



The Effect of Financial Statement Readability on Audit Report Readability

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ABSTRACT

The main objective of the present study is to assess the relationship between financial statement readability and audit report readability. The procedure of the study is descriptive correlation based on published information from listed firms on the Tehran Stock Exchange from 2013 to 2022 with a sample of 143 firms (1287 observations). The method used for hypothesis testing is linear regression using panel data. The results indicate a positive and significant relationship between the readability of financial statements and the readability of the audit report based on the three indicators of text length and Felsch. In this paper, in contrast with the previous studies, four indicators have been used to measure financial statement readability, three of which are the FOG, Text Length, and Felsch, and the fourth one is a new indicator that is used for the first time obtained from the exploratory factor analysis of the above three indicators. Moreover, Since the present focus on emerging financial markets such as Iran has been examined to determine the relationship between the readability of financial statements and the readability of the audit report, it can bring helpful information in this regard for readers. Also, in the present study, three indicators have been used to measure the readability of the audit report, which can help obtain valuable results.

Keywords:

financial statement readability, audit report readability

1. Introduction

Financial statement auditing is one of the essential pillars of accreditation and provides investors with high-quality information; auditors try to plan and implement the audit process by adopting appropriate strategies to provide the necessary evidence and documents, present expert and professional opinion, and minimize audit risk. The audit report is an important document and a link between the auditor and the users (Mareque et al., 2015). Due to its extensive consequences for the users of financial reports, the audit report has always been of great concern to scholars and is studied differently. According to the study by Mock et al. (2013), the studies on audit reports can be divided into two groups:

The first group of studies paid attention to the information content of audit reports. In other words, they seek to answer what information should be considered in audit reports. For example, Gray et al. (2011) show that understanding the basic concepts used in an audit report, including partial trust, significance, and sampling, is a problem for users. Hence, most users only rely on the type of audit opinion and do not review the report content. Moreover, studies conducted by CFA Institute (2010) also show that 94% of users of audit reports believe that more information should be released about audit reports.

The second group analyses the reaction of users to financial information proposed by the auditor. For example, Church et al. (2008) illustrate that the expectation gap between the auditor and audit report users after publishing ISA700 and SAS50 is declined. Rezee et al. (2012) show that the market emphasizes effective internal controls. The conducted studies (Tan et al., 2015) showed that users' reaction to a contextual aspect of financial reports is not limited and is influenced by formal and linguistic features. Hence, audit report readability (the degree of ease in understanding a text) is expected to affect the reaction of users, like other financial reports. That can pave the way for conducting studies on audit report readability. For example, Smith (2019) assesses the effect of ISA700 on the tone and readability of audit reports in England and figures out that after the publication of ISA700, the readability of audit reports has increased with a more negative unconfident tone.

The present study is among those that assess the non-contextual aspects of audit reports. In other words,

in this paper, we emphasize one of the linguistic aspects (writing style), readability. In other words, this paper assesses the effect of financial statement readability on audit report readability. It seeks to answer "whether the readability of reported financial statements by the management can contribute to more readability of audit reports."

Readability can depend on the physical or contextual aspect of texts; the former is more concerned about design, font, eye structure, and visual processes; the latter concerns some topics, like text length, base lexicons, sentence structure, etc., and semantic and grammatical ambiguities. In this paper, by readability, we mean contextual aspect, defined as the ease of understanding concerning the type of text (Pound, 1981).

Although the phenomenon of readability has been referred to many times in the literature on financial reporting and its effect on the decisions of financial statement users, including investors (e.g. Asay et al., 2017; Bagheri Azghandi et al., 2018) and financial analysts (Lehavy et al., 2011) is approved, there are a few studies (e.g. Pound, 1981; Smith, 2019; Fakhfakh, 2015, 2016) are concerned about audit report as an independent entity in financial statements and studied the readability. However, none assessed the effect of financial statement readability on audit report readability, so there is a gap, and the present study attempts to resolve the issue. The innovation is that in contrast with most of the conducted studies that examined that readability as a criterion, this paper has used three existing indices of readability, involving FOG, Text Length, and Felsch, that can give more interest to the topic of the study since the previous ones yielded different results in the topical literature. Loughran and McDonald (2014) assert that the FOG index is not an appropriate measurement of the readability of financial documents. In contrast, they express that the text length of annual reports can be a good criterion for annual report readability since, in their view, the text length of annual reports outperforms the FOG index. Besides, compared with the FOG index, the text length of annual reports is easier and can be confirmed easily. With the increase of information disclosure requirements to improve information transparency and reduce information asymmetry, researchers have noticed the usefulness of information text for external users. By reviewing the topical literature, we conclude that the result of most

of the conducted studies has been as follows: assessing the relationship between annual report readability and agency costs (Lou et al., 2018), annual report readability, and performance of Indian banks (Jayasree & Shette, 2021), financial reporting readability and risk criteria of an audit project (Kazemiolum et al., 2020) annual report readability and financial performance of firms (Kare & Baker, 1992), audit response to annual reports readability (Salehi et al., 2020), annual report readability and audit fee (Rezvani & Barandak, 2019), so the study results can bring helpful information for the practitioners in this field.

Since Iran has not assessed all three indicators in one study so far, the present study also seeks to investigate which indicator's effect was better. By integrating these three indicators based on exploratory factor analysis, a new indicator has been achieved, combining these three indicators. The research hypothesis has been tested with the indicator once, and finally, these indicators are compared with each other regarding the amount of evaluation.

Therefore, the main goal of the present study is to examine the relationship between financial statement readability and audit report readability. This paper can contribute to the richness of the literature on the readability of financial statements and audit reports.

Theoretical Principles and hypothesis development

Readability means the chance of success of the reader in reading and understanding a text. The main objective of studying readability is to estimate the hardness of reading and understanding a text for a particular community, including children, students, foreign language learners, people with mental disabilities, etc. This can be achieved by assessing the linguistic features of a text (François, 2015). The readability of texts should follow the reader's readability, for whom the text is written. In auditing studies, readability is usually the degree of complexity in the writing style that affects the reader's understanding of the text (Asay et al., 2017). Pound (1981) carries out one of the first studies on audit report readability, where he considers audit reports as a tool for transferring concepts from auditors to financial statement users. The efficiency of an audit report is a function of readability and ease of understanding materials. He believes that the physical

presence of an audit report in a bank statement bears a meaning, but that is not enough if we do not mind how the note is written to transfer the message effectively. An appropriate association between auditors and financial information users occurs when the messages are delivered to the receivers as expected by the auditors. However, when auditors face increasing complexity and ambiguity in the text of the financial statements, they issue the audit report with a delay to reduce the audit risk (Abernathy et al., 2015). The illegibility of the audit report can harm the understanding of the users and make their decision-making quality problematic; Therefore, examining the factors influencing the text readability of the audit report as an essential source of information can help to solve this problem to some extent.

The content of the audit report is critical due to its consequences for the users, and it is very effective to use understandable words and not to use complex and difficult expressions. Fakhfakh (2016) points to the criticisms about the understandability of audit reports and analyses the linguistic problems of audit reports in combined financial statements provided according to international audit standards No. 700. He figures out that the standard requirements contrast with linguistic principles. Auditors should attempt to optimize the readability of their reports and keep the said standards to the point possible. Moreover, Fakhfakh (2016) indicates that the readability problem Pound (1981) mentioned was not resolved after several decades. He also posits that audit reports are not understandable for most users. The readability of the audit report contributes significantly to the readability of financial statements provided by the management. Managers use discretionary disclosure as a tool to reduce negative agency effects and as a mechanism to signal the capital market to improve decision-making. Therefore, transparency and the ability to understand a significant part of the information are vital for understanding and interpreting the information presented in the text of the financial statements (Luo et al., 2018). In other words, the complexity of financial statements proposed by the management can contribute to the amount of un/readability of audit reports. Information disclosure that is complex in terms of content reduces the readability of financial reports and is expected to cause difficulties for investors in processing financial information and reduce their usefulness (Boubaker et al., 2019).

Theoretically, annual reports are an essential communication bridge between management and shareholders outside the firm. Investors outside the firm and small shareholders can collect information through annual reports about financial status, financial performance, and cash flow and, following that, evaluate the growth perspective and qualification of the firm (Luo et al., 2018). Not all investors are able to understand complex reports quickly. Therefore, companies should avoid publishing complicated, long or unnecessary reports (Ajina et al., 2016). Until the information is understood, there will be no ability to use it later. Therefore, one of the critical factors for obtaining comprehensible information is reading and processing the material correctly while reading. Financial statement users expect independent auditors responsible for crediting financial statements to assess the reliability of statements and deliver the audit report in an understandable and readable way (Luo et al., 2018).

Hence, we can conclude that financial statement readability influences the readability of an audit report. Readability affects investors' decisions, and low readability can hinder their understanding of investors about financial reports. Financial statement users, particularly investors, assess the proposed information by firms to meet the information needs and decide appropriately. If the information helps make decisions, it may be understandable. The value of existing information in a text can only be realized when text readability is high. Audited financial statements can ensure that investors and creditors are reliable. Hence, auditing financial statements can bring added economic value to a firm. The conducted studies on financial statement readability and audit report readability are as follows: Smith (2016) reveals that audit report readability, in addition to external variables, including standards, is under the effect of expertise and audit firm size. Salehi et al. (2022) found a negative and significant relationship between the auditor's characteristics (tenure, compensation, and expertise) and audit report readability. In addition, the variables of narcissism, self-confidence, and obligatory auditor change have a positive and significant relationship with audit report readability. Luo et al. (2018) also observe that firms with better readability in annual reports experience lower agency costs and find a negative relationship between

readability and agency costs in firms with high audit quality.

Pramata et al. (2022) found that the more a company is involved in tax avoidance, the less the readability of financial statements would be. Salehi et al. (2022) found a negative and significant relationship between managerial entrenchment and actual and accrual profit management and audit report readability based on the Fog index, and a positive and significant relationship between management narcissism, CEO overconfidence, and the board effort and the audit report readability. Besides, they found a negative and significant relationship between managerial entrenchment, CEO overconfidence, actual and accrual profit management, and audit report readability based on text length and the Felsch index. They also showed that CEO narcissism and effort have a positive and significant relationship with the board and audit report readability based on these indicators. Xu et al. (2018) state that old managers present high-quality annual reports compared with newer ones. Arianpoor and Sahoor (2022) showed that all methods of calculating financial reporting quality, cost leadership strategy, differentiation strategy and the readability of the annual report positively and significantly affected the quality of financial reporting. Salehi et al. (2020) show a positive relationship between delay in the audit report and financial statement readability and a negative and significant relationship between readability and delivering a report about the continuity of activity. Hassan (2017) showed that capable managers publish more readable and understandable financial statements to inform investors and analysts about the company's performance and show their capabilities.

Arora Chauhan (2023) investigated whether the readability of financial statements leads to the reduction of foreign investors' information losses. Their research showed that the readability of financial statements, or in other words, readable financial statements, leads to the attraction of foreign investors and is a competitive advantage for business units that are less competitive in industries.

Aldoseri and Melegy (2023) also showed that the readability of financial statements leads to increased information efficiency and stock liquidity. This means that the more readable the financial statements are, the more efficient the shares' information and liquidity will be.

So, regarding the above facts, the research hypothesis is as follows:

H1: There is a positive and significant relationship between financial statement readability and audit report readability.

2019. The systematic elimination method is used for samplings, and after imposing the following conditions, the statistical sample of the study is selected in Table 1.

Research Methodology

The statistical population of this paper includes all listed firms on Tehran Stock Exchange from 2013 to

Table (1): The number of companies in the statistical community and applying conditions for sample selection

Description	Removed companies	Total number of companies
All companies admitted to the Tehran Stock Exchange.		395
Removal of financial intermediation, financing, insurance and investment companies	88	
Removal of companies that entered the stock market during the research period	24	
Companies that have stopped during the year	112	
Removal due to lack of access to information	43	
Statistical Society		128

Data analysis

The data analysis method is cross-sectional and year-by-year (panel data). This paper uses the multivariate linear regression model for hypothesis testing. Descriptive and inferential statistical methods are used for analyzing the obtained data. Hence, a frequency distribution table is used for describing data. At the inferential level, the F-Limer, Hausman test, test of normality, and multivariate linear regression model are used for hypothesis testing.

Research model

The following model is used to test the hypothesis of the study. To assess the study's dependent variable (audit report readability), three indices of FOG, Text Length, and Felsch are used. Hence, the following model is examined three times using the variables of FOG, Text Length, and Felsch.

Model (1)

$$\begin{aligned}
 &auditreadability_{it} \\
 &= a_0 + a_1readability_{it} \\
 &+ a_2achange_{it} + a_3loss_{it} \\
 &+ a_4size_{it} + a_5mchange_{it} \\
 &+ a_6bind_{it} + a_7AEM_{it} \\
 &+ a_8REM_{it} + a_9mtenure_{it} \\
 &+ a_{10}year_{it} + a_{11}industry_{it} \\
 &+ \varepsilon_{it}
 \end{aligned}$$

Model (1-1)

$$\begin{aligned}
 &Index_{it} = a_0 + a_1readability_{it} + a_2achange_{it} \\
 &+ a_3loss_{it} + a_4size_{it} \\
 &+ a_5mchange_{it} + a_6bind_{it} \\
 &+ a_7AEM_{it} + a_8REM_{it} \\
 &+ a_9mtenure_{it} + a_{10}year_{it} \\
 &+ a_{11}industry_{it} + \varepsilon_{it}
 \end{aligned}$$

Model (1-2)

$$\begin{aligned}
 &Felesh_{it} = a_0 + a_1readability_{it} + a_2achange_{it} \\
 &+ a_3loss_{it} + a_4size_{it} \\
 &+ a_5mchange_{it} + a_6bind_{it} \\
 &+ a_7AEM_{it} + a_8REM_{it} \\
 &+ a_9mtenure_{it} + a_{10}year_{it} \\
 &+ a_{11}industry_{it} + \varepsilon_{it}
 \end{aligned}$$

Model (1-3)

$$\begin{aligned}
 &ARA_{it} = a_0 + a_1readability_{it} + a_2achange_{it} \\
 &+ a_3loss_{it} + a_4size_{it} \\
 &+ a_5mchange_{it} + a_6bind_{it} \\
 &+ a_7AEM_{it} + a_8REM_{it} \\
 &+ a_9mtenure_{it} + a_{10}year_{it} \\
 &+ a_{11}industry_{it} + \varepsilon_{it}
 \end{aligned}$$

Dependent variables

Audit report readability (readability) is calculated using the following three indices:

- **FOG index:**

To calculate the readability of financial statement notes, we used the study of You and Zhang (2009),

Lawrence (2013), and Ajina et al. (2016). The financial reporting readability index is FOG (FOGIND) which is a function of two variables of sentence length (based on words) and complicated words (defined in the form of the number of three or multi-syllabus words) and is calculated as follows:

FOG index = (average no. of words in each sentence + percentage of complicated words) * 0.4

The process and manner of determination of financial reports' level of readability in the above index are as follows:

- 1) Selecting a 100-word sample from the beginning, a 100-word sample from the middle, and a 100-word sample from the end of the report, randomly;
- 2) Counting the number of sentences of each sample; and,
- 3) Determining average sentence length by dividing the number of words into the number of complete sentences of each sample of 100-word;
- 4) Counting the number of existing three-syllabus and more than three-syllabus words (complicated words) in each 100-word text;
- 5) Adding the number of complicated words with the average number of words in sentences;
- 6) Multiplying the number of complicated words and average words in sentences by the fixed figure of 0.4;
- 7) Calculating no. 4, 5, and 6 for two other 100-word samples; and,
- 8) Calculate all three samples' average results by adding and dividing by a number.

The relationship between the FOG index and readability level is as follows: FOG>18 means the text is not readable and more complicated; 14-18 (hard text), 12-14 (average text), 10-12 (acceptable text), 8-10 (easy text).

- **Text length index (INDEXT):**

The second index for financial reporting readability is text length (indevt), which is calculated as follows:

Text length index = Ln number of text words

Since higher values of the above indices indicate lower readability of financial reporting, each calculated index is multiplied by -1 to obtain a direct criterion from the financial reporting readability index.

- **Felsch Index:**

Felsch index determines the degree of difficulty or simplicity of the text based on two linguistic factors

average sentence length and the number of syllables of each sample.

Felsch readability index = average number of words * -1.015 (average words length* 262.835 – 84.6)

The process and manner of placement of financial reporting readability in the above index are as follows:

- 1) Calculating average word length: syllables are counted in the text and divided into total numbers of the text;
- 2) Word length is multiplied by 84.6;
- 3) The obtained figure from the previous step is subtracted from 206.835;
- 4) Calculating the number of average words: the number of words in the text is divided into the number of complete sentences;
- 5) The average number of words is multiplied by 1.015, and,
- 6) The obtained figure from the previous step is subtracted from the one calculated in the third step to determine the degree of text simplicity.

The relationship between the Felsch index and readability level is as follows: 71 or higher (extremely simple), between 60 and 70 (normal readability), and lower than 60 (hard and unreadable).

Independent variables:

FOG: financial statement readability: To calculate the readability of financial statement notes, we used the study of You and Zhang (2009), Lawrence (2013), and Ajina et al. (2016). The financial reporting readability index is FOG (FOGIND) which is a function of two variables of sentence length (based on words) and complicated words (defined in the form of the number of three or multi-syllabus words) and is calculated as follows:

Control variables

Mtenure: CEO tenure. The duration the CEO has consistently been in the position until the year under study;

Mchange: CEO change. If the CEO has changed during year 1, otherwise, 0;

Atenure: audit tenure. The duration the auditor has consistently been in the position until the year under study;

Loss: firm loss, should the firm lose in the year under study 1; otherwise, 0;

Size: firm size, the natural logarithm of firm assets;

REM: real earnings management. Abnormal cash flow (EM_CFO), abnormal cost (EM_PROD) and abnormal discretionary costs (EM_DISX) are used for measuring firm sales control, production control, and discretionary costs control. Formula (2) is used for estimating the abnormal cash flow of the firm (EM_CFO), formula (3) for estimating the abnormal production cost of the firm (EM_PROD), and formula (4) for estimating the abnormal discretionary cost of the firm (EM_DISX) (Cohen and Zarowin, 2010; Zang, 2012). This paper uses the formula (4) to estimate real earnings management.

$$\frac{CFO_{i,t}}{A_{i,t-1}} = \beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{S_{i,t}}{A_{i,t-1}} + \beta_3 \frac{\Delta S_{i,t}}{A_{i,t-1}} + \delta_{i,t} \quad (2)$$

$$\frac{PROD_{i,t}}{A_{i,t-1}} = \beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{S_{i,t}}{A_{i,t-1}} + \beta_3 \frac{\Delta S_{i,t}}{A_{i,t-1}} + \beta_4 \frac{\Delta S_{i,t-1}}{A_{i,t-1}} + \delta_{i,t} \quad (3)$$

$$\frac{DISX_{i,t}}{A_{i,t-1}} = \beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{S_{i,t-1}}{A_{i,t-1}} + \delta_{i,t} \quad (4)$$

$S_{i,t}$ in formula (2) is the sales income of the firm i in the year t . $PROD_{i,t}$ in formula (3) is the total cost of the firm i of product in the year t , equal to the total product cost and change in inventory.

$DISX_{i,t}$ in formula (4) is the total office costs and sales costs of the firm i in the year t . For a

Similar industry and year, given the formula (2), (3), and (4), EM_COF (abnormal cash flow of the firm), EM_PROD (abnormal production cost), EM_DISX (abnormal discretionary costs) are assigned to the regression residuals. Since the firm may select a combination of these three ways, we used Cohen and Zarowin (2010) and Zang (2012) to create a total index of real earnings management:

EM PROXY = EM PROD – EM CFO – EM DISX
 AEM: accrual-based earnings management, for the calculation of which the adjusted Jone’s model is used. The coefficients are estimated through equation (5):

$$\frac{TA_{i,t}}{Assets_{i,t-1}} = \alpha_1 \left(\frac{1}{Assets_{i,t-1}} \right) + \alpha_2 \left(\frac{\Delta Sales_{i,t}}{Assets_{i,t-1}} \right) + \alpha_3 \left(\frac{PPE_{i,t}}{Assets_{i,t-1}} \right) + \varepsilon_{i,t} \quad (5)$$

After estimating the coefficients, non-discretionary accruals will be calculated after coefficient estimation:

$$\frac{NDA_{i,t}}{Assets_{i,t-1}} = \alpha_1 \left(\frac{1}{Assets_{i,t-1}} \right) + \alpha_2 \left(\frac{\Delta Sales_{i,t} - \Delta AR_{i,t}}{Assets_{i,t-1}} \right) + \alpha_3 \left(\frac{PPE_{i,t}}{Assets_{i,t-1}} \right) \quad (6)$$

Finally, for the calculation of the discretionary accruals, we have:

$$\frac{DA_{i,t}}{Assets_{i,t-1}} = \frac{TA_{i,t}}{Assets_{i,t-1}} - \frac{NDA_{i,t}}{Assets_{i,t-1}} \quad (7)$$

The above equation A is accruals, total assets, sales income, AR accounts receivable, PPE is gross properties, machinery, and instrument, and NDA is non-discretionary accruals.

In this paper, the following formula is used for calculating accruals which are referred to as profit and loss:

Accruals = Operational cash flow – profit before unpredicted items

Year: dummy variable for the year.

Achange:

Bind:

Industry: dummy variable for the industry.

Data analysis

Descriptive statistics

The audit report readability variable uses three FOG, Text Length, and Felsch indices. The study data were obtained from 143 firms during 2013–2022. Tables 2 and 3 display the information related to research variables, including the number of observations, mean, standard deviation, minimum, and maximum.

ARA: is audit report readability, obtained through the exploratory factor analysis of three Fog indicators; text length and Flesch are calculated.

According to the central limit theorem, whether the sample is selected from a normal or abnormal society, despite the number of observations of more than 30 in the sample (more than 1281 observations in this paper for each variable), The selected sample will have a normal distribution. Hence, parametric tests of t , z , F , etc., can be used to perform various tests.

Table 2: descriptive statistics of quantitative research variables

Sign	Variable	Observation	Mean	Standard deviation	Minimum	Maximum
Audit Readability	Fog index	1.287	-21.615	1.618	-23.802	0.080
Index	Text length	1.281	7.144	0.309	6.422	8.268
Felsch	Felsch indicator	1.281	99.817	18.493	60.309	177.105
ARA	Audit report readability	1.287	9.687	10.001	-1.985	38.407
Readability	Readability of financial statements	1.287	-15.974	1.526	-21.930	-13.904
Size	Firm	1.287	14.293	1.381	10.533	19.774
Blnd	Board Independence	1.285	0.695	0.194	0	1
AEM	Accrual earning management	1.285	0.005	0.174	-0.853	0.996
REM	Real earning management	1.285	0.001	0.012	-0.047	0.132

Source: research findings

Table 3: descriptive statistics of qualitative research variables

Sign	Variable	Observation	Mean	Standard deviation	No. of 0	No. of 1
Achange	Audit Readability	Fog index	1.287	-21.615	1.618	-23.802
Loss	Index	Text length	1.281	7.144	0.309	6.422
Mchange	Felsch	Felsch indicator	1.281	99.817	18.493	60.309

Source: research findings

Collinearity test

Table (4) shows the results of the VIF collinearity test for these four regressions. According to the statistics obtained, VIF for all the variables of all four models

was calculated to be less than 10; hence, there is no collinearity between any of the variables of the first to fourth models. Therefore, there is no problem of collinearity in the considered regressions.

Table 4: The results of the collinearity test of the research models

Variable	Model 1		Model 2		Model 3		Model 4	
	VIF	1/VIF	VIF	1/VIF	VIF	1/VIF	VIF	1/VIF
Mchang	1.23	0.811	1.25	0.800	1.24	0.805	1.28	0.780
Mtenure	1.22	0.818	1.24	0.807	1.24	0.810	1.25	0.803
Loss	1.11	0.898	1.14	0.875	1.14	0.877	1.14	0.876
Blnd	1.05	0.949	1.08	0.922	1.07	0.932	1.09	0.914
Aem	1.05	0.951	1.07	0.934	1.07	0.936	1.06	0.943
Rem	1.02	0.983	1.04	0.963	1.02	0.980	1.06	0.948
Size	1.01	0.986	1.04	0.958	1.02	0.978	1.04	0.957
Achange	1.01	0.989	1.03	0.974	1.01	0.988	1.07	0.937
Readability	1.01	0.990	1.03	0.976	1.02	0.980	1.02	0.979
ind7			1.04	0.964	1.03	0.971		
ind4			1.04	0.965	1.03	0.969		
ind14			1.02	0.979			1.03	0.970
ind13			1.09	0.918	1.07	0.939	1.05	0.948
y98			1.06	0.942			1.81	0.553
y99			1.06	0.943			1.8	0.556
ind16			1.05	0.957				
y94			1.04	0.957			1.79	0.560
y96							1.84	0.543
y95							1.79	0.558
y97							1.81	0.552
y93							1.78	0.563
y400							1.82	0.549

Integration test results

According to the integration test results presented in the table below, the calculated F-statistics for the first to fourth research models were obtained as 7.38, 4.37, 8.96 and 922.87, respectively. The null hypothesis that the data are integrated at the 99% confidence level is rejected for all four models. Therefore, the panel data model should be used to estimate the coefficients of these models.

Test results to determine fixed or random effects

According to Table (6), the Hausman test statistic based on the estimate for the first to fourth models is 8.60, 42.59, 37.52 and 32.54, respectively. Unlike the first model, the calculated χ^2 value is greater than the χ^2 statistic in the table, and the null hypothesis is rejected at the 99% confidence level. Therefore, the fixed effects model is more suitable for estimating the second, third and fourth models. To estimate the first model, the random effects method is more suitable.

Table 5: Results of integration test of regressions

	Calculated statistic	Probability level
Model 1	7.38	0.000
Model 2	4.37	0.000
Model 3	8.96	0.000
Model 4	922.87	0.000

Source: research findings

Table 6: results of Hausman test of regressions

	Calculated statistic	Probability level
Model 1	8.6	0.475
Model 2	42.59	0.001
Model 3	37.52	0.000
Model 4	32.54	0.027

Source: research findings

Results of the correlation matrix

This test examines the relationship between the variables used in the models two by two, the output of which is the above matrix. The diameter of this matrix is always one since it checks the correlation of each variable with itself, which means complete correlation. The closer these numbers are to one, the more direct the correlation, and the closer to zero, there is no correlation. Negative numbers also indicate an inverse correlation. What is clear is that the relationship between the readability variable and four readability indicators has a positive and significant correlation.

Estimation of the model and interpretation of the results

According to the topics elaborated in the theoretical section, in this section, experimental models are estimated based on the methods of fixed and random effects of panel data. These four models are:

Model (1)

$$\begin{aligned}
 &auditreadability_{it} \\
 &= a_0 + a_1readability_{it} \\
 &+ a_2achange_{it} + a_3loss_{it} \\
 &+ a_4size_{it} + a_5mchange_{it} \\
 &+ a_6bind_{it} + a_7AEM_{it} \\
 &+ a_8REM_{it} + a_9mtenure_{it} \\
 &+ a_{10}year_{it} + a_{11}industry_{it} \\
 &+ \varepsilon_{it}
 \end{aligned}$$

Model (1-1)

$$\begin{aligned}
 &Indext_{it} = a_0 + a_1readability_{it} + a_2achange_{it} \\
 &+ a_3loss_{it} + a_4size_{it} \\
 &+ a_5mchange_{it} + a_6bind_{it} \\
 &+ a_7AEM_{it} + a_8REM_{it} \\
 &+ a_9mtenure_{it} + a_{10}year_{it} \\
 &+ a_{11}industry_{it} + \varepsilon_{it}
 \end{aligned}$$

Model (1-2)

$$\begin{aligned}
 Felesh_{it} = & a_0 + a_1readability_{it} + a_2achange_{it} \\
 & + a_3loss_{it} + a_4size_{it} \\
 & + a_5mchange_{it} + a_6bind_{it} \\
 & + a_7AEM_{it} + a_8REM_{it} \\
 & + a_9mtenure_{it} + a_{10}year_{it} \\
 & + a_{11}industry_{it} + \varepsilon_{it}
 \end{aligned}$$

$$\begin{aligned}
 ARA_{it} = & a_0 + a_1readability_{it} + a_2achange_{it} \\
 & + a_3loss_{it} + a_4size_{it} \\
 & + a_5mchange_{it} + a_6bind_{it} \\
 & + a_7AEM_{it} + a_8REM_{it} \\
 & + a_9mtenure_{it} + a_{10}year_{it} \\
 & + a_{11}industry_{it} + \varepsilon_{it}
 \end{aligned}$$

Model (1-3)

Table 7: Results of the correlation matrix of research models' variables

	Mtenure	REM	AEM	Blnd	Mchange	Size	Loss	Achange	Readability	ARA	Felesh	Indext	Audit-ity
Audit-ity													1.000
Indext												1.000	0.077
Felesh											1.000	0.072	0.039
ARA										1.000	0.187	0.073	0.041
Readability									1.000	0.001	0.051	0.053	0.001
Achange								1.000	-0.023	-0.031	0.037	0.021	-0.003
Loss							1.000	0.031	0.006	0.002	-0.027	0.044	-0.011
Size						1.000	-0.021	-0.064	-0.042	-0.008	-0.003	0.188	0.002
Mchange					1.000	0.056	0.141	0.024	-0.022	-0.013	-0.040	0.012	-0.025
Blnd				1.000	-0.014	-0.013	-0.215	0.011	-0.053	0.032	0.086	0.013	0.044
AEM			1.000	0.024	-0.011	0.006	-0.195	-0.022	-0.034	-0.004	-0.013	-0.059	-0.041
REM		1.000	0.094	-0.047	0.000	0.008	0.007	-0.065	0.047	-0.073	0.056	0.025	0.030
Mtenure	1.000	-0.002	-0.009	-0.002	-0.420	-0.075	-0.085	-0.031	0.037	-0.062	0.027	-0.044	-0.021

Source: research findings

First model estimation

According to the integration test results, the first regression model should be estimated using the panel data method. Also, by performing the Hausman test, it was determined that in order to achieve the best regression estimate, the random effects data method should be used. Table (8) shows the estimation results of this model. According to the random effects model results, Readability at the 95% level has a positive and significant effect on the audit report readability of the fog index. Among the control variables, auditor change increases the audit report readability of the Fog index. On the contrary, the variables of firm loss, real and accrual-based earnings management are the factors that reduce the audit report readability of the Fog index.

At the end of Table (8), serial correlation, heterogeneity variance, model specification test and the normality of the residuals of the first model have been tested. Wooldridge test has been used for serial correlation. According to the obtained results, the first

model has no serial correlation. According to the Breusch-Pagan heterogeneity variance test result, this model has a heterogeneity variance at the 99% confidence level. For this reason, the estimated model is a robust model, and in addition, the GMM method was also used. The results of the model specification test also show that the omitted variable model is not important. Also, the residuals of the first model have a normal distribution according to the result of the Kolmogorov-Smirnov test.

According to the results of the GMM method, readability at the 95% level has a positive and significant effect on the audit report readability of the fog index. Among the control variables, auditor change increases audit report readability of the Fog index. On the contrary, the variables of firm loss, real and accrual-based earnings management are the factors that reduce audit report readability of the Fog index. It is worth mentioning that the dummy variables of year and industry do not affect the audit report readability of the Fog index.

Table 8: Estimation results of the first model

Variable	RE Model		GMM Model	
	Coefficient	P-value	Coefficient	P-value
Readability	0.013	0.027	0.024	0.030
Achange	0.303	0.043	0.302	0.041
Loss	-0.239	0.020	-0.239	0.019
Size	0.021	0.194	0.021	0.192
Mchange	-0.020	0.837	-0.020	0.837
Blnd	-0.258	0.305	-0.258	0.287
AEM	-0.66	0.073	-0.607	0.071
REM	-0.157	0.040	-0.021	0.095
Mtenure	-0.003	0.869	-0.003	0.868
Constant	-21.402	0.000	-21.404	0.000
Obs	1281		1281	
R ²	2520		26.58	
Wald Test	33.98	0.001		
Autocorrolation Test	0.046	0.831		
Heteroskedasticity Test	1992.76	0.000		
Ramsey Reset Test	0.13	0.943		
Normality of Resid	0.472			

Source: research findings

Second model estimation

In the second model, the dependent variable is the audit report readability based on the text length. According to the integration test results, the second regression model should be estimated using the panel data method. Also, by performing the Hausman test, it was determined that in order to achieve the best regression estimate, the fixed effects data method should be used. Table (9) shows the estimation results of the model. According to the robust fixed effects model results, Readability at the 95% level has a positive and significant effect on audit report readability of the text length index. Among the control variables, the firm size and real earnings management increase the readability of the audit report and the text length index. Among dummy year variables, 2014, 2018, and 2019 have lower average readability of the text length index than other years. Among the

industries, industries 7 and 13 have a lower average audit report readability of the text length index than other industries, and industries 4, 14 and 16 have a higher average readability of the text length index audit report. According to the results of the GMM method, readability at 95% has a positive and significant effect on the audit report readability of the text length index.

According to the results at the end of Table (9), the second serial correlation and heterogeneity variance model has a 99% confidence level. For this purpose, the estimated model is robust, and the GMM method was also used. The results of the model specification test also show that the model does not have an important omitted variable. Also, the residuals of the second model have a normal distribution according to the Kolmogorov-Smirnov test.

Table 9: Estimation results of the second model

Variable	RE Model		GMM Model	
	Coefficient	P-value	Coefficient	P-value
Readability	0.002	0.013	0.009	0.020
Achange	0.005	0.797	0.017	0.331
Loss	0.042	0.141	0.029	0.280
Size	0.041	0.000	0.040	0.000

<i>Mchange</i>	-0.007	0.739	-0.003	0.866
<i>Blnd</i>	0.004	0.936	0.017	0.706
<i>AEM</i>	-0.067	0.161	-0.058	0.236
<i>REM</i>	1.330	0.165	1.101	0.078
<i>Mtenure</i>	-0.005	0.218	-0.005	0.129
<i>y94</i>	0.048	0.086	0.052	0.056
<i>y98</i>	-0.059	0.036	-0.054	0.042
<i>y99</i>	-0.064	0.013	-0.053	0.032
<i>ind4</i>	0.177	0.000	0.121	0.004
<i>ind7</i>	-0.114	0.004	-0.104	0.007
<i>ind13</i>	-0.140	0.000	-0.128	0.000
<i>ind14</i>	0.112	0.016	0.111	0.009
<i>ind16</i>	0.122	0.004	0.137	0.000
<i>Constant</i>	6.629	0.000	6.715	0.000
<i>Obs</i>	1275		1275	
<i>R²</i>	10.37		10.60	
<i>F or Wald Test</i>	10.69	0.000	164.87	0.000
<i>Autocorrolation Test</i>	9.435	0.003		
<i>Heteroskedasticity Test</i>	8.15	0.004		
<i>Ramsey Reset Test</i>	0.29	0.832		
<i>Normality of Resid</i>	0.864			

Source: research findings

Third model estimation

In the third model, the dependent variable is the audit report readability based on the Felsch index. The integration test results show that the third regression model should be estimated using the panel data method. Also, by performing the Hausman test, it was determined that in order to achieve the best regression estimate, the fixed effects data method should be used. Table (10) shows the estimation results of the model. According to the results of the robust fixed effects model, Readability at the 99% level has a positive and significant effect on audit report readability of the Felsch index. Among the control variables, board independence and real earnings management are the factors that increase audit report readability of the Felsch index, and accrual earnings management is the factor that decreases that. Year dummy variables do

not affect this variable. Among the industries, industries 7 and 13 have more average audit report readability of the Felsch index than other industries and industry 4 has less average readability of the Felsch index audit report. According to the results of the GMM method, readability at the level of 99% has a positive and significant effect on the audit report readability of the Felsch index.

According to the results at the end of Table (10), the third serial correlation and heterogeneity variance model has a confidence level of 99%. For this purpose, the estimated model is robust, and the GMM method was also used. The results of the model specification test also show that the model does not have an important omitted variable. Also, the residuals of the third model have a normal distribution according to the Kolmogorov-Smirnov test.

Table 10: Estimation results of the third model

Variable	RE Model		GMM Model	
	Coefficient	P-value	Coefficient	P-value
<i>Readability</i>	0.224	0.002	0.263	0.002
<i>Achange</i>	1.088	0.372	1.872	0.106
<i>Loss</i>	-1.471	0.370	-0.850	0.580
<i>Size</i>	0.129	0.724	0.045	0.902
<i>Mchange</i>	-1.114	0.386	-1.701	0.160

<i>Blnd</i>	8.067	0.005	7.795	0.004
<i>AEM</i>	-7.881	0.037	-4.739	0.181
<i>REM</i>	112.214	0.020	96.680	0.031
<i>Mtenure</i>	0.100	0.627	0.127	0.553
<i>ind4</i>	-15.472	0.000	-12.242	0.000
<i>ind7</i>	7.294	0.024	8.956	0.004
<i>ind13</i>	4.671	0.001	5.024	0.000
<i>Constant</i>	82.213	0.000	84.067	0.000
<i>Obs</i>	1275		1275	
<i>R²</i>	22.42		20.40	
<i>F or Wald Test</i>	7.42	0.000	81.16	0.000
<i>Autocorrolation Test</i>	7.166	0.008		
<i>Heteroskedasticity Test</i>	23.36	0.000		
<i>Ramsey Reset Test</i>	1.43	0.232		
<i>Normality of Resid</i>	0.379			

Source: research findings

ARA model estimation

In the fourth model, the dependent variable is the audit report readability. The integration test results show that the fourth regression model should be estimated using the panel data method. Also, by performing the Hausman test, it was determined that in order to achieve the best regression estimate, the fixed effects data method should be used. Table (11) shows the estimation results of the model. According to the robust fixed effects model results, readability positively and significantly affects the audit report readability at the 99% level. Among the control variables, board independence increases the audit report readability. Among the years under review, 2013, 2014 and 2018 compared to other years, the average audit report readability was higher, and in the years 2015, 2016, 2017, 2019, and 2014 compared to

other years, the audit report readability was higher. Compared to other industries, industry 13 has a higher average audit report readability and industry 4 has a lower average readability of audit report. According to the results of the GMM method, readability at the 95% level has a positive and significant effect on the audit report readability.

According to the results at the end of Table (11), the fourth model does not have serial correlation, but this heterogeneity variance model has a 99% confidence level. For this purpose, the estimated model is robust, and the GMM method was also used. The results of the model specification test also show that the model does not have an important omitted variable. Also, the residuals of the fourth model have a normal distribution according to the Kolmogorov-Smirnov test.

Table 11: Estimation results of the fourth model

Variable	RE Model		GMM Model	
	Coefficient	P-value	Coefficient	P-value
<i>Readability</i>	0.097	0.000	0.089	0.022
<i>Achange</i>	-0.113	0.629	0.012	0.957
<i>Loss</i>	0.010	0.972	-0.002	0.994
<i>Size</i>	0.006	0.924	-0.022	0.688
<i>Mchange</i>	-0.121	0.515	-0.175	0.302
<i>Blnd</i>	0.968	0.043	1.026	0.301
<i>AEM</i>	-0.513	0.324	-0.236	0.626
<i>REM</i>	7.687	0.200	7.584	0.236
<i>Mtenure</i>	0.007	0.837	-0.006	0.840
<i>y93</i>	6.580	0.000	6.632	0.000
<i>y94</i>	17.330	0.000	17.301	0.000
<i>y95</i>	-13.003	0.000	-13.56	0.000

<i>y96</i>	-1.110	0.001	-1.099	0.001
<i>y97</i>	-9.705	0.000	-9.587	0.000
<i>y98</i>	4.489	0.000	4.585	0.000
<i>y99</i>	-12.624	0.000	-12.597	0.000
<i>y400</i>	-8.364	0.000	-8.303	0.000
<i>ind4</i>	-1.725	0.000	-1.350	0.000
<i>ind13</i>	0.490	0.024	0.528	0.010
<i>Constant</i>	9.490	0.000	10.037	0.000
<i>Obs</i>	1281		1281	
<i>R²</i>	91.89		91.90	
<i>F or Wald Test</i>	1053.36	0.000	25681.52	0.000
<i>Autocorrolation Test</i>	0.646	0.423		
<i>Heteroskedasticity Test</i>	974.00	0.000		
<i>Ramsey Reset Test</i>	0.51	0.678		
<i>Normality of Resid</i>	0.520			

Source: research findings

Discussion and conclusion

Linguistic literature offers several writing methods for transferring transparent and simple messages. In accounting, readability is the degree of text complexity of financial reports and their connection with the users' understanding (Souza et al., 2019). By simplifying communication techniques, independent auditors optimize the content of their audit reports. Previous studies on expectations from the audit profession show that audit reports should be written and transparently. The transparency of audit reports assumes that readers can fully understand the audit information. The independent auditor should deliver a report that includes all descriptive parameters of financial statements. The summary of audit reports should comprise several linguistic principles, including clarity, brevity, simplicity, adaptability, and cohesion. Moreover, independent auditors should increase the reporting quality to meet the information needs of the stakeholders. Further analysis of audit reports will help transfer clear and logical information.

An audit report is an essential tool for communication and adaptability that reduces information asymmetry despite its flaws. Audit standards should consider linguistic regulations to improve the audit reports' readability. Several determining factors elucidate the changeability of audit report readability (Fakhfakh, 2013). For example, financial statement readability, financial reporting quality, international standards translation, audit revision, and editing standards affect auditors' reports.

The obscurity of audit reports gives rise to ambiguity and complexity of accounting information and financial statements. Financial information is unbalanced when audit information is unreadable. Unreadable comments disrupt the behavior of financial statement users, particularly creditors and shareholders. With unreadable labels, investors and shareholders will not credit authorized agencies to justify their financial and economic decisions like the audit profession. Financial statement unreadability can influence the content and form of audit reports. Financial statement users require readable reports, and the readability of reports influences the understanding of the firm's financial status. The unreadability of audit results can disrupt the international balance in audit reports. The coincidence of audit reports is realized as a process to limit audit policy variations and guarantee their convergence for audit communications (Archer et al., 1989, King, 1999, Gangolly et al., 2002, Fakhfakh and Fakhfakh, 2010). Accordingly, the present study assessed the relationship between financial statement readability and audit report readability in the Tehran Stock Exchange-listed firms. The results indicate a positive and significant relationship between financial statement readability and audit report readability based on three FOG, Index, and Felsch indices. By increasing the readability of financial statements, the readability of the audit report would be far better. We believe the International Accountants Federation should improve the international standards of independent auditors' reports. Accounting standard regulators and audit authorities should consult with

linguistic specialists, where the participation of standardization experts enriches the audit reports and optimize the accounting issues.

Moreover, by comparing the coefficients of the obtained indicators in hypothesis testing, we found that the Felsch index displays the audit report readability better than the other two indicators and the indicator achieved from these three indicators. That occurs because the Felsch index's coefficient is higher than others. Hence, based on Felsch, the relationship between financial statement readability and auditor's report is stronger compared to other indicators.

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