# EXAMINING THE READABILITY OF ACCOUNTING NARRATIVES DERIVED FROM EARNINGS MANAGEMENT

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**Abstract.** This study investigates whether language difference affects the readability scores of accounting narratives derived from earnings management practices in 226 companies in the UK, Spain, and Jordan from 2017 to 2021.Our analytical method applies three of the most significant readability measures based on the characteristics of each language, as well as multiple linear and logistic regression models, to demonstrate the impact of language differences on the readability of accounting narratives. The findings indicate that earnings management practices significantly affect the readability of accounting disclosures/narratives, and that past financial profitability moderates this relationship. The implications of the findings reported will help decision-makers better understand the quality and readability of accounting narratives derived from companies' earnings management. Our analysis also has implications for how stakeholders, accounting policymakers, financial statement auditors, and academics understand the relationship between accounting reporting narratives and earnings management.

**Keywords:** accounting narratives, readability, language variety, earnings management, foreign language effect, earnings forecasts, Fog index, transparency.

**JEL Classification:** A13, F36, G40, M12, M41.

## Introduction

Although the legibility of accounting narratives has been studied from various points of view (e.g., Aubert & Grudnitski, 2014; Besuglov & Crasselt, 2021; Yang & Liu, 2017), a linguistic perspective is essential to an in-depth study of readability research. Some studies of language problems in corporations have found that these problems are associated with opportunistic behaviour (Ghosh, 2022; Shafi Dar & Sahu, 2022). Espahbodi et al. (2022) argued that opportunistic management behaviour leads to a more aggressive practice of earnings management when managers' incentives are at risk. Linguistic problems thus appear when voluntary

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accounting narratives/disclosures become less readable to hide the effect of such intentional earnings management practice (EMP). Not having a code of ethics that includes linguistic differences in preparing accounting disclosures may also result in less readable accounting narratives (Arena et al., 2014; Chen et al., 2017).

Based on the foregoing, this exploratory study investigates whether language differences affect the readability scores of accounting narratives derived from EMPs. Its analysis thus addresses specific knowledge gaps concerning (1) the relationship between earnings management and the readability of accounting narratives and (2) the moderating role of the proposed past financial performance index in this relationship.

To accomplish these objectives, our method applies three of the most significant readability measures based on the characteristics of each language to perform a cross-country comparison of study variables. We use multiple linear and logistic regression models to show the impact of language differences on the readability of accounting narratives. Disclosures contained in bilingual reports from the same company do not serve our re-search goals, however, because comparing the readability measures of accounting disclosures in different business environments helps to formulate the basic foundations of writing that make accounting narratives more readable, especially in Spanish and Arabic.

This study contributes to the literature in several ways. Firstly, it advances previous research on the relationship between linguistic differences in accounting narratives and the reports' readability scores. Second, the findings raise stakeholder awareness of readability of the information, ultimately affecting management of company profits. Third, our in-depth analysis of accounting narratives contributes to transparency in companies' ac-counting and financial information.

This paper is structured as follows. Section 1 explains the theoretical framework, presenting the literature review and the study's hypotheses. Section 2 describes the methodology used to achieve the research objectives. Section 3 then considers the analysis and extraction of results. Finally, Section 4 discusses the study findings and presents the conclusions and implications.

## 1. Literature review and hypothesis development

Prior research has considered issues of readability when analyzing the quality of voluntary narrative accounting disclosures, using thematic or syntactic analysis to compare readability and comprehension (Li, 2010; Loughran & McDonald, 2016; Richard et al., 2015; Sarvi et al., 2019). The creative perspective encompasses a conceptual framework that clarifies the cause and effect relationship between the EMPs and the readability of accounting narratives, how to mitigate this effect (i.e., the past financial performance index), and whether the different languages in which reporting accounting narratives are written affect readability. Also, managers are generally inclined to use the discretion permitted by accounting standards to create financial statements that inflate or soften earnings based also on the readability of accounting narratives (Boachie & Mensah, 2022). For these reasons, it became necessary to advance the study on the readability of accounting narratives from the perspective of a corporate governance that aligns the interests of management with those of shareholders and other stakeholders.

The distinction between manipulation and obfuscation can help researchers determine what makes accounting narratives less readable. Manipulation is an attempt to manage earnings that impacts financial statements (Haga et al., 2021). EMPs are defined as managers' attempts to use certain practices to influence reported income in the short term (Boachie & Mensah, 2022; Hickman et al., 2020; Lara et al., 2020). The accounting literature shows that opportunistic management uses EMPs to improve stock prices by exploiting increased operations for firms (Han & Wu, 2022), increasing managers' incentives (Aubert & Grudnitski, 2014; Chen et al., 2022; Espahbodi et al., 2022). EMPs are thus one of the agency's problems, as they cause information asymmetry between management and stakeholders (Hussain & Akbar, 2022).

Courtis (1987) introduced the term obfuscation to contrast with manipulation. Obfuscation is considered a consequence of EMPs' opportunistic behaviour. Obfuscation is a tool that can reduce the reader's desire to investigate information in an accounting narrative more closely. According to Riley and Yen (2019), the term "accounting narrative" refers to the non-quantitative linguistic narratives that provide contextual information about a company's financial performance in voluntary accounting disclosures. These disclosures can include non-quantitative narratives found in various sources such as a corporate annual report, a president's statement, and content on a corporate website. The literature demonstrates this causal relationship: EMPs make voluntary narrative accounting disclosures more confusing and less readable (Xu et al., 2020; Sandell & Svensson, 2016; Cheung & Lau, 2016; Cheung & Hu, 2017; Bradbury et al., 2018). The more subtle the obfuscation, the more successful the manipulation (Courtis, 1998; Hooghiemstra et al., 2017; Rutherford, 2003), and the weaker companies perform, the more sophisticated their disclosure strategies become (Laskin, 2018).

EMPs can be used to increase managers' primary objective, incentives. Management cannot achieve this aim without using past information, which serves as a signal in managers' decisions to use EMPs, thus moderating EMPs' impact on the accounting disclosures' readability (Chen et al., 2022; Cheng & Warfield, 2005). Signal theory argues that successful companies use financial data to communicate with the market (Ross et al., 2007). Prior studies confirm that past financial performance is a signal for managers, enabling them to make decisions about managing their earnings – decisions whether to avoid risks or to achieve future returns (Alwathainani, 2009; Cheng & Warfield, 2005; Deumes, 2008; Souza et al., 2019). Karle et al. (2016) demonstrate that past financial performance is a moderate indicator of higher incentives and thus of less readable accounting disclosure.

The readability of accounting disclosures affects the quality of textual communication between managers and stakeholders (Richards & Van Staden, 2015). Andersen and Rasmussen (2004) confirmed that language skills are essential for effective communication and help stakeholders understand real firm performance. Deumes (2008) also indicated that both the presentation and reporting language of the accounting disclosure distort stakeholders' perception of the company's performance. Chen et al. (2017) found that firms whose CEOs were fluent in several languages were better able to persuade shareholders. Courtis and Hassan (2002) argued that different languages might generate different reading behaviour. Thus, language mastery that produces a clear style in accounting narrative reduces potential risks resulting from making incorrect decisions by stakeholders due to lack of knowledge (Bonsall et al., 2017).

Many researchers have examined the relationship between readability of accounting narratives and EMPs (Ajina et al., 2016; Hooghiemstra et al., 2017; Lo et al., 2017). Previous studies confirmed that, the more aggressive the EMPs, the less readable the accounting disclosure, particularly because different business environments might vary in including a great deal of non-financial information (Xu et al., 2020; Sandell & Svensson, 2016; Cheung & Hu, 2017; Bradbury et al., 2018). We thus formulate the first hypothesis:

*H1: There is a significant relationship between EMPs and the readability of accounting narratives, ceteris paribus.*

The literature on EMPs has focused primarily on incentives for managers (Chen et al., 2022). However, past financial performance can serve as a signal for managers' decision-making about whether to use EMPs (Alwathainani, 2009). Mantari and Nuryasman (2017) thus argue that signals such as past financial performance can serve as a tool that moderates in the relationship between EMPs and readability. That is, past financial performance may play a moderating role in determining management's priorities in managing earnings and reporting disclosures (Karle et al., 2016). To this end, we formulate the second hypothesis as follows:

*H2: Past financial performance moderates the relationship between EMPs and the readability of accounting narratives.*

Third, this study tests other financial factors that Li (2008) considers as control variables impacting the readability of accounting narratives. These factors include firm size (Sun, 2023), operations volatility (Loughran & McDonald, 2013), leverage (Tran, 2022), and financial performance (Carney et al., 2020; Ferris et al., 2021). We therefore formulate the third hypothesis as follows:

*H3: There is a significant relationship between financial factors and the readability of accounting narratives.*

After conducting an international comparison in the different business environments of the confirmatory relationships studied in the previous accounting literature, we perform an international comparison to explore the effect of reporting in three different languages on the readability of accounting disclosure in corporate reports. To this end, we formulate the fourth hypothesis as follows:

*H4: Reporting in a different language significantly affects accounting disclosures to be more or less readable.*

## 2. Research methodology

### 2.1. Description of sample

We created three samples of firms listed on stock exchanges in three countries, using information from the Orbis database (Bureau van Dijk, 2022) and based on several criteria: (1) The firms were listed on financial markets as follows: 2084 UK firms on the London Stock Exchange, 486 Spanish firms on the Madrid Stock Exchange, and 197 Jordanian firms on the Amman Stock Exchange. (2) The firms' accounting disclosures were reported under

the IFRS. (3) The official language for reporting accounting disclosures changed from one country to another. (4) Both qualitative and quantitative data were available. Our analysis thus uses three sub-samples, with a total of 226 firms, respectively, and data from 2017 to 2021. Table 1 summarizes the essential points in selecting the sample.

Table 1. A summary of the most important points in selecting the sample

| Criteria of selecting the research samples | UK | Spain | Jordan |
|---|---|---|---|
| The firms are listed by financial markets | 2084 | 486 | 197 |
| The firms' accounting disclosures are reported under the IFRS | 1864 | 432 | 197 |
| Different official languages are used for reporting accounting disclosures | 1864 | 432 | 197 |
| Both qualitative and quantitative data are available | 72 | 85 | 69 |
| Final number of firms selected for the study samples | 72 | 85 | 69 |

The types of data used in this study are (1) quantitative data gathered by extracting items from the financial statements retrieved from the Orbis database, based on definition of the study variables; and (2) qualitative data represented by the chairman's statement, extracted from the Orbis database or (if not available in Orbis) from the company website in PDF format.

## 2.2. The chairman's statement as the most widely read section of accounting narratives

Corporate reports typically contain a high proportion of the voluntary disclosures necessary for an accounting narrative (Lo et al., 2017). The Management Discussion and Analysis (MD&A) report and chairman's statement are additional components of accounting narratives. The chairman's statement is the most widely read section and contains critical information that investors often use to make investment decisions (Li, 2008). The MD&A tends to be less regulated (not reviewed by auditors), and managers have discretion in determining its written content (Loughran & McDonald, 2014). The emphasis is thus on reading the chairman's statement by stakeholders (Courtis & Hassan, 2002; Clatworthy & Jones, 2006; Fialho et al., 2002; Mankayi et al., 2023). Our study focuses on the chairman's statement as empirical evidence of differences in readability scores of accounting disclosures in firms operating in different countries, considering various institutional factors.

## 2.3. Study variable definitions: readability measures, EMP indicator, measure of past financial performance, and control variables

This study hypothesizes a relationship between EMPs and the readability of accounting disclosures. To test H1, we used readability measures compatible with to the characteristics of each language to estimate the texts' reading difficulty. Additional measures were also employed to detect EMPs, as follows:

The *FOG* index, the index most used in the literature to measure degree of readability in English (Ajina et al., 2016), is calculated based on syllables per word and words per

sentence. Efretuei and Hussainey (2022) argued that the challenge in using the *FOG* index to measure corporate report readability in English lies in determining the inputs of *TW* as words per sentence, and *CW* as the percentage of complex words. Readability is calculated as follows:

$$FOG = (TW + CW\,\%) \times 0.4. \tag{1}$$

*FOG* measures reading ease on the following scale: *FOG* >18 (unreadable); 14–18 (difficult); 12–13.99 (ideal); 10–11.99 (acceptable); and 8–9.99 (childish).

To analyze the readability of the president's statement in Spanish, we applied a modified version of the Flesch adjusted readability formula, in which a higher (lower) *Adjusted FREF* score indicates that accounting narratives are more (less) readable (Moreno & Casasola, 2015), where *wl* equals number of syllables per 100 words and *sl* sentence length. We obtain the following equation for the modified Flesch formula:

$$Adjusted\,FREF = 206.84 - 0.6wl - 1.02sl. \tag{2}$$

The *Adjusted FREF* classifies reading ease as follows: 0–29.99 (very difficult); 30–49.99 (difficult); 50–59.99 (fairly difficult); 60–69.99 (standard); 70–79.99 (fairly easy); 80–89.99 (easy); and 90–100 (very easy).

Measuring the readability of Arabic texts is challenging due to the absence of syllables and complex words in business. Sentence length can, however, be a factor in measuring complexity. Our study thus proposes the Coleman–Liau Index (Coleman & Liau, 1975), where *Le* is the average number of letters per 100 words and *Se* the average number of sentences per 100 words, as follows:

$$CL\,Index = 0.0558\,Le - 0.296\,Se - 15.8. \tag{3}$$

The *CL Index* uses the following scale to measure readability: 5 and below (very easy to read); 6 (easy to read); 7 (fairly easy to read); 8–12 (fairly difficult to read); 13–16 (difficult to read); and 17 and above (extremely difficult to read).

Although the *FOG* index was computed using many text analysis software programs for readability research in English, the most common program is the Linguistic Inquiry and Word Count (LIWC), designed by psychologists Pennebaker et al. (2001). Various scholars have used the LIWC to measure readability (Chiu et al., 2022; Efretuei & Hussainey, 2022; Li, 2008). Our study uses the LIWC (Version 22) to measure the *FOG* index of 360 UK corporate reports for 72 firms from 2017 to 2021.

We computed the *Adjusted FREF* by using the software of INFLESZ developed by Barrio-Cantalejo et al. (2008). This software is especially designed to apply the adjusted Flesch formula to texts in Spanish, and various scholars have used it to measure readability (Moreno & Casasola, 2015) to measure the *Adjusted FREF*.

Finally, dealing with Arabic texts was different. The manual method extracts the inputs of *CL Index* by counting number of letters per 100 words and number of sentences per 100 words after converting the PDF files into Word files.

Managers use discretionary accruals at the end of the period to determine how much they can manipulate earnings upward to avoid lower gains and losses, and thus obtain higher

incentives (Chauhan & Jaiswall, 2023; Le et al., 2021). Our study adopts the original Jones model (1991) as an indicator for EMPs, due to this model's ability to control organizational performance when separating total accruals (*TACC*) into non-discretionary (*NDA*) and discretionary accruals (*DA*), as follows:

$$TACC = DA + NDA . \tag{4}$$

Jones used change in revenue ($\Delta REV$) and fixed assets (*PPT*) as independent variables to predict discretionary accruals. These variables are deflated by lagging total assets ($TA_{t-1}$) to reduce heteroskedasticity. After extracting the estimates of coefficients, discretionary accruals *DA* can be calculated in period *t*, as follows:

$$\frac{TACC_{it}}{TA_{it-1}} = \beta_1 \frac{1}{TA_{it-\perp}} + \beta_2 \frac{\Delta REV_{it}}{TA_{it-1}} + \beta_3 \frac{PPE\, it}{TA_{it-1}} + \varepsilon_i ; \tag{5}$$

$$DA_{it} = \frac{TACC_{it}}{TA_{it-1}} - \left( \beta_1 \frac{1}{TA_{it-1}} + \beta_2 \frac{\Delta REV_{it}}{TA_{it-1}} + \beta_3 \frac{PPE_{it}}{TA_{it-1}} \right). \tag{6}$$

This study also hypothesizes that past financial performance moderates the relationship between EMPs and the readability of accounting narratives, as past financial performance can serve as a signal for managers, shifting their decision-making towards adopting EMPs (Karle et al., 2016; Mantari & Nuryasman, 2017). To test H2, this study proposes a measure of financial performance based on the past year, where the value of the lagged ($EPS_{t-1}$) divided by the logarithm of lagged total assets ($TA_{t-1}$), subtracting the value of the lagged discretionary accruals ($DA_{t-1}$), quantifies the value of financial performance achieved in the past year, unaffected by EMPs and assuming that managers rely on a real financial performance scenario to ascertain the implications of their decision whether or not to engage in EMPs (Karle et al., 2016).

$$PreFP = \left( \frac{EPS}{\ln TA} \right)_{t-1} - DA_{t-1} . \tag{7}$$

Lim et al. (2018) used a set of determinants related to the readability of corporate disclosures and their interaction with EMPs. These control variables may have the potential influence hypothesized in H3. The factors examined here include the following variables:

 – *Firm Size*: Larger firms have more complex accounting disclosures due to high EMPs (Sun, 2023). Our study employs the logarithm of total assets (*SIZE*), in line with Serrasqueiro and Nunes (2008).
 – *Operations volatility*: Firms operating in more volatile business environments are assumed to provide more opaque disclosures to avoid negative market reactions (Loughran & McDonald, 2013). Our study thus uses firm-earnings volatility (*VOL*) measured by the standard deviation of the operating earnings (Courtis, 1995; Li, 2008).
 – *Leverage*: The higher the leverage, the more likely the company's managers are to manage earnings, increasing the complexity of annual report and decreasing its readability (Tran, 2022). This study uses leverage (*LEV*), defined as the company's debt-to-equity ratio, in line with previous studies (DeAngelo et al., 2011; Hull, 1999).

- *Financial performance*: Good financial performance presents more good news than bad ones, and firms with poor financial performance do not focus on bad news (Clatworthy & Jones, 2006). We thus measure key financial performance by return on assets (*ROA*), measured as the ratio of net income to total assets, consistent with recent studies (Carney et al., 2020; Ferris et al., 2021).
- *Language difference*: This study examines the effect of language differences on the readability of accounting narratives to determine which language exerts the most influence on disclosures. We use logistic regression to measure the reading level of accounting narratives as 0 (less readable) or 1 (more readable). Table 2 summarizes all study variables, to be measured using STATA, as follows.

Table 2. The study variables

| Variables | Symbol | Definition |
|---|---|---|
| Dependent variables used to test H1: | | |
| Fog Index for English texts | *FOG* | Equation 1 |
| Adjusted Flesch measure for Spanish texts | *Adjusted FREE* | Equation 2 |
| Coleman–Liau Index for Arabic texts | *CL Index* | Equation 3 |
| Independent variable used to test H1: | | |
| Discretionary accruals | *DA* | Equation 6 |
| Independent variable (Moderator) to test H2: | | |
| Past financial performance indicator | *PreFp* | Equation 7 |
| Control variables to test H3: | | |
| Firm size | *SIZE* | Logarithm of total assets |
| Firm-earnings volatility | *VOL* | Standard deviation of the operating earnings |
| Leverage | *LEV* | Debt-to-equity ratio |
| Financial performance | *ROA* | Return on assets |
| Independent variables (Dummy variables) to test H4: | | |
| Language difference | $D_{language}$ | Linguistic regression model, Equation 9 |

## 2.4. Econometric models

This study uses multiple linear regression to examine the relationship between the readability of accounting narratives, where ($Readability_j$) represents *FOG*, *Adjusted FREF*, and *CL Index*, discretionary accruals (*DA*) represent a detecting proxy of the EMPs and control variables in H1 and H3. Since H2 uses a standard method of moderator analysis to determine whether a moderating effect exists, we must add an interaction term (*PreFP × DA*) in the multiple regression model (Jose, 2013), as follows:

$$Readability_j = \beta_0 + \beta_1 DA_t + \beta_2 (\Pr eFP_{t-1} \times DA_t) + \sum \beta_j \, Controls_j + \varepsilon. \tag{8}$$

To test H4, we create three dummy variables ($D_{language}$) to differentiate between English (1), Spanish (2), and Arabic (3). We then use a logistic regression model to generate a

readability dummy variable ($RD$) by dividing the readability indexes into two groups, 0 (less readable) and 1 (more readable), to test which language differences influence accounting disclosures to be either more readable or less readable as follows:

$$\log\left(\frac{RD_i}{1-RD_i}\right) = \beta_0 + \beta_1 D_{language} + \beta_2\, DA_t + \beta_3\, \mathrm{Pr}\,eFP_{t-1} + \Sigma\beta_j\, Controls_j + \varepsilon. \qquad (9)$$

## 3. Results

### 3.1. Descriptive statistics

Table 3 describes the research data, displaying central tendency and dispersion measures.

Table 3. Descriptive analysis

| Panel A | | The UK sample (N. of Observations = 360) | |
|---|---|---|---|
| Variables | Mean | Median | Std. Deviation |
| FOG | 16.082 | 16.480 | 2.251 |
| DA | 0.034 | 0.032 | 0.052 |
| PreFP | 0.064 | 0.080 | 0.097 |
| SIZE | 15.895 | 15.979 | 0.950 |
| VOL | 109.960 | 89.067 | 77.712 |
| LEV | 1.789 | 1.404 | 1.364 |
| ROA | 6.775 | 6.452 | 5.584 |
| Panel B | | Spain's sample (N. of Observations = 425) | |
| Variables | Mean | Median | Std. Deviation |
| Adjusted FREF | 56.585 | 17.657 | 14.057 |
| DA | 0.021 | 0.019 | 0.069 |
| PreFP | 0.011 | 0.053 | 0.094 |
| SIZE | 13.726 | 13.807 | 2.355 |
| VOL | 108.747 | 87.617 | 88.624 |
| LEV | 1.636 | 1.335 | 1.545 |
| ROA | 2.913 | 2.493 | 6.030 |
| Panel C | | Jordan's sample (N. of Observations = 345) | |
| Variables | Mean | Median | Std. Deviation |
| CL Index | 6.940 | 6.440 | 1.724 |
| DA | 0.029 | 0.027 | 0.098 |
| PreFP | −0.052 | 0.026 | 0.104 |
| SIZE | 16.920 | 16.669 | 1.703 |

*End of Table 3*

| Panel C | | Jordan's sample (N. of Observations = 345) | |
| --- | --- | --- | --- |
| Variables | Mean | Median | Std. Deviation |
| VOL | 48.094 | 43.214 | 31.306 |
| LEV | 0.885 | 0.605 | 0.983 |
| ROA | −2.197 | 0.620 | 9.529 |

The three panels in Table 7 represent three samples within time series. In Panel A, the *FOG* mean is 16.1 and its standard deviation 2.25, indicating that data points are spread out over a broader range. Further, the mean and median values are close together, indicating normal symmetrical distribution for the UK sample data, where the mean *DA* is 0.034, with a slightly higher standard deviation of 0.052. The data for *PreFP* are narrowly distributed.

From Panel B, we observed that the behaviour of Spanish firms is very similar to that of UK firms, where the mean of *Adjusted FREF* is 17.61 and its standard deviation 4.86, indicating that firms using less readable disclosures are distributed over a narrow range of the Spanish sample. We observe, however, that Spanish firms, with a mean *DA* of 0.02 and a high standard deviation of 0.07, are more conservative in managing their earnings than are firms in the UK. Lara et al. (2020) argued that conservatism could limit managers' discretion in manipulating earnings by recognizing potential losses early and only recognizing potential gains when they are certain. The mean value of *PreFP* is 0.011 and its standard deviation 0.094, indicating data points spread out over a broader range.

Panel C shows the behaviour of Jordanian firms to be very similar to that of Spanish firms, especially in EMPs, where the mean *DA* is 0.03 and its standard deviation 0.098, indicating that the data spread over a broader range of values. The mean value of *PreFP* is −0.052 and its standard deviation 0.104, again indicating that data points are spread out over a broader range. However, the readability measure for Arabic texts as represented by the *CL Index* – a mean value of 6.9 and a standard deviation of 1.8 – indicates that the data extend over a narrow range of values. Thus, most Jordanian firms use a consolidated writing style because they repeat the same speech in the chairman's statement annually.

### 3.2. Empirical results

In Table 4, the Pearson's correlation coefficient reveals an association between variables in the three panels, enabling us to measure the linear correlation between two sets of data and ignore the type of relationship, as follows:

Table 4. Correlation analysis

| Panel A (UK sample) | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Variables | FOG | DA | PreFP | SIZE | VOL | LEV | ROA |
| FOG | 1 | | | | | | |
| DA | −0.199** | 1 | | | | | |

*End of Table 4*

| Panel A (UK sample) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Variables | *FOG* | *DA* | *PreFP* | *SIZE* | *VOL* | *LEV* | *ROA* |
| *PreFP* | 0.228** | −0.143** | 1 | | | | |
| *SIZE* | −0.363** | 0.135* | −0.225** | 1 | | | |
| *VOL* | −0.064 | 0.047 | −0.106* | −0.011 | 1 | | |
| *LEV* | −0.014 | −0.057 | −0.013 | −0.044 | 0.712** | 1 | |
| *ROA* | −0.039 | 0.182** | −0.075 | 0.299** | 0.065 | −0.01 | 1 |
| Panel B (Spanish sample) | | | | | | | |
| Variables | *Adjusted FREF* | *DA* | *PreFP* | *SIZE* | *VOL* | *LEV* | *ROA* |
| *Adjusted FREF* | 1 | | | | | | |
| *DA* | 0.172** | 1 | | | | | |
| *PreFP* | 0.357** | 0.139** | 1 | | | | |
| *SIZE* | 0.149** | 0.125 | 0.06 | 1 | | | |
| *VOL* | −0.208** | −0.033 | −0.066 | 0.264** | 1 | | |
| *LEV* | −0.085 | −0.053 | −0.028 | 0.278** | 0.596** | 1 | |
| *ROA* | 0.963** | 0.199** | 0.356** | 0.065 | −0.249** | −0.108* | 1 |
| Panel C (Jordanian sample) | | | | | | | |
| Variables | CL Index | *DA* | *PreFP* | *SIZE* | *VOL* | *LEV* | *ROA* |
| *CL Index* | 1 | | | | | | |
| *DA* | −0.287** | 1 | | | | | |
| *PreFP* | −0.368** | 0.069 | 1 | | | | |
| *SIZE* | −0.374** | 0.089 | 0.264** | 1 | | | |
| *VOL* | 0.460** | −0.083 | −0.284** | 0.118* | 1 | | |
| *LEV* | 0.068 | −0.067 | 0.049 | 0.218** | 0.272** | 1 | |
| *ROA* | −0.940** | 0.301** | 0.392** | 0.380** | −0.480** | −0.108* | 1 |

** Correlation is significant at the 0.01 level (2–tailed).
* Correlation is significant at the 0.05 level (2–tailed).

According to Panel A, the *FOG* indicator indirectly reduces investors' perceptions of management credibility (Ajina et al., 2016; Efretuei & Hussainey, 2022). The results thus indicate that more management of earnings leads to less readable disclosures, using the *FOG* index as an inverse association at a significance level of 1% ($p < 0.01$). The findings also indicate a correlation between readability of accounting narratives and financial performance achieved in pre-year at a significance level of 1% ($p < 0.01$). This result is more consistent with the desire of managers in the UK firms to manage their profits to achieve greater incentives, as financial performance in pre-year after removing discretionary accruals from that year is considered a more essential motivation for managers to run their earnings. According to Lo et al. (2017), the determinant *SIZE* is only related to readability of corporate disclosures at a significance level of 1% ($p < 0.01$).

In Panel B, a lower *Adjusted FREF* score indicates that the annual report is less readable (Moreno & Casasola, 2015). This result explains the positive correlation between readability of disclosures written in Spanish and management of earnings using discretionary accruals at a significant level of 1% ($p < 0.01$). Economic fluctuations seem, however, to play a major role in the financial performance achieved in the past year, as *PreFP* is positively associated with *adjusted FREF* at a significance level of 1% ($p < 0.01$). A set of determinants is also related to the readability of accounting narratives, including *SIZE*, *VOL*, and *ROA*, at a significance level of 1% ($p < 0.01$).

In Panel C, the *CL Index* is inversely related to readability of the annual report; the longer the sentences (more words), the higher the *CL Index* (Coleman & Liau, 1975). These outcomes indicate that more management of earnings leads to less readable disclosures, using the *CL index* as an inverse association at a significance level of 1% ($p < 0.01$). Economic fluctuations also played a major role in financial performance achieved in the past year in Jordan, as *PreFP* is positively associated with the *CL Index* at a significance level of 1% ($p < 0.01$). Finally, some financial factors are also related to readability of accounting narratives in Jordanian firms. These factors include *SIZE*, *VOL*, and *ROA*, at significance levels of 1% ($p < 0.01$). Since multiple regression analysis should not include independent and control variables with a bivariate correlation of more than 0.70 (Tabachnick & Fidell, 1996), we dropped the variable *ROA* to mitigate multicollinearity problems. We used a multiple linear regression to test the first three hypotheses, as follows (see Table 5).

Table 5. International comparison of readability indexes

| Variables | Model 1 FOG | | | Model 2 Adjusted FREF | | | Model 3 CL Index | | |
|---|---|---|---|---|---|---|---|---|---|
| | Coeff. | S.E. | Sig. | Coeff. | S.E. | Sig. | Coeff. | S.E. | Sig. |
| DA | −6.411 | 2.089 | *** | −4.094 | 2.55 | * | 0.011 | 0.034 | * |
| PreFP * DA | 5.588 | 1.635 | *** | −0.824 | 2.077 | ** | 0.872 | 0.301 | ** |
| SIZE | −0.784 | 0.155 | *** | 0.501 | 0.078 | *** | −0.033 | 0.22 | – |
| VOL | 0.037 | 0.521 | – | 0.01 | 0.002 | – | 0.021 | 0.001 | – |
| ROA | 0.385 | 0.23 | – | 0.245 | 0.031 | *** | −0.166 | 0.005 | *** |
| F | 26.347 | | *** | 22.13 | | *** | 34.35 | | *** |
| Constant | 8.796 | | | 6.137 | | | 7.07 | | |
| R-square | 0.182 | | | 0.635 | | | 0.887 | | |
| Adjusted R2 | 0.175 | | | 0.511 | | | 0.886 | | |
| No. of obs. | 360 | | | 425 | | | 345 | | |

*Note*: *$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

From the adjusted $R^2$ results in each sample, we affirm that the findings for the three samples have high explanatory power, but in varying proportion. In Model 1, R-squared is 0.182, meaning that the *DA* variable explains 18.2% of the variation in the *FOG*. Further, as the results indicate a strong causal effect between *DA* and *FOG* (P-value = 0.000), the relationship between *DA* and *FOG* variables is significant, enabling us to accept H1. The

results for the moderation effect indicate that the interaction variable ($PreFP * DA$) has a significant moderating effect on the relationship between $DA$ and $FOG$ at a level of 1% ($p < 0.01$). H2 is thus also accepted in this study. The effect of firm size was also apparent in the UK sample, where we observe a statistically significant relationship between $SIZE$ and $FOG$ at a level of 1% ($p < 0.01$). Hence, H3 is accepted.

In Model 2, R-squared is 0.635, meaning that $DA$ explains 63.5% of the variation in $Adjusted\ FREF$. The results also indicate a significant relationship between $DA$ and $Adjusted\ FREF$ at a level of 10% ($p < 0.10$), enabling us to accept H1. The results for the moderation effect indicate that the interaction variable ($PreFP * DA$) has a significant moderating effect on the relationship between $DA$ and $Adjusted\ FREF$ at a level of 5% ($p < 0.05$). H2 is thus also accepted in this study. The effect of control variables ($SIZE$ and $ROA$ in the Spanish sample) is also apparent, as we observe a statistically significant relationship between $SIZE$, $ROA$, and $Adjusted\ FREF$ at a level of 1% ($p < 0.01$). Hence, H3 is accepted.

In Model 3, R-squared is 0.887, meaning that $DA$ explains 88.7% of the variation in the $CL\ Index$. The results also indicate a significant relationship between $DA$ and $CL\ Index$ at a level of 10% ($p < 0.10$), enabling us to accept H1. The results for the moderation effect indicate that the interaction variable ($PreFP * DA$) has a significant moderating effect on the relationship between $DA$ and $CL\ Index$ at a level of 5% ($p < 0.05$). H2 is thus also accepted in this study. Finally, the effect of $ROA$ in the Jordanian sample is also apparent, where we observe a statistically significant relationship between $ROA$ and $CL\ Index$ at a level of 1% ($p < 0.01$). Hence, H3 is accepted.

This study thus combines the categories from each index into two main groups, those indicating reading difficulty (less readable) and the rest to another group (more readable), as shown in Table 6.

Table 6. The binary classification of the readability dummy variables ($RD$)

| Readability indexes | More readable | % | Less readable | % | Total % |
|---|---|---|---|---|---|
| FOG | 8–10 (childish) | 0.00% | 14–18 (difficult) | 83.89% | 100.00% |
|  | 10–12 (acceptable) | 7.22% |  |  |  |
|  | 12–14 (ideal) | 8.89% |  |  |  |
|  | Total % | 16.11% | Total % | 83.89% |  |
| Adjusted FREF | 90–100 (very easy) | 0.00% | 50–60 (fairly difficult) | 25.43% | 100.00% |
|  | 80–90 (easy) | 0.00% | 30–50 (difficult) | 27.76% |  |
|  | 70–80 (fairly easy) | 21.64% | 0–30 (very difficult) | 2.35% |  |
|  | 60–70 (standard) | 22.82% |  |  |  |
|  | Total % | 44.46% | Total % | 55.54% |  |
| CL Index | 5 and below (very easy to read) | 18.26% | 8–12 (fairly difficult to read) | 27.54% | 100.00% |
|  | 6 (easy to read) | 34.20% | 13–16 (difficult to read) | 0.00% |  |
|  | 7 (fairly easy to read) | 20.00% | 17 and above (extremely difficult to read) | 0.00% |  |
|  | Total % | 72.46% | Total % | 27.54% |  |

Following combination of the three subsamples into two main groups, we performed two-sample t-tests to determine whether average $D_{language}$ differs between these two groups based on the following null and alternative hypotheses (see Table 7 for results):

$$H0:\mu1=\mu2;$$

$$H1:\mu1\neq\mu2.$$

Because H4 is bi-directional (either more or less readable), a two-tailed test uses both positive and negative tails of the distribution in Table 7. That is, the p-value of the test (0.00), which corresponds to a t-value of –17.91 with a degree of freedom of 1128, is less than 0.05, indicating a significant difference between the two groups. The null hypothesis stating no significant difference in the means of each sample is thus rejected, indicating that the mean $D_{language}$ is different between less readable accounting disclosures and more readable.

Table 7. Two-sample t-test with equal variances

| *RD* groups | Obs. | Mean | Std. Deviation | | Std. Error Mean | |
|---|---|---|---|---|---|---|
| Less readable | 626 | 1.65 | 0.7090 | | 0.0280 | |
| More readable | 504 | 2.40 | 0.6840 | | 0.0300 | |
| $D_{language}$ (Independent) | F | Sig. (1-tailed) | t | d.f. | Sig. (2-tailed) | 95% Conf. of Interval |
| Equal variances assumed | 0.812 | 0.368 | –17.91 | 1128 | 0.00 | –0.829 | –0.666 |
| Equal variances not assumed | | | –17.98 | 1092 | 0.00 | –0.829 | –0.666 |

The second econometric model adopted in this study is logistic regression to study the probability of relationships between two dependent groups in order to predict which languages exert stronger influence on accounting disclosures. The results displayed in Table 8 show that the number of the chairman's statements studied for the less readable group is greater than that studied for the more readable group, and that the number of chairman's statements expected for the less readable group will increase by 57.1%. According to likelihood ratio tests from the model fit information, the final model significantly improves fit over a null model $\{X^2(6) = 701.109, p < 0.001\}$, and Pearson's chi-square test indicates that the model fits the data well $\{X^2(1123) = 7918.342, p < 0.001\}$.

As for the parameter estimates, the research findings identify $D_{language}$ as a significant predictor (B = –4.084, S.E. = 0.321, p < 0.001), and the odds ratio of 0.017 indicates that the amount of less readable content in the chairman's statement will decrease in all research populations. As to probability of each language affecting the less readable group, (i) English language is a significant predictor (B = 6.402, S.E. = 0.437, p < 0.001); its odds ratio of 602.947 indicates that the amount of less readable content in the chairman's statement written in English will increase; (ii) Spanish language is a significant predictor (B = 2.315, S.E. = 0.294, p < 0.001); its odds ratio of 10.123 indicates that the amount of less readable content in the chairman's statement written in Spanish will increase; (iii) Arabic language is a significant predictor (B = 1.772, S.E. = 0.433, p < 0.001); its odds ratio of 5.884 indicates that the amount of less readable content in the chairman's statement written in Arabic will increase. H4 is thus accepted.

Table 8. Logistic regression results

| Groups | Observed | | Predicted | | |
|---|---|---|---|---|---|
| | | | Less readable | More readable | Percent correct |
| Less readable | 626 | 55.40% | 565 | 61 | 90.30% |
| More readable | 504 | 44.60% | 80 | 424 | 84.10% |
| Overall | 1130 | 100.00% | 57.10% | 42.90% | 87.50% |
| Likelihood ratio tests | | | Chi-square | d.f. | Sig. |
| Model fitting information | | | 701.109 | 6 | 0.00 |
| Goodness-of-fit (Pearson) | | | 7918.342 | 1123 | 0.00 |
| *RD*[a] | | B | Std. Err. | Sig. | Exp(B) |
| Less readable | Intercept | 10.476 | 1.021 | 0.000 | |
| | $D_{language}$ | −4.087 | 0.321 | 0.000 | 0.017 |
| | English | 6.402 | 0.437 | 0.000 | 602.947 |
| | Spanish | 2.315 | 0.294 | 0.000 | 10.123 |
| | Arabic | 1.772 | 0.433 | 0.000 | 5.884 |
| | *DA* | −16.264 | 1.548 | 0.000 | 0.000000086420 |
| | *PreFP*DA* | 8.071 | 0.498 | 0.000 | 3.182 |
| | *SIZE* | −0.146 | 0.048 | 0.003 | 0.864 |
| | *VOL* | 0.005 | 0.001 | 0.00 | 1.005 |

*Note*: a. The reference category is: More readable.

The results above show that language differences affect the readability of accounting disclosures, and that the likelihood of this effect will continue to increase. Although language does not influence accounting narratives because it is objective and neutral, linguistic approaches can be used to either strengthen or weaken readability index scores, depending on managers' intentions. In the absence of basic writing guidelines for accounting narratives in non-English languages or of a code of ethics that considers language differences when preparing accounting disclosures, such intentions may motivate managers to adopt EMPs (Gutiérrez Ponce et al., 2023). Table 9 summarizes the results of hypothesis testing, as follows.

Table 9. Summary of hypothesis test result

| Hypo-thesis | Logistic regression | | Multiple linear regression | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Readability dummy variable | | *FOG* | | *Adjusted FREF* | | *CL Index* | |
| | Accepted | Rejected | Accepted | Rejected | Accepted | Rejected | Accepted | Rejected |
| *H1* | ✓ | – | ✓ | – | ✓ | – | ✓ | – |
| *H2* | ✓ | – | ✓ | – | ✓ | – | ✓ | – |
| *H3* | ✓ | – | ✓ | – | ✓ | – | ✓ | – |
| *H4* | ✓ | – | N/A | N/A | N/A | N/A | N/A | N/A |

| Hypo-thesis | Logistic regression | | Multiple linear regression | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Readability dummy variable | | *FOG* | | *Adjusted FREF* | | *CL Index* | |
| | Accepted | Rejected | Accepted | Rejected | Accepted | Rejected | Accepted | Rejected |
| In sum | *H1 is accepted 4 times, and rejected 0; therefore, it is clearly acceptable.* | | | | | | | |
| | *H2 is accepted 4 times, and rejected 0; therefore, it is clearly acceptable.* | | | | | | | |
| | *H3 is accepted 4 times, and rejected 0; therefore, it is clearly acceptable.* | | | | | | | |
| | *H4 is accepted 1 time, and rejected 0; therefore, it is clearly acceptable.* | | | | | | | |

## 4. Discussion of results

H1 asserted a relationship between readability of accounting narratives and EMPs in the countries analyzed. These findings are consistent with Besuglov and Crasselt (2021), indicating that the *FOG* index (negatively related to readability) is associated with higher levels of EMP and implying that companies with less readable disclosures tend to use more EMPs.

These results confirm what has been found in previous literature. Hooghiemstra et al. (2017) found that the effectiveness of obfuscation lies in opportunistic managerial influence over stakeholder decisions by making reports more difficult to read. Further, Souza et al. (2019) provide evidence that managers intentionally add complexity to narrative accounting disclosures to make the disclosures less readable and thus obscure information about poor company performance.

As for the second hypothesis, on the moderation effect of the interaction variable (*PreFP*DA*), the results of all study samples indicate that the financial performance in the last year has a significant moderating effect on the relationship between *DA* and readability indexes at a significance level of 1% (p < 0.01), 5% (p < 0.05), and 5% (p < 0.05) in the UK, Spanish, and Jordanian samples, respectively.

These results confirm what has been found in previous literature. Both Li (2008) and Luo et al. (2018) demonstrated that firms' past performance signals to management the need to obfuscate information to make the accounting narrative less readable. Less readability, in turn, forces shareholders to seek help from analysts in understanding the content of these disclosures, increasing agency costs.

Following Lim et al. (2018), this study used some determinants of the readability of accounting disclosures as control variables. Our results indicate that larger firms have more complex accounting disclosures due to high EMPs, leading to less readable accounting narratives. Firm profitability also helps managers to mitigate adoption of EMPs. Further, our findings indicate that firms operating in more volatile business environments provide less readable accounting disclosures to avoid adverse market reactions. These results confirm what has been found in previous literature (Loughran & McDonald, 2013; Sun, 2023).

H4 was bi-directional, suggesting that more or less readable accounting disclosures were expected. The two-tailed test showed a significant difference between the two groups, with

the p-value of the test (0.00) below 0.05, indicating difference between less and more readable accounting disclosures in the mean $D_{language}$.

The research findings also indicate a significant correlation between $D_{language}$ and readability scores derived from EMPs at 1% (p < 0.01). Further, the odds ratio of 0.017 suggests that less readable content in the chairman's statement will decrease for all study samples. H4 was thus accepted, highlighting the significant influence of language differences on the readability of accounting disclosures due to EMPs.

The accounting literature also supports the results of this study, as interpreted by Gutiérrez Ponce et al. (2023). For instance, Sandell and Svensson (2016) argued that language failure could reflect management's inability to communicate effectively, leading to disclosures that include less readable justifications and excuses. Chen et al. (2017) further confirmed that changes in the relative importance of different languages contribute to heterogeneity in corporate behaviour. Besuglov and Crasselt (2021) argued that language proficiency affects readability, as intermediate level language prevents stakeholders from reading accounting disclosures effectively. Rjiba et al. (2021) added that managers might use '"technical accounting terms" to present justifications behind adverse outcomes to avoid managerial responsibility that affects the cost of equity, leading to increased annual report complexity and ambiguity. Tailab and Burak (2021) also found little effect of linguistic style on accounting disclosures due to the market reaction. Finally, Hannah et al. (2022) argue that managers may deliberately use unnecessary terms in accounting narratives to further their agenda of preventing shareholders from understanding the company's real situation.

## Conclusions, implications, and limitations

Our findings indicate that EMPs significantly affect disclosures, making them less readable. Firms prefer to manage their earnings based on accruals because they conduct accrual EMPs at the end of the period, which helps them determine the amount of earnings before manipulation. Opportunistic management resorts to an ambiguous writing style, preparing a less readable accounting narrative to hide the impact of EMPs. The research results indicate that the previous year's financial profitability also plays a role, after subtracting the value of discretionary accruals. This profitability modifies the relationship between readability of the accounting narratives and EMPs. Our study also indicates that some financial determinants contribute to EMPs' impact on the readability of accounting narratives.

We thus conclude that managers in poorly performing firms exploit linguistic approaches, adopting a writing style that makes accounting narratives more complex, and making the outcomes of readability indexes for disclosures written in different languages remain convergent.

Finally, considering linguistic difference, the readability of the narrative portion in corporate reports makes it easier for regulators, investors, and other stakeholders to effectively communicate value-related information among companies, stakeholders, and potential users.

This study has many strengths. One major strength is its synthesis of knowledge about the readability literature in various disciplines to apply recent trends in readability research to accounting disclosures. These trends focus on two main factors that significantly influence

research outcomes: (i) advances in technology and (ii) accounting scholars and researchers' ability to develop methodologies from other related research fields to increase knowledge so that readability research thrives in the accounting literature. Some weaknesses in readability research are, however, lack of consensus on a definition of the term, the diversity of readability formulas, and new methodologies and automation programs that produce different results.

Our study also has significant implications. The findings reported in this paper will help decision-makers to better understand the quality and readability of accounting narratives derived from EMPs. Our study also has implications for how stakeholders, accounting policymakers, auditors of financial statements, and academics understand the relationship between reporting accounting narratives and EMPs. Finally, this study opens a horizon of future research directions that could benefit researchers who must consider linguistic differences in the wording of the voluntary disclosures based on the US GAAP and IFRS, as such differences may reduce the readability of accounting narratives.

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