: In general, the research indicated that companies with a high market-to-book ratio, older and known by the market, smaller concerning their market value, with greater shareholding concentration, in addition to low fluctuations in their quarterly earnings, issue reports that are more readable and less complex.

Theoretical/Methodological contributions: The findings here reinforce the importance of readability as a tool for efficient corporate disclosure and depict how the entity can use this element in favor of the company.

Keywords: Readability. Fog Index. Capital Markets. IBrA. determinants.

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1 INTRODUCTION

The management obfuscation hypothesis (MOH) argues that managers are encouraged to obfuscate information to the market when the company's performance is below expectations, as agents may react with the late incorporation of information contained in complex disclosures (Bloomfield, 2002). The assumption behind this argument is that information that is more costly to process is less reflected in security prices (Grossman & Stiglitz, 1980). In this sense, management may strategically want to hide adverse information through less transparent disclosures, creating a fog in its disclosure (Bloomfield, 2002).

Usually, corporate disclosure involves three elements: content (what), timing (when), and presentation (how), whose usefulness depends on readability and understanding (Ajina et al., 2016; Courtis, 2004). In this regard, readability, in general, is the ability to assimilate and interpret a given text, characterized by clear and sharp writing that is easy to understand (Li, 2008).

In this regard, the fog index (fog index) is conventionally applied in research to estimate the readability of a given textual corpus (Bonsall et al., 2017). The first to use the Fog Index in financial research, Li (2008) explores the relationship between readability and company performance, associating the readability of the annual report, company performance, and earnings persistence. Li (2008) states that the reports of companies with lower profits are more difficult to read (that is, they have a higher fog index and are more extensive), corroborating the management obfuscation hypothesis. Additionally, companies with easier-to-read reports report more persistent earnings.

Subsequently, Lo et al. (2017) investigated how the readability of reports varies concerning the practice of earnings management. The authors concluded that companies are more likely to manage earnings to exceed prior period earnings, have more complex disclosures, and that managers strategically use corporate disclosure to mislead or influence investors about firm value.

Like Li (2008) and Lo et al. (2017), other researchers, such as Ajina et al. (2016), Loughran and McDonald (2014), and Souza et al. (2019), use a list of variables that may or may not be related to the readability levels of companies around the globe. Among them, we can mention company size, market-to-book index, age, business volatility, liquidity, the complexity of operations, shareholding concentration, and leverage, among other items. However, none of these studies have determinants as the center of the study, but rather as a control variable in their econometric models.

The research on this topic is essentially focused on the complexity of financial statements, particularly the 10-K report and the M&A section, for the North American market (Li, 2008). However, studies on the complexity of other types of reports and disclosure forms are still at an early stage. In this way, Guay et al. (2016) highlight the relevance of research that encompasses other reports, such as press releases and teleconferences, since the causes and consequences of complexity probably vary according to the type of disclosure.

Based on the arguments above and to explore an identified research gap, this study aims to explore the determinants of readability of earnings releases in the Brazilian capital market. The choice for the earnings release was to study its peculiar characteristics: disclosure is voluntary since no legislative body obliges its publication; a summary of all the results reported by the companies in the period; and are not audited or supervised by regulatory agencies.

This environment provides more discretion for companies concerning which information will be highlighted and how it will be communicated to their stakeholders, opening a greater margin for the presence of print management in these reports. For example,

in their studies, Lang and Lundholm (2000) found evidence of the strategic use of communication techniques to influence investors' perceptions of the company's performance. Similarly, Guillamon-Saorin et al. (2017) found evidence of press releases as a tool and print management by European companies.

About the differential of research focused on the linguistic aspect, Silva and Fernandes (2009) state that studies involving narrative texts in accounting are still incipient. Moreno and Casasola (2016) refer that the reports of readability studies are predominantly written in English and that other languages, such as Portuguese, have been little explored, which reinforces the pertinence of the research. For the company, improved readability can reduce costs and agency conflicts (Li, 2008) and increase trust and credibility among creditors and investors (Guay et al., 2016; Loughran & McDonald, 2014). As far as stakeholders are concerned, the survey can be relevant to their financial decision-making process. Empirical evidence indicates that investors are affected by the readability of annual reports, particularly regulators, investors, and analysts (Lehavy et al., 2011; Li, 2008).

When defining information quality, readability should be considered, as it can establish confidence in stock markets and attract investors (Ajina et al., 2016). In addition, Lo et al. (2017) refer that clarity is an indispensable component of published financial statements since, according to the authors, it is based on this clarity that stakeholders of financial statements can interpret them and make their decisions.

It is important to emphasize that, although there are other studies in Brazil with a similar objective, this one differs due to some factors, among them: (i) analysis based on multiple regression with fixed effects for year and sector, according to international literature; (ii) increase in the number of determinants; (iii) sample composed of observations with a longer period and use of quarterly data; (iv) use of the Fog Index and length of reports as a proxy for readability; and (v) analysis of the readability of a report (release of results), until then, little explored.

2 THEORETICAL REFERENCE

2.1 Earnings release

The quantitative aspect present in financial reports gives investors an incomplete view of a company's economic environment, given that, in order to be used, quantitative information needs to be initially codified and subsequently processed by market agents (Fiske & Taylor, 1991; Huang et al., 2014).

For investors to have a holistic view of the company's economic and financial situation, a qualitative (non-financial) analysis of the reports is also necessary, aiming to improve the quality of the published quantitative information (Souza & Silva, 2020).

Lo et al. (2017) argue that the textual narrative represents most of the disclosure in a typical corporate report, while the rest consists of numbers and representations of quantitative data. In this sense, the readability and tone of the disclosure are tools for analysis by information users (Loughran and McDonald, 2016).

A significant part of financial research commits its efforts to the quantitative aspects. However, there is a growing interest in the non-financial aspect of various reports, such as specific sections of 10-K reports, earnings press releases, management reports, conference calls, and material facts. (Huang et al., 2014; Kim et al., 2019; Souza & Silva, 2020).

The press release is the report issued by publicly-held companies on a quarterly and voluntary basis to update interested parties regarding the company's situation. The report contains, among other information, announcements of results and perspectives of managers

concerning the company's performance (Davis et al., 2012; Kim et al., 2019). This report is not subject to external audit scrutiny, and managers have more discretion in its preparation (Huang et al., 2014).

In Brazil, although there is no law or regulation governing the disclosure and content of the earnings release, the listing segment with the highest level of corporate governance (Novo Mercado) of the Stock Exchange - B3 - requires simultaneous disclosure, in English and Portuguese, of press releases of results. It is inferred, therefore, that despite the initially non-mandatory character, the market interprets the press release disclosure as a good governance practice on the part of companies.

Furthermore, the information in earnings releases has increased significantly over time (Collins et al., 2009; Souza & Silva, 2020). In their studies, Davis et al. (2012) found that managers use language (positive/negative) throughout the press release to signal their expectations for the company's future performance in the market, which respond to this signal.

On the national scene, Souza e Silva (2020), when verifying whether publicly traded Brazilian companies manipulate their qualitative information by managing the tones in their earnings releases, concluded that the companies that express a greater positive tone in their reports are those that least manage their results. The result indicates that companies provide informational content rather than opportunistic content in reports. Therefore, information users must be aware of financial data and qualitative information, which are as important as financial information when providing information to the capital market.

2.2 Degree of readability

Empirical evidence suggests that low-quality disclosure negatively impacts the relevance of decision-making, especially when accounting reports are extensive and complex, as they hinder the extraction of relevant information (Lawrence, 2013; Li, 2008). The authors argue that accounting reports' readability and excessive size are serious barriers for stakeholders to capture relevant information about financial disclosures.

Readability and lexical resources capture the characteristics related to the ease or fluidity of reading the text and do not correspond to an analysis of the textual content (Li, 2008; Silva et al., 2017). Loughran and McDonald (2014) define readability as effectively communicating relevant information to the assessment. One of the methodologies used and disseminated in empirical studies is the Fog Index, a readability test for English writing developed by the American businessman Robert Gunning in 1952 and known in Brazil as Gunning's Fog Index or Fog Index. Li (2008) pioneered developing research that related the Fog Index to accounting reports in the financial market.

Among other indexes, we can mention the Kincaid and Flesch indexes. Both, as well as the Fog Index, use computational tools to calculate readability and apply the relationships between syllables per word and words per sentence to elaborate degrees of readability of the texts. However, most of the empirical results based on the Kincaid Index and the Flesch Index are similar to those based on the Fog Index, showing very high correlations and their results, which are suppressed from the final research in some studies, such as those by Franco et al. (2015), Guay et al. (2016) and Lehavy et al. (2011).

Over the years, other methodologies and indices have been developed to capture the readability of the reports, as, for example, in the works of Bonsall et al. (2017) and Loughran and McDonald (2014). Based on the argument that the fog index is poorly specified in financial applications and that of the two Fog components, one is poorly specified, and the other is difficult to measure. Loughran and McDonald (2014) state that the file size

(document) provides a simple readability proxy that outperforms the Fog Index requires no document parsing, facilitates replication, and correlates with alternative readability constructs.

Meanwhile, Bonsall et al. (2017) start from the computational indices traditionally used and propose an adjustment through a new readability measure, the Bog Index, which captures the simple attributes of disclosure in English (for example, active voice and hidden verbs). However, both new methodologies are not free from criticism and have limitations, such as the change in the formatting of file disclosure over the years, in the case of Loughran and McDonald (2014), and the use only in language reports. English, in the Box index (Bonsall et al., 2017).

2.3 Readability determinants

Li (2008) used the fog index and reporting length to explore the relationship between the readability of the annual report, current company performance, and earnings persistence. Their findings suggested a clear correlation between linguistic features of annual reports and company performance. The author argues that more complex annual reports increase the cost of information processing for investors.

Bloomfield (2008) presents some alternative explanations for Li's (2008) findings, such as the ontological premise that bad news is inherently more difficult to communicate; the management obfuscation hypothesis; management by exception; conservatism; litigation, among other factors. Nevertheless, Bloomfield's (2008) findings generally corroborate Li's (2008) thinking that companies with transitory losses or profits publish annual reports with longer sentences and big words. In addition, Bloomfield (2008) adds the hypothesis of management obfuscation as the main theoretical foundation for such findings.

Li (2008) presents a list of control variables that may be related to the readability of disclosed financial reports. Among his findings, he found that larger companies and those with more volatile businesses present more complex annual reports due to the positive and significant relationship between the variables 'size' and 'volatility in earnings and returns.' On the other hand, age was negatively associated with the Fog index, suggesting that younger companies have more complex annual reports.

In his study, Li (2008) explored the readability relationship in three different types of reports - the full annual report, the MD&A section, and the readability of the explanatory notes - and found different results and relationships of the variables throughout the reports. For example, size and age are unrelated to MD&A readability, while market-to-book is positively associated.

In their study, Ajina et al. (2016) explored the connection between earnings management and the readability of the annual report. They found a positive and significant relationship between the level of discretionary accounting adjustments and the Fog Index in the French market. Companies that manage their earnings tend to make the annual report more complex. Furthermore, the authors found a significant link between the Fog Index and the other financial indicators. Generally, companies with more dispersed ownership and high profitability publish more readable annual reports. In contrast, the level of indebtedness and the size of companies were positively related to readability, indicating that indebted and larger entities tend to issue more complex reports, that is, less readable.

Lo et al. (2017) explored how the readability of annual reports varies as earnings management practice is established. The authors concluded that companies more likely to manage earnings to exceed prior period earnings have more complex reports. This disruption of the general readability pattern, increasing with the level of profits found in Li (2008),

challenges the ontological explanation that good news is inherently easier to communicate and evidence that management obfuscation contributes to making disclosures more complex.

Furthermore, the authors included the control variables in the econometric model, according to the research by Li (2008), and concluded that the loss coefficient is positive and the profit coefficient is negative, which indicates that the analysis of the performance of the most profitable companies it is less complex. In addition, the size of the companies was not significant. At the same time, the market-to-book ratio, age, and volatility in returns were positively related to the readability of the reports, indicating that companies priced with high market value, older, and with more volatility in their papers tend to present more complex financial reports.

Recently, et al. (2019) examined the effect of the textual complexity of the annual report on the liquidity of companies' shares in the French market and inferred that less readable files are associated with lower liquidity of shares. The study provides evidence that hard-to-read annual reports impair investors' ability to process and analyze the information in corporate annual reports, reducing their willingness to trade and decreasing stock liquidity.

Seifzadeh et al. (2020) evaluated the relationship between management characteristics (such as narcissism and CEO overconfidence.) and the readability of Tehran company statements and found a negative and significant relationship between managerial entrenchment and earnings management based on accruals. The results indicated that entrenched managers and more adept at management practice are likely to cover their opportunistic behavior with less readable statements. However, older companies with more stock returns and sales growth are less likely to provide readable statements. In contrast, larger companies with dispersed ownership are more likely to prepare readable financial statements (Seifzadeh et al., 2020).

Among the national studies exploring the determinants of readability, Borges and Rech (2019) investigated the characteristics of publicly traded Brazilian companies that are part of the IBrX 50, contributing to the readability of the explanatory notes. They noted that the characteristics of operational complexity, big four auditings, corporate governance, the extent of disclosure, size, and time since it was publicly traded were statistically significant concerning readability variability.

Holtz and Santos (2020) aimed to identify the determinants of the readability of explanatory notes (ENs) of Brazilian companies listed on B3, using data from 2005, 2010, and 2015 and noted evidence that size and performance impact metrics of ENs readability. Size is related to the fact that the complexity of the business leads to larger and less readable reports, while performance is related to the hypothesis of overshadowing management.

Finally, Souza and Borba (2021) evaluated the effect of companies' results and harmonization with IFRS on the readability of the Management Report from 2006 to 2019. The research innovated by modifying traditional readability formulas and adapting them to the studied context, developing a readability metric based on a computational tool. In the descriptive area, the findings showed an apparent improvement in the reports' readability compared to the pre- and post-IFRS periods. Companies with persistent and positive results publish less complex reports in the econometric field, meaning managers publish more readable reports to signal positive results to the market.

3 METHODOLOGICAL PROCEDURES

3.1 Sample and data collection

The study explores the determinants of readability of financial reports in the Brazilian capital market of publicly-held companies. For this purpose, quarterly accounting and financial data and earnings releases publicly disclosed by companies in the market were used, and the sample period involved the years 2010 to 2019. The starting year is based on the mandatory period for adopting IFRS in Brazil, and the cut-off year represents the last financial period without the influence of the covid-19 crisis on financial reports.

Financial and accounting data were collected from the Economática database. In addition, company reports were collected manually, for the entire analysis period, from the investor relations (IRs) websites of publicly-held Brazilian companies that made up the Brazil Broad-Based Index (IBrA). The choice to use the IBrA is justified because of the coverage of a larger number of companies with different characteristics in the Brazilian market. A similar approach was used in the study by Araújo Júnior et al. (2019).

On the date the data were collected, the IBrA index was composed of 135 public companies from 2010 to 2019. As a result, 5,400 observations were accumulated in the panel. However, due to some filters performed, a final sample of 3,316 observations was reached in the model, maintaining the same 135 initial companies because of an unbalanced panel.

Table 01

Sample composition

| Exclusion criteria for sample composition | Number of observations |
|---|------------------------|
| Initial sample | 5.400 |
| (-)Absence of data (Fog) | (832) |
| (-)Absence of accounting data | (1.252) |
| Final sample | 3.316 |

As for the degree of readability, it should be noted that, contrary to the majority of research identified for the Brazilian market that uses relevant facts (Silva & Fernandes, 2009), financial reports (Miranda et al., 2018), explanatory notes (Gomes et al., 2019; Holtz & Santos, 2020), independent audit report (Reina et al., 2021) and management report (Souza and Borba, 2021). This study aimed to analyze the earnings releases that naturally have their particularities regarding elaboration, regulation, and dissemination.

Furthermore, in line with previous studies (Li, 2008), only the written text of published reports (press releases) was analyzed. Therefore, charts, tables, figures, and headers are not part of the calculation of this study. The report readability calculation is designed for written text, not for analyzing numbers or tables. In addition, the identification data of the companies were also excluded.

3.2 Measurement of dependent variables

3.2.1 Degree of readability

There are several measures that empirical studies use to capture companies' readability level, such as file size, the Kincaid Index, and the Flesch Index. However, following Li (2008), this study focuses on two specific variables: the Fog Index and the extent of reports disclosed by publicly-held companies.

The Fog Index is a measure that derives from the computational linguistics literature, which was initially tested in the financial area by Li (2008). It is widely used in empirical research to detect the level of readability of documents disclosed by firms. Its statistic

combines the number of words per sentence with the number of syllables per word to create a measure of readability:

$$GFI = \left[\left(\frac{\text{number of words}}{\text{number of sentences}} \right) + (\text{number of difficult words}) \right] \cdot 0,4 \quad (1)$$

In equation 1, the Gunning Fox Index (GFI) corresponds to the number of words per sentence, calculated as the proportion of the total number of words divided by the number of sentences in the releases, while complex words are those with three syllables or more. So, when the Fog Index has a high value, it is more difficult to understand the report because it is more complex.

The relationship between the Fog Index and ease of reading can be seen in Table 02, which shows that the higher the level of readability expressed by the report, the more illegible the company's disclosure will be.

Table 02

Relationship between Fog Index and readability

| Levels of text comprehension | Degree of readability |
|------------------------------|-----------------------------------|
| Unreadable | Index equal to or greater than 18 |
| Difficult | Index between 14-18 |
| Ideal | Index between 12-14 |
| Acceptable | Index between 10-12 |
| Immature | Index between 8-10 |

Source: Adapted from Li (2008)

The recent national studies that were found, such as those by Miranda et al. (2018) and Silva, et al. (2017), who use the Fog Index metric to measure the degree of readability of published reports, employ the Gunning's Fog Index program, available on the online platform via the link <http://gunning-fog-index.com/>. A similar methodology was used in this research.

The second readability measure used concerns the length of the reports. The reasoning is that longer reports are more dissuasive, with more power to convince investors, and require higher information processing costs (Li, 2008). The author defines length as the natural logarithm of the number of words in the text:

$$\text{Length} = \log (\text{Number of words}) \quad (2)$$

The use of the natural logarithm is due to the variation in the number of words between companies and, consequently, to the existence of extreme values, considering the argument that longer reports are more difficult to understand due to higher processing costs of information. In this sense, Franco et al. (2015) argue that using length may seem less intuitive at first sight. However, the fundamental idea is that everything else remains constant (*ceteris paribus*), and longer files are harder for users of financial reports to read and process.

3.3 Econometric Model and determinants

Equation 3 was elaborated to explore the determinants of readability in the reports of companies in the Brazilian capital market and to achieve the objective of the research:

$$\text{Readability}_{i,t} = \alpha_{i,t} + \beta_1 \text{Size}_{i,t} + \beta_2 \text{Float}_{i,t} + \beta_3 \text{MtB}_{i,t} + \beta_4 \text{Profit}_{i,t} + \beta_5 \text{Age}_{i,t} + \beta_6 \text{Illiquidity}_{i,t} + \beta_7 \text{Earn.Vol}_{i,t} + \beta_8 \text{Vol.Ret}_{i,t} + \beta_9 \text{Analist}_{i,t} + \beta_{10} \text{Sector}_{i,t} + \beta_{11} 4Q_{i,t} + \varepsilon_{i,t} \quad (3)$$

The dependent variable 'readability'_{i,t} corresponds, at first, to the Fog Readability Index, measured according to equation 1, while, at a second moment, it corresponds to the length of reports, measured according to equation 2.

Concerning the independent variables of the econometric model, from β_1 to β_{11} , they correspond to readability determinants selected based on studies such as those by Ajina et al. (2016), Boubaker et al. (2019), Hasan (2020), Li (2008), Lo et al. (2017) and Seifzadeh et al. (2020), who previously explored determinants of readability. More details about the model's independent variables and their potential impact can be seen in Table 03.

Table 03

Definition of econometric model readability determinants

| Proxy | Description | Expected outcome |
|---------------------|---|--|
| $Size_{i,t}$ | Logarithm of the market value of shareholders' equity at the end of the year. | Larger companies are expected to have longer and more complex annual reports. |
| $Free_float_{i,t}$ | Ownership dispersion is defined as the percentage of shares held by the public. | Companies with high ownership dispersion are expected to issue more readable annual reports. |
| $MtB_{i,t}$ | The ratio of market value (product of price and number of outstanding shares) to book value (book equity). | Growing companies (high Market-to-Book) are expected to have more complex business models, uncertain future results, and therefore more complex reporting. |
| $Profit_{i,t}$ | Net profit for the year scaled by Operating Revenue times 100 (one hundred). | Less profitable companies are expected to write less readable reports and make bad news more costly to analyze. |
| $Age_{i,t}$ | Age of companies based on their founding date. | Older companies are expected to have lower readability due to lower asymmetry and uncertainties. In this way, reports should be simpler and more readable. |
| $Illiquidity_{i,t}$ | It is the average ratio between the absolute value of returns and the volume traded in reais (times 106). | It is expected that firms with less readable files are associated with lower liquidity of their shares. |
| $Earn_Vol_{i,t}$ | Standard deviation of operating earnings during the previous four fiscal quarters. | Companies with higher business volatility are expected to have higher readability levels. |
| $Vol_Ret_{i,t}$ | Standard deviation of weekly stock returns in the previous quarter. | Communication between the firm and the investor in firms with more volatile business environments is presumably more complicated. Companies with greater volatility in returns are expected to have high readability levels. |
| $Analysts_{i,t}$ | It is the number of analysts who monitor the entity's reports. | Companies with more analysts are expected to issue less readable reports. |
| $4Q_{i,t}$ | It is a dummy variable with a value of 1 when the report is for the fourth quarter, and 0 for other quarters. | Fourth quarter reports are expected to be inherently larger and more complex. |

Moreover, two regressions in panel data were derived from equation 3, estimated by ordinary least squares (OLS), with quarterly data from 2010 to 2019. Finally, the companies were segregated, according to their sector of activity, following The Brazilian Institute of Geography and Statistics (IBGE) classification used by Andrade and Lucena (2021).

Finally, a dummy variable referring to the fourth quarter's results was added to the survey to capture a possible ontological bias of larger or more complex reports, as it was the last report released by the company in the year.

4 RESULTS

4.1 Presentations of results and descriptive statistics

This section presents the descriptive statistics and the correlation matrix of the econometric model used in the research, which have readability as a dependent variable. The descriptive statistics below expose the mean values, the standard deviation, the maximum values, the minimum values, and the median.

The analysis observed the behavior of the data used in the research and trends. In the analysis of readability proxies used in the research, the Fog Index showed a low standard deviation, which indicated low dispersion in the data, which can be better visualized by approaching the mean values to those of the median. The average of approximately 22, which the literature considers an expressive value, requires high effort from its users to read.

This finding is in line with some national surveys that explore the readability between the various releases released by companies and find high complexity, whether in the relevant facts (Silva & Fernandes, 2009), in the explanatory notes (Gomes et al., 2019), in financial reports (Miranda et al., 2018) or an independent audit report (Reina et al. 2021). Similarly, the pattern of high levels of readability indexes in company releases also follows in international empirical evidence, such as Franco et al. (2015), Lehavy et al. (2011), Li (2008), and Lo et al. (2017), highlighting the fact that financial reports, regardless of their nature and characteristics, are too complex and difficult to read.

Table 04

Descriptive statistics of variables

| Variables | Mean | SD* | Minimum | Median | Maximum |
|-----------------------------|---------|-----------|----------|--------|----------|
| Fog _{i,t} | 22,02 | 2,07 | 12,88 | 22 | 32,51 |
| Extension _{i,t} ** | 3.637 | 2.135 | 158 | 3.137 | 32112 |
| Size _{i,t} | 6,79 | 0,64 | 4,64 | 6,77 | 8,61 |
| Free_float _{i,t} | 49,78 | 22,96 | 0,59 | 47,13 | 100 |
| MtB _{i,t} | 2,57 | 4,33 | -166,22 | 1,67 | 57,13 |
| Profit _{i,t} | -48,99 | 2.132 | -123.419 | 8,95 | 6.874 |
| Age _{i,t} | 47 | 36,89 | 1 | 43 | 211 |
| Illiquidity _{i,t} | 57,24 | 718,76 | 0,00 | 0,98 | 30.018 |
| Earn_Vol _{i,t} | 260.945 | 1.248.196 | 112,84 | 44.144 | 2,26e+07 |
| Vol_Ret _{i,t} | 0,04 | 0,02 | 0,00 | 0,04 | 0,41 |
| Analysts _{i,t} | 7 | 5,17 | 0 | 8 | 18 |

* SD corresponds to the standard deviation of the variables. ** The variable 'Extension' was presented in numerical values for descriptive purposes.

The Variable Extension_{i,t} has a large dispersion in its data, as can be seen in the value of its standard deviation (2.135), which indicates that there are outliers in the survey, which can influence the estimates. This fact, contrary to the behavior observed in the Fog variable, evidences the presence of a heterogeneous behavior in the reporting of information carried out by the companies through their reports concerning the length of their releases.

Still, according to Table 04, the size of the companies, measured by the natural logarithm of the market value of the companies, and the volatility in the returns present the smallest dispersions in their data, which is confirmed by the low standard deviation (0.64 and 0.02 respectively) with mean and median values very close.

The free float index has an average percentage of 49.78% of the outstanding shares in the market. The illiquidity index has a high mean (57.24) and, as its standard deviation is too high (718.76), it indicates that there are outliers in the sample, resulting from companies with reduced trading volumes in the stock market, for this expresses low liquidity.

The independent variables 'free float,' 'profitability,' 'age,' 'illiquidity,' 'earnings volatility,' and 'analysts' show high data dispersion evidenced by descriptive statistics. The winsorization technique was applied in the research at a level of 5% in the tails of the distribution.

It is observed that, throughout the analyzed period, the companies presented great oscillations in their results due to the high values obtained by the volatility of the quarterly profits. Regarding age, companies have an average of 47 years in the market; however, with a considerable standard deviation (36.89), evidencing the presence of both younger and older companies and consolidated companies in the market. The oldest company in the sample had been operating in the market for 211 years, demonstrating the plurality between the firms regarding their business history.

Table 05 shows the model's correlation matrix to verify the degree of association between each variable. The matrix indicated, in general, a good relationship between the variables. However, correlations do not necessarily indicate causality but signs for which further research can be developed.

Regarding the readability variables used (Fog and Extension), they have a significant positive relationship. Furthermore, except for the variables 'profitability,' 'free float,' and 'analysts,' all the other regressives maintained similar relationships for both, which is empirically consistent, given that both proxies aim to capture the same theoretical construct.

Fog has a significant and positive association with the free float index, profitability, firm age, and earnings volatility. Therefore, it is inferred that the greater the number of shares free to trade on the market, the more profitable and older, and the more volatile they publish results, the more complex their reports will be regarding readability.

The market-to-book ratio, stock illiquidity, and the volatility of weekly company return significantly and negatively correlated with Fog and reporting length. Therefore, the greater the discrepancy between the market and accounting, the illiquidity of the securities traded, and the high volatility of the shares, the lesser the complexity expressed by the releases released by the companies.

Still, according to Table 05, a significant and positive correlation was observed, at first, between a particular research variable: the 4th quarter and the length of reports. However, this association was not found in the Fog Index, which means that reports issued at the end of the financial year are longer, but not necessarily more complex, than other financial periods.

In order to meet the objective of the research – to explore the determinants of readability in the national financial market – equation 3 was estimated at two different times, according to the modification in the readability proxy used. Initially, tests were performed to verify whether the data met the assumptions of the regression model used. Therefore, as they are configured as panel data regressions, the Hausmann test, Chow's F, and Breusch-Pagan's LM were performed to know which method is most appropriate between Pooling, Fixed or Random Effects, as shown in Table 06.

Table 05

Pearson's correlation matrix of the econometric model (2010-2019)

| Var | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|-----|-----------|------------|-----------|-----------|-----------|-----------|-----------|-----------|----------|-----------|-------|----|
| 1 | 1 | | | | | | | | | | | |
| 2 | 0,146*** | 1 | | | | | | | | | | |
| 3 | 0,020 | 0,108*** | 1 | | | | | | | | | |
| 4 | 0,080*** | -0,030** | -0,014 | 1 | | | | | | | | |
| 5 | -0,029* | -0,0590*** | 0,256*** | -0,003 | 1 | | | | | | | |
| 6 | 0,066*** | -0,022 | 0,212*** | 0,003 | 0,1123*** | 1 | | | | | | |
| 7 | 0,032** | 0,089*** | 0,279*** | 0,033** | -0,0136 | -0,065*** | 1 | | | | | |
| 8 | -0,056*** | -0,053*** | -0,427*** | -0,192*** | -0,185*** | -0,120*** | -0,138*** | 1 | | | | |
| 9 | 0,026* | 0,096*** | 0,477*** | 0,052*** | -0,118*** | -0,004 | 0,213*** | -0,141*** | 1 | | | |
| 10 | -0,053*** | -0,0548*** | -0,256*** | 0,049*** | -0,161*** | -0,257*** | -0,093*** | 0,147*** | 0,094 | 1 | | |
| 11 | -0,024 | 0,019 | 0,411*** | 0,133*** | 0,226*** | 0,087*** | 0,217*** | -0,428*** | 0,051*** | -0,103*** | 1 | |
| 12 | 0,002 | 0,152*** | 0,021 | 0,000 | 0,026* | 0,016 | 0,000 | -0,015 | 0,013 | 0,033 | 0,000 | 1 |

Notes: * significant at 10%, ** at 5%, and *** at 1%.

The numbering of the variables corresponds respectively: (1) Fog; (2) Extension; (3) Size (4) Free float; (5) MtB; (6) Profit.; (7) Age; (8) Illiquidity; (9) Earn. Vol; (10) Vol. Ret.; (11) Analyst; (12)4thQuarter.

Table 06

Model specification tests

| | Chow test | Hausmann test |
|-----------|-----------|---------------|
| Fog | 0,0000 | 0,0006 |
| Extension | 0,0000 | 0,0000 |

According to the Chow test, the null hypothesis was rejected in both models, considering that the fixed effects model was more adequate than the Pool. Similarly, starting with the Hausmann test, both models for Fog and Extension were statistically significant, indicating rejection of the null hypothesis of preference for random effects. Thus, the estimates were performed by fixed effects.

Continuing with the tests of the regression assumptions, tests of autocorrelation (Wooldridge), heteroscedasticity (Breush Pagan), residual normality (Jarque-Bera), and multicollinearity (VIF) were performed for both regressions. Except for multicollinearity, the regressions showed problems with their assumptions. Therefore, the models were estimated in their robust form, and the assumption of normality was relaxed following the assumptions of the Central Limit Theorem (Brooks, 2002). Both estimates and their results are presented in Table 07.

The portrayed econometric estimates were estimated on unbalanced panel data for the sample period from 2010 to 2019, with quarterly data. The following section further explores its inferences, significance, and analysis.

Table 07
Regressions according to equation 3

| Variables | Fog index | | Extension of reports | |
|----------------------------|--------------|-------------|----------------------|-------------|
| | Coefficients | t statistic | Coefficients | t statistic |
| Constant | 24,766 | 11,91*** | 7,444 | 15,10*** |
| Size _{i,t} | -0,155 | -0,53 | 0,194 | 2,33** |
| Free_float _{i,t} | 0,004 | 1,08 | 0,003 | 3,41*** |
| MtB _{i,t} | -0,085 | -1,92* | -0,013 | -1,34 |
| Profit _{i,t} | -0,001 | -0,35 | 0,000 | 0,16 |
| Age _{i,t} | -0,036 | -1,23 | -0,019 | -2,40** |
| Illiquidity _{i,t} | 0,004 | 1,19 | -0,000 | -0,24 |
| Earn_Vol _{i,t} | 7.27e-08 | 0,36 | 1,74e-07 | 3,28*** |
| Vol_Ret _{i,t} | 0,975 | 0,60 | 0,168 | 0,28 |
| Analyst _{i,t} | 0,006 | 0,28 | 0,007 | 0,99 |
| 4th quarter _{i,t} | -0,010 | -0,24 | 0,163 | 12,59*** |
| Sector dummy | Yes | | Yes | |
| Average VIF | 1,49 | | 1,49 | |
| Observation | 3.316 | | 3.316 | |
| Problem > chi2 | 0,0700* | | 0,0000*** | |

Notes: * Significant at 10%, ** at 5%, and *** at 1%.

4.2 Discussion of results

Analyzing the estimates obtained by regression, in which the dependent variable corresponds to the Fog index, only the market-to-book dependent variable showed statistical significance in the estimation, with a negative sign, indicating that the greater the discrepancy between the market assessment and the company's accounting, the more readable the report issued by the companies will be, contrary to what was expected by the survey.

Regarding this finding, based on the management obfuscation hypothesis (Bloomfield, 2008), the hypothesis is that companies with high levels of market-to-book ratio are not prone to obfuscate their reports because stakeholders are well evaluating their results. A similar finding was found by Hasan (2020) and corroborates the research by Black, et al. (2017), in which there was an alternation between the various tools used by managers to manage user perceptions, including accruals and Non-GAAP information disclosure.

Still on Table 07, concerning the model with the length proxy as the dependent variable, it obtained a better overall fit of the model, in addition to disparate results, which despite having strong correlations, indicates that the readability proxies may be capturing distinctive aspects of the same construct (Li, 2008).

Regarding the determinants, contrary to expectations, based on the research by Ajina et al. (2016), the free float was significant for the extension with a positive coefficient; that is, it was observed that firms with high ownership dispersion issued more extensive annual reports, but they will not necessarily be more complex, given the absence of statistical significance of this variable for the model with the Fog Index. Thus, the result may be related to more voluntary information disclosed by companies with high ownership dispersion (Oliveira et al., 2006). In Brazil, Souza and Silva (2020) found that companies provide more informational content in their earnings releases than opportunistic content.

As expected by the research, companies with more volatility in their businesses, an aspect visualized by the volatility in their profits, presented higher levels of readability, with a positive and significant coefficient. The assumed premise is that communication with investors by companies with more volatile business environments is inherently more complex and affects the readability of issued reports (Li, 2008; Lo et al., 2017).

As for the size, it was a determining factor for the readability of the releases released by the entities, with a positive coefficient of 0.194. Thus, larger companies publish longer and more complex, less readable annual reports. This finding is in line with the studies by Ajina et al. (2016), Hasan (2020), and Li (2008).

The negative and significant coefficient for the age of companies is as expected - that older firms have lower readability due to less information asymmetry and uncertainties in their operations. Similar results were obtained by Hasan (2020), Li (2008), and Seifzadeh et al. (2020).

Finally, to expand the inferences obtained in research in the field of readability, a dummy variable was included for the results released in the last reporting period, which was positive and significant for the extension model, but not significant for the model with Fog Index. This finding indicates that the reports released by the companies at the end of the reporting period (fourth quarter) differ from the others in terms of 'length,' but are not necessarily more complex (Fog); This reinforces the argument that the proxies used here capture distinct aspects of readability. In addition, these results may be related to the greater amount of information disclosed for that specific period, as the releases can make predictions for the next financial year and a summary of the year ended.

5 CONCLUSIONS

In this work, the factors determining the readability of earnings releases in companies listed on the Brazilian stock exchange, mainly those in the IBrA index, with quarterly data, were investigated from 2010 to 2019. For this, as a proxy for readability, the Fog Index of readability, developed by Gunning (1952), and the extension of financial reports, both advocated in financial research by the study by Li (2008), were used. As for the determinants, they were selected according to the previous international literature.

Concerning the Fog Index, only the market-to-book index was a significant determining factor for the readability of financial reports with a negative sign; that is, companies with a high market-to-book ratio (well-evaluated by the market) issued reports less complex. Therefore, these companies are unwilling to obfuscate their releases since their results are already well-evaluated by the market or are probably being managed using other tools (Black et al., 2017; Hasan, 2020).

In the econometric model, whose dependent variable is the length, age was negatively related to the length of releases, indicating that older companies issued clearer and more readable reports, as they have been in the market for longer, are better known, and express less risk for investors. A similar finding was obtained by Seifzadeh et al. (2020).

The findings indicated that the greater the ownership dispersion of companies, measured by the free float index, the more extensive the reports issued by them. Brazilian firms generally have high shareholding concentration and weak legal protection for minority shareholders (Brandão & Crisóstomo, 2015); This allows for more discretion and opportunistic behavior by controlling shareholders (Crisóstomo & Pinheiro, 2015). Research on companies in developing countries indicates that family businesses (high concentration), for example, are more likely to practice earnings management (Bataineh et al., 2018).

In summary, the research indicated that companies with a high market-to-book ratio, older and known by the market, smaller concerning their market value and with more shareholding concentration, and low fluctuations in their quarterly profits, issue reports that are more readable and less complex.

Regarding the research's limitations, we highlight that not all Brazilian companies were used and that the readability index was used, which was developed essentially for the

English language, which can affect the results. In addition, some findings were different from those found in the previous literature, considering the type of report addressed (release). Li (2008) found heterogeneous results and signs among the readability determinants in his research, as the analyzed financial report was modified.

In general, the model with the dependent variable (Extension) was better adjusted to the data, with a greater number of significant determinants; This means that the use of foreign language readability indices may not be the most efficient approach for the Portuguese language. However, future research can be carried out and new methodologies explored, such as creating a specific index for Portuguese or using document size and approaching other types of financial reports (Bonsall et al., 2017; Loughran and McDonald, 2014).

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Legibilidade nos releases de resultados das Companhias Brasileiras Abertas

RESUMO

Objetivo: Explorar os determinantes da legibilidade nos releases de resultados das companhias brasileiras abertas.


Método: O estudo foi realizado nas entidades pertencentes ao Índice Brasil Amplo (IBrA), entre 2010 e 2019, com documentos trimestrais. Os dados financeiros e os contábeis foram coletados na base de dados Economática, e os relatórios das companhias (releases) foram coletados manualmente, para todo o período de análise, nos sites de relacionamento com investidores (RIs) das companhias. A legibilidade foi estimada por meio do índice Fog e pela extensão dos relatórios, segundo Li (2008). Foram estimados dois modelos econométricos em dados em painel com efeito fixo.

Originalidade/Relevância: Por examinar os releases de resultados, até então pouco explorados e com particularidades próprias, além de uma amostra ampla e trimestral, este trabalho se diferencia dos anteriores.

Resultados: De modo geral, a pesquisa indicou que as companhias com elevado índice market-to-book, mais antigas e conhecidas pelo mercado, menores em relação ao seu valor de mercado, com mais concentração acionária, além de baixas oscilações em seus lucros trimestrais, emitem relatório que são mais legíveis e menos complexos.

Contribuições Teóricas/Metodológicas: Os achados aqui retratados reforçam a importância da legibilidade como ferramenta para o disclosure corporativo eficiente e a forma como a entidade pode utilizar esse elemento em favor da companhia.

Palavras-Chave: Legibilidade. Índice Fog. IBrA. Determinantes.

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