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Araştırma Makalesi

CAN EARNINGS MANAGEMENT BE REVEALED THROUGH ANNUAL REPORT READABILITY? EVIDENCE FROM TÜRKİYE

(FAALİYET RAPORU OKUNABİLİRLİĞİ, KAR YÖNETİMİ UYGULAMALARININ TESPİTİNDE BİR GÖSTERGE OLARAK KULLANILABİLİR Mİ? TÜRKİYE ÖRNEĞİ)

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ABSTRACT

Readability is a measure of how comprehensible a text is to the average reader. Given a significant portion of corporate disclosures consists of text, readability level of these disclosures make them important particularly for investors. On the other hand, the use of readability as a strategic communication tool by management has become an interesting topic in the last decade. This study investigates whether earnings management affects annual report readability in the Turkish capital market. The sample includes 2012-2021 periods of 54 firms listed on the Borsa Istanbul. Annual report readability is measured using the Fog (1952) Index. As a proxy for earnings management, discretionary accruals are estimated by using the modified Jones (1995) model. Results of panel regression analysis show that annual reports are less readable for firms that manage their earnings. Thus, it is concluded that annual report readability could be considered as an indicator for detecting earnings management.

Keywords: Annual Report Readability; Earnings Management; Borsa Istanbul
JEL Classification: G14, G18, M41

ÖZ

Okunabilirlik, bir metnin ortalama bir okuyucu tarafından ne düzeyde anlaşılabildiğinin bir ölçüsüdür. Kurumsal açıklamaların önemli bir kısmının metinlerden oluştuğu düşünüldüğünde, yapılan açıklamaların okunabilirlik düzeyi özellikle yatırımcılar açısından önem arz etmektedir. Öte yandan okunabilirliğin firma yönetimleri tarafından stratejik bir iletişim aracı olarak kullanımı ise son on yıllık dönemde literatürde tartışma konusu olmaya başlamıştır. Bu çalışmada, kar yönetimi uygulamalarının faaliyet raporu okunabilirliği üzerine etkisi araştırılmıştır. Türkiye örnekleminde yürütülen çalışma, Borsa İstanbul'da işlem gören 54 firmanın 2012-2021 faaliyet dönemlerini kapsamaktadır. Çalışmada faaliyet raporu okunabilirliği Fog (1952) Endeksi kullanılarak ölçülmüştür. Kar yönetiminin bir ölçüsü olarak ise ihtiyari tahakkuklar Düzeltilmiş Jones (1995) modeli ile tahmin edilmiştir. Yürütülen panel regresyon analizi neticesinde, karını yöneten firmaların faaliyet raporlarının daha az okunabilir olduğu sonucuna ulaşılmıştır. Buradan hareketle, faaliyet raporu okunabilirliğinin kar yönetiminin tespitinde bir gösterge olarak değerlendirilebileceği anlaşılmaktadır.

Anahtar Kelimeler: *Faaliyet Raporu Okunabilirliği; Kar Yönetimi; Borsa İstanbul*
JEL Kodları: *G14, G18, M41*

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1. INTRODUCTION

The legal framework has a significant role both in determining the fundamentals of financial communication and ensuring that this communication is provided effectively. In fact, the primary objective of the legal framework is to protect investors by securing true and transparent information (Ajina et al., 2016, p.509). At this point, financial institutions monitor whether firms are acting in accordance with this objective through the legal regulations they have implemented.

Despite this legal framework, it can be posited that financial scandals are still common (Viana Jr. et al., 2023, p.2). It is inevitable that such financial scandals lead to a loss of confidence in the global market. This loss of confidence is largely attributable to accounting problems arising from firms' weak internal control operations (Ajina et al., 2016, p.510).

The main reason for aforementioned situation is the increase in agency costs. The separation of ownership and control increases these costs (Ajina et al., 2016, p.511). A notable example of this phenomenon can be observed in the tendency of controlling agents to maximise their own benefits through opportunistic behaviours, such as earnings management (Arora and Chauhan, 2022, p.1).

It is evident that earnings management prevents the information presented in corporate disclosures from being transparent and objective. These practices are inherently difficult to detect. This is because earnings management allows managers, as agents, to manipulate and conceal actual performance by utilising accounting discretions. Consequently, earnings management hinders investors' access to true information and undermines the effectiveness of financial communication provided through corporate disclosures.

On the other hand, annual reports are the most valuable corporate disclosures as a tool of financial communication (Moreno and Casasola, 2016, p.2). These reports are substantially composed of textual information. Even if numbers are subject to manipulation as a result of earnings management, it is reasonable to expect that narrative disclosures may also be affected by obfuscation in a similar manner to the numbers. Because some studies indicate that numerous managers attempt to obfuscate their actual performance by increasing the complexity in annual reports, thereby supporting the big bath accounting hypothesis of systematic manipulation (Schäffer et al., 2012, p.48). This complexity can be derived from decreasing the reading ease of narrative disclosures. By this way, investors experience greater information processing cost preventing their access to information and hereby obfuscate it (Ajina et al., 2016, pp.510-511). To sum up, it can be expected that firms that manage their earnings publish less readable annual reports.

Studies investigating the relationship between annual report readability and earnings management in the literature are moderately limited. While Ajina et al. (2016) examined this relationship in French companies and also Lo et al. (2017) in USA, Arora and Chauhan (2022) and Shauki and Oktavini (2022) examined it in Indian and Indonesian samples, respectively. However, Viana Jr. et al. (2023)'s research indicates that as macroeconomic volatility increases, accrual-based earnings management practices decrease in developed markets such as France and USA, while in emerging markets such as India and Indonesia, the level of these practices increases. As another example of emerging markets, Türkiye stands out negatively from them in terms of macroeconomic volatility, according to World Bank (n.d.) data. This is because Türkiye experiences significantly higher levels of inflation than India and Indonesia[3]. Inflationary conditions make it difficult to value assets and performance (Açık, 2006, pp.348-350) thus increasing the likelihood of accrual-based earnings management (Leuz et al., 2003, p.510). Therefore, the Turkish capital market ensures the most viable financial environment for investigating the relationship between annual report readability and earnings management compared to extant literature.

The aim of this study is to investigate whether earnings management affects annual report readability in Türkiye. For this purpose, a panel regression analysis was conducted using observations from the 2012-2021 periods of 54 companies listed on the Borsa Istanbul (BIST). The research findings indicate that annual reports published by firms that managed their earnings are more complex, i.e. less readable. Thus, it is concluded that annual report readability could be considered as an indicator for detecting earnings management.

The contribution of this study to the literature can be evaluated from three different aspects. The main contribution is that this relationship has been investigated in the most viable financial environment according to the extant literature. Moreover, there has been no previous study conducted on the relationship between annual report readability and earnings

[3] Macroeconomic volatility "is a complex and multidimensional phenomenon that cannot be measured directly, as it is affected by a variety of factors such as inflation, market capitalisation, and GDP (Viana Jr. et al., 2023, p.7)." In this study, World Bank (n.d.) data was analysed through the variables that constitute Viana Jr. et al.'s macroeconomic volatility index and it was discovered that Türkiye had more unfavourable economic conditions than India and Indonesia in most of these variables during the years that formed the sample of the research.

management in Turkish capital market. Thus, this study expands the limited literature on relevant subject. Finally; as a practical contribution, it has been introduced a new parsing procedure to measure annual report readability.

The remainder of this paper is organized as follows: the second section presents literature on relevant subject and the theoretical foundations of research hypothesis. Detailed information about the sample, data, and research methods used are illustrated in methodology section. The fourth section contains research findings and presents discussions surrounding them. The paper ends with limitations and conclusion sections respectively.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Prior studies with similar objectives in the literature are summarised in Table 1. The research hypothesis tested is formulated referring the studies that are documented in this table.

The usefulness of annual reports depends on their level of readability and comprehensibility (Ajina et al., 2016, p.509). Readability is defined as a measure of how comprehensible an annual report is when read by a non-professional. The background of studies in readability literature on annual reports dates back to the 1950s. For instance, in their work published in 1950, Pashalian and Crissy had investigated the level of readability in annual reports of companies listed in *Business Week* magazine's billionaires club. Subsequently, Hoskins (1984) measured the readability of various sections in annual reports. However; since 1950s, annual report readability continues to be an interesting topic in accounting literature and has been the subject of numerous research such as Courtis (1986), Clatworthy and Jones (2001) and Gutiérrez Ponce et al. (2023).

The concept of annual report readability has become a topic of interest not only within academic circles but also among regulatory bodies. As a matter of fact, the Securities and Exchange Commission (SEC) in USA and subsequently the Autorité des Marchés Financiers (AMF) in France have taken various actions to enhance readability (Ajina et al., 2016, p.509). Through its chairman's statements, the SEC has emphasised the importance of quantifying the concept of readability (Cheng et al., 2018, p.794). The AMF has drawn up a plan to make financial information more readable for non-professionals in 2010 (Ajina et al., 2016, p.509). In a similar vein, a regulation[4] has been implemented in Türkiye in 2012, underscoring the significance of preferring simple and exact concepts rather than technical ones to make easier to comprehend narrative disclosures.

Given its conceptual importance in both theoretical and practical context, annual report readability inherently makes the factors affecting it significant as well. However; in accounting literature, many relational studies have been conducted on various topics concerning the factors that may influence readability. For example, Kim and Chung (2014) examined the effect of gender of the CFO and similarly Ginesti et al. (2018) investigated female board participation on annual report readability. Habib and Hasan (2018) studied how business strategies affect annual report readability and Noh (2021) inquired about cultural effects on complexity in reports.

However, Li (2008)'s study which investigated the relationship between annual report readability and financial performance has broadened horizons within the context of readability. According to the study, in lower levels of earnings annual reports become less readable.

Building upon this, Bloomfield (2008) proposed various interpretations of Li (2008)'s main findings. These interpretations present the potential underlying factors contributing to the readability-performance relationship. Two of them stand out in particular: obfuscation and ontology. Obfuscation refers to managers attempting to hide negative processes by disclosing them more difficult to understand. Per contra, ontology posits that communicating negative processes is inherently more difficult (Lo et al., 2017, p.3).

Ontological interpretation is discussed in two different perspectives. Bloomfield (2008) argues that firms with poor performance necessitate detailed explanation in consequence of "management by exception" to delineate their actual circumstances. Once again, Bloomfield (2008) contends that more timely recognition of negative processes relative to positive ones compels managers to disclose more detailed explanation about the future under poor performance. In sum, according to ontological perspectives, readability is a function of the prevailing circumstances by its nature (Lo et al., 2017, p.4).

[4] The related regulation is "Şirketlerin Yıllık Faaliyet Raporunun Asgari İçeriğinin Belirlenmesi Hakkında Yönetmelik", published in T.C. Resmi Gazete numbered as 28395 on 28 August 2012. The regulation can be accessed at https://resmigazete.gov.tr/eskiler/2012/08/20120828-2.htm.

Table 1. Synopsis of the Literature Review

Author	Extent	Sample	Method	Result
Pashalian and Crissy (1950)	examines the levels of readability in annual reports	USA	Content Analysis	The majority of adult readers are unable to comprehend annual reports. These reports are characterised as "difficult" and "boring" documents to read.
Hoskins (1984)	evaluates the readability of various sections in annual reports	USA	Content Analysis	"*General Overview*" and "*Chairman's Report*" sections are characterised as "difficult" to read.
Courtis (1986)	examines the levels of annual report readability for both general population and shareholders	Canada	Content Analysis	Readability in annual reports of the significant proportion of Canadian companies has been found to be at a level comparable to that of academic or scientific writing.
Clatworthy and Jones (2001)	examines how thematic structure affects the variability of readability	UK	Content Analysis	Thematic structure has a significant effect on variability. Also, readability in "*Chairman's Statements*" section of annual reports varies and the introduction part is easier to read than the rest.
Li (2008)	examines whether financial performance affects annual report readability	USA	Panel Regression	Bad performed firms have less readable reports. Moreover, persistent earnings are associated with more readable annual reports.
Bloomfield (2008)	proposes various interpretations on Li (2008)'s findings	-	Critical Analysis	Li (2008)'s findings was reviewed from seven different interpretations, including obfuscation and ontology.
Kim and Chung (2014)	examines the effect of the gender of CFO on annual report readability	USA	Panel Regression	Annual reports overseen by female CFOs are written in a more comprehensible language.
Ajina et al. (2016)	examines the relationship between annual report readability and earnings management	France	Panel Regression	Firms managing their earnings publish more complex annual reports. Also, some other financial indicators have been found to be related with readability.
Lo et al. (2017)	examines the relationship between annual report readability and earnings management	USA	Panel Regression	Firms most suspected of earnings management have more complex annual reports. The underlying reason of this result is the presence of obfuscation.

Ginesti et al. (2018)	examines the relationship between female board participation and annual report readability	Italy	Panel Regression	Female participation may increase or decrease annual report readability depending on the degree of board connections.
Habib and Hasan (2018)	examines the relationship between business strategies and annual report readability	USA	Panel Regression	Firms adopting conservative strategies are in tendency to produce more readable annual reports while those adopting innovative strategies have less readable reports.
Noh (2021)	examines how state culture affects annual report readability	USA	Panel Regression	Cultural tightness of the state of the firm has a positive effect on annual report readability. This result is merely effective in "*subgroups with high litigation risk*".
Arora and Chauhan (2022)	examines the relationship between annual report readability and earnings management	India	Panel Regression	Firms managing their earnings publish more complex annual reports. That is, earnings manipulation makes narrative disclosures less readable.
Shauki and Oktavini (2022)	examines the relationship between annual report readability and earnings management	Indonesia	Panel Regression	Firms that manage their earnings may publish complex annual reports.
Gutiérrez Ponce et al. (2023)	presents a systematic review on annual report readability literature to explore fundamentals of obfuscation phenomenon	-	Literature Review	Obfuscation phenomenon exists in annual reports. It may show itself by using complex writing style. Also, some ways are suggested to mitigate obfuscation effect.

On the other hand; according to the obfuscation interpretation, managers can interfere in financial disclosures. Indeed, management may make biased choices with the intention of modifying earnings by utilising eligible accounting discretions. It is necessary for these disclosures to be presented in a non-transparent attitude so that earnings manipulation fulfilled with mentioned choices to have intended effect. One way to reduce transparency, or in other words, conceal the actual circumstances, is to focus on the writing style of disclosures. As a matter of fact, processing the information presented in financial disclosures, whether narrative or not, is costly endeavour (Lo et al., 2017, p.5). Lo et al. (2017) predict that investors will merely analyse financial information up to the point at which its marginal cost equals its marginal benefit. However, Bloomfield (2002)'s "incomplete revelation hypothesis" proposes that presenting disclosures in a more costly manner may reduce market reactions to negative processes. The complex presentation of financial disclosures also increases information processing costs for investors thereby constraining the depth of their analyses (Ajina et al., 2016, p.510; Lo et al., 2017, p.5). Therefore, consistent with incomplete revelation hypothesis, less readable disclosures reduce the likelihood of detecting earnings management practices that are intended to be concealed. Ajina et al. (2016) and Lo et al. (2017) considered this case as the direct effect of obfuscation on readability while explicating findings of Li (2008).

From this point of view; in developed markets, Ajina et al. (2016) and Lo et al. (2017) investigated whether managers obfuscate negative processes with more complex disclosures in annual reports of firms that manage their earnings. In both studies, the null hypothesis representing ontology was rejected and it was found that earnings-managing firms published less readable annual reports. Following Ajina et al. (2016) and Lo et al. (2017); Arora and Chauhan (2022) and Shauki and Oktavini (2022) reinvestigated this relationship in emerging markets and obtained consistent results with previous studies. However, taking into consideration the limited literature, Türkiye ensures the most viable environment for investigating this relationship.

Based on these discussions, the hypothesis tested in research is specified as follows:

H0. Earnings management does not have any significant effect on annual report readability.

3. METHODOLOGY

3.1. Sample and Data

To test the hypothesis, the study used data covering the 2012-2021 periods for 54 firms listed on the BIST. This ten-year timeframe was selected because the 2012 regulation promulgated by the Ministry of Trade has presented a significant step forward in terms of enhancing annual report readability in Türkiye. Since the extracting of readability data from texts is a time-consuming and arduous task, the data had to be kept limited. Financial institutions were excluded from sample due to their different reporting concept (Ajina et al., 2016). Furthermore, firms that had not published their annual reports in English were excluded from the sample since readability measures used in this study were designed for English language.

To extract readability data, annual reports were collected from the Public Disclosure Platform of Türkiye and official web sites of sample firms. In addition to the Public Disclosure Platform, Finnet as one of BIST's official data provider (Arıoğlu, 2020, p.935) was also used for financial data.

3.2. Variable Measurements

3.2.1. Annual Report Readability

In studies conducted on annual reports, readability is commonly measured by means of the *Management Discussion and Analysis (MD&A)* or *Chairman's Message (CM)* sections of the reports or similar sections with respect to content (Courtis, 1998; Li, 2008; Lo et al., 2017; Rahman, 2014). Since the relevant section in annual reports of BIST firms is titled *Chairman's Message*, this study used *CM* sections to assess annual report readability.

In order to assess readability, texts from the *CM* sections which have been obtained in .pdf format must be parsed by several steps for being prepared to measurement. Generally, studies on annual report readability have outlined the steps merely for reports in HTML format. These steps have been consolidated and reviewed, and transformed into the steps that must be followed to prepare .pdf formatted annual reports for measurement. The parsing procedure including the steps is outlined in Appendix 1: Parsing Procedure.

One of the most common methods for measuring textual readability is to use readability indexes (Moreno and Casasola, 2016, p.9). In this study, readability is measured by Gunning (1952)'s Fog Index since it is the most favoured readability index by accounting researchers (Bonsall IV et al., 2017, p.333).

The Fog Index measures textual readability by assigning a score to the grade level of formal education required for an average reader to comprehend it at once in response to the word-sentence load of text (Ajina et al., 2016, p.513). Gunning (1952) formulated the Fog Index as shown in equation 1:

$$FOG = (\text{number of words per sentence} + \text{percentage of complex words}) \times 0{,}4 \quad (1)$$

The term "complex words" refers to words consisting of three or more syllables. However, an increase in the Fog Index score means a decrease in the level of readability[5].

3.2.2. Earnings Management

For detecting earnings management, discretionary accrual models are frequently used. In this study, discretionary accruals were estimated with the modified Jones model[6] which was developed by Dechow et al. (1995). The model exerts following equation to estimate for firm i and year t:

$$TA_{i,t} / A_{i,t-1} = \alpha_0 \times (1 / A_{i,t-1}) + \alpha_1 \times ((\Delta SA_{i,t} - \Delta REC_{i,t}) / A_{i,t-1}) + \alpha_2 \times (PPE_{i,t} / A_{i,t-1}) + \varepsilon_{i,t} \quad (2)$$

where TA: total accruals, A: total assets, ΔSA: change in net sales, ΔREC: change in net receivables, PPE: gross property, plant and equipment, ε: discretionary accruals.

3.2.3. Control Variables

To control the factors affecting annual report readability, the control variables that were used by Ajina et al. (2016), Li (2008) and Lo et al. (2017) were considered in the research model. Furthermore, two additional control variables from readability theory have been integrated into the research model. According to Ginesti et al. (2017), auditor type may have an effect on annual report readability. Besides, Wallace et al. (1994) state that firms audited by one of the six largest auditing firms are likely to write more detailed reports. Thus, size of the auditing firm was included in the study as one of the control variables. The other control variable relates to gender of the CM author. Kim and Chung (2014) investigate whether female CFOs are better at improving the annual report readability. Research findings reveal that reports overseen by female CFOs include less complex words. In this respect, the research model incorporated the variable of author gender to control for its potential effect on annual report readability.

3.3. The Model

In order to test research hypothesis, the model constructed with determined variables is in the following equation form:

$$FOG = \beta_0 + \beta_1 \times DAMJ + \beta_2 \times LEV + \beta_3 \times LNVL + \beta_4 \times LOSS + \beta_5 \times MTB + \beta_6 \times RA + \beta_7 \times ROA + \beta_8 \times SIZE + \beta_9 \times BIG + \beta_{10} \times FM + \varepsilon \quad (3)$$

Table 2 presents the variables incorporated in the model along with their definitions and expected effects.

Table 2. Variable Definitions and Expected Effects

Variable	Definition	Expected Effect
FOG	Fog Index scores as a proxy for readability level	
DAMJ	Absolute value of discretionary accruals; modified Jones model	+
BIG	1, if audited by one of the big four auditing firms	+
FM	1, if gender of CM author is female	-
LEV	Percentage of total debt to total assets ratio	+
LNVL	Natural logarithm of standard deviation of operating income prior 5 year	+
LOSS	1, if operating income<0	+
MTB	Market to book ratio	+

[5] In order to obtain more robust results, the Flesch-Kincaid Index developed by Kincaid et al. (1975) was also used. Flesch-Kincaid Index had been used in many studies together with the Fog Index (Ajina et al., 2016, p.513; Guay et al., 2016, p.262; Li, 2008, p.225) and is formulated as FKI = (0,39 x number of words per sentence) + (11,8 x number of syllables per word) – 15,59. As the FKI score increases, readability decreases.

[6] In order to obtain more robust results, the model developed by Jones (1991) was also used as was done by Bergstresser and Philippon (2006), Lo et al. (2017) and Hong et al. (2022). The following equation is employed to estimate discretionary accruals using the Jones model: $TA_{i,t} / A_{i,t-1} = \alpha_0 \times (1 / A_{i,t-1}) + \alpha_1 \times (\Delta SA_{i,t} / A_{i,t-1}) + \alpha_2 \times (PPE_{i,t} / A_{i,t-1}) + \varepsilon_{i,t}$ where for firm i in year t; TA: total accruals, A: total assets, ΔSA: change in net sales, PPE: gross property, plant and equipment; ε: discretionary accruals.

RA	Number of years since registration date	-
ROA	Operating income to total assets ratio	-
SIZE	Natural logarithm of total assets	+

In this study, panel regression analysis was conducted using firm-year observations covering the 2012-2021 periods of 54 companies listed on the BIST. Panel regression analyses are characterised by two specific dimensions, referred to as individual and period (Gujarati, 2004). The individual dimension denotes the firms while the period dimension represents operating periods.

4. RESULTS AND DISCUSSION

4.1. Descriptive Statistics

The descriptive statistics of variables used in panel regression analysis are given in Table 3.

Table 3. Descriptive Statistics

Variable	Mean	St. Deviation	Min	Max
FOG	16,526	2,03	7,7	23,8
DAMJ	0,068	0,069	0	0,518
BIG	0,846	0,361	0	1
FM	0,123	0,328	0	1
LEV	58,781	21,263	11,63	116,65
LNVL	17,866	1,562	13,309	21,962
LOSS	0,096	0,295	0	1
MTB	2,94	4,399	0,3	70,52
RA	41,7	13,857	4	71
ROA	0,084	0,071	-0,206	0,323
SIZE	21,733	1,58	17,957	26,592

As shown in Table 3, *FOG* scores range from 7,7 to 23,8, with a mean value of 16,526. This average value indicates that annual reports are "difficult" to read. Also Ajina et al. (2016), Arora and Chauhan (2022), Li (2008), Lo et al. (2017) and Shauki and Oktavini (2022) found similar levels of the Fog Index scores.

The mean value of discretionary accruals estimated by modified Jones model is 0,068. This value is approximate to the value in the study by Yaşar (2013), which was conducted on a Turkish sample and used the same model[7].

In addition; it has been found that approximately 85% of observations were audited by one of the big four auditing firms. Furthermore, it is determined that 12% of *CM* sections had female authors. The control variable *LOSS* indicates that a very small portion of observations had negative operating income. The sample firms' age varies from 4 to 71 years, with a mean of 41,7 years.

4.2. Fixed Effect Model

In this study, fixed effect panel regression analysis was conducted to investigate the effect of discretionary accruals on annual report readability. This is because, cross-sectional volume is not sufficiently large since the total number of BIST firms observed is 54. Moreover, it is important to note that each firm is considered to be a separate legal entity. Additionally, given that sample firms are BIST firms that publish their annual reports in English, it cannot be asserted that the sample selection is random from the BIST population. For these reasons, the fixed effect model is the most convenient model for research data. The employment of fixed effect model by Ajina et al. (2016) supports the resolution adopted in the study as well.

[7] The statistics for other measures employed in the study are not reported here. Even though obtained at lower values, the statistical outcomes of the Flesch-Kincaid (1975) Index scores are similar to the findings for the Fog (1952) Index scores. Also, concerned values of estimated discretionary accruals according to the Jones (1991) model are almost equal to those in the modified Jones (1995) model.

4.3. Testing the Assumptions

4.3.1. Multicollinearity

In panel regression analyses, the presence of multicollinearity is considered to be detrimental to the reliability of research model (Alin, 2010, p.370). This study used Variance Inflation Factor (VIF) to test multicollinearity. The VIF values for independent variables are in Table 4:

Table 4. VIF Values for Independent Variables

Variables	VIF
DAMJ	1,122
BIG	1,201
FM	1,367
LEV	1,416
LNVL	8,012
LOSS	1,681
MTB	1,15
RA	1,1
ROA	1,962
SIZE	7,568
Average VIF	2,658

According to Kutner et al. (2005), a variable's VIF value exceeding 10 or the average VIF value significantly exceeding 1 indicates serious multicollinearity issue. The VIF values of variables in the study reveals that these values are generally between 1 and 2, only *LNVL* and *SIZE* variables having values of 8,012 and 7,568 respectively. In summary, VIF values of all independent variables are less than the reference value of 10. On the other hand, the average value of VIF is 2,658 and does not exceed the reference value of 1 significantly. Consequently, it can be asserted that the research model is not afflicted by a critical multicollinearity issue.[8]

4.3.2. Autocorrelation

In order to ensure the validity of the results produced by the research model, it is expected that there is no autocorrelation in the variables (Akmut et al., 1999, p.19; Nurwulandari, 2020, p.34). Autocorrelation is detected through various tests and in this study, it was analysed using the Wooldridge Test.

Along with the Wooldridge Test, null hypothesis states that there is no autocorrelation while alternative hypothesis indicates the presence of it. The result of the Wooldridge Test for research model is in Table 5:

Table 5. Wooldridge Test

Wooldridge test for autocorrelation in panel data
H_0: no first-order autocorrelation
F(1, 52) = 14,555
Prob > F = 0,0004

According to the results shown in Table 5, null hypothesis is rejected thus research model has autocorrelation issue[9]. To obtain consistent results, autocorrelation issue must be solved before regression analysis.

4.3.3. *Heteroscedasticity*

Another assumption that must be tested for panel regressions is that the variance of error terms is constant. To test the assumption of constant variance, this study employed the Modified Wald Test.

[8] Based on the results not reported here, no significant multicollinearity issue was detected according to the Jones (1991) model as well.

[9] The Wooldridge Test was also applied to the alternative models. According to the test results not reported here, autocorrelation issue was detected in all alternative models.

According to the Modified Wald Test, null hypothesis posits that the variance of error terms is constant, while alternative hypothesis states that it is heteroscedastic (Washington State University, 2015, p.8). The result of test applied to the research model is given in Table 6.

Table 6. Modified Wald Test

Modified Wald test for groupwise heteroscedasticity in fixed effect regression model
H_0: sigma(i)^2 = sigma^2 for all i
chi2 (54) = 1257,28
Prob>chi2 = 0,0000

Upon examining the test results above, it is evident that null hypothesis is rejected. Consequently, the variance of error terms in research model is not constant and the assumption of constant variance is not hold[10]. As in autocorrelation issue, to obtain consistent results, heteroscedasticity problem must be solved as well.

4.4. Newey and West's Heteroscedasticity and Autocorrelation Consistent Estimator

Data defined by econometric models frequently exhibit heteroscedasticity and/or autocorrelation issues. Therefore, the econometric literature proposes heteroscedasticity and autocorrelation consistent (HAC) estimators to be able to draw conclusions from such models (Zeileis, 2004, p.1).

In the literature, it can be found numerous examples of HAC estimators. This study employed the Newey and West's HAC estimator to estimate the econometric model. Newey and West HAC estimator, which has been used in many studies such as Boachie and Ramu (2016), Cepni et al. (2017) and Siddiqui et al. (2025), ensured that the analysis results were obtained in a valid form by correcting standard errors for heteroscedasticity and autocorrelation issues that exist.

4.5. Panel Regression Analysis

Table 7 provides the results of fixed effect panel regression analysis with Newey and West standard errors.

Table 7. Results of Panel Regression Analysis with Newey and West Standard Errors

FOG	**Coefficients**	**St. Error**	**t-value**	**p-value**	**Significance Level**
DAMJ	2,852	1,403	2,033	,043	**
BIG	,058	,381	,151	,88	
FM	-1,036	,331	-3,133	,002	***
LEV	-,003	,005	-,518	,604	
LNVL	,488	,158	3,096	,002	***
LOSS	,124	,396	,313	,754	
MTB	-,048	,037	-1,298	,195	
RA	-,011	,008	-1,336	,182	
ROA	-2,18	1,852	-1,177	,24	
SIZE	-,411	,158	-2,606	,009	***
Constant	17,494	1,829	9,563	0	***
Prob > F		0,0000	F-test		4,211
Number of Obs.		492			

**** p<,01, ** p<,05, * p<,1*

As shown in Table 7, F-test statistic is 4,211 and the significance level of the test statistic is 0,000. Therefore, the present model which investigates the effect of discretionary accruals on annual report readability is statistically significant. As illustrated in Table 7, the coefficient of *DAMJ* is 2,852 and the p-value is 0,043. This indicates that there is a positive and significant relationship between discretionary accruals estimated by modified Jones model and Fog readability index. The

[10] The Modified Wald Test was also applied to the alternative models. According to the test results not reported here, heteroscedasticity issue was detected in all alternative models.

analysis yielded a result that rejected the null hypothesis, thereby indicating that discretionary accruals significantly influence annual report readability. The coefficient which points that the relationship between dependent and independent variable is positive suggests firms with more discretionary accruals have less readable annual reports.

Furthermore, the p-value between *BIG* and *FOG* variable is 0,88 indicating that no significant relationship was found between these two variables. There is no significant difference in annual report readability between firms audited by the big four auditing firms and those not audited by them.

Between *FM* and *FOG* variables, the coefficient is -1,036 and the p-value is 0,002. It is evident from findings that the relationship between *FM* and *FOG* variables is negative and significant at the 0,01 level of significance. This finding indicates that having female *CM* authors is associated with diminished Fog Index scores, consequently enhancing the annual report readability.

For another control variable, namely *LEV*, the p-value is 0,604 suggesting the relationship between the leverage ratio and readability is not statistically significant. In other words, level of indebtedness does not have a significant impact on firms' annual report readability.

On the other hand; the coefficient of *LNVL* variable, which serves as a metric for volatility in earnings, exhibits a value of 0,488 with the p-value of 0,002. This finding indicates a positive and statistically significant relationship between *LNVL* and *FOG* dependent variable. It has been demonstrated that an increase in earnings volatility results in elevated Fog Index scores, leading to a decrease in readability.

The p-value for *MTB* control variable is 0,195. Thus, it is evident that market to book ratio does not exhibit a substantial correlation with annual report readability in research model. In a similar vein, the p-value for the *RA* is 0,182 and this finding suggests that the age of firm does not have a significant effect on readability. Furthermore, the p-value for *ROA* is 0,24 and the p-value for *LOSS* dummy variable is 0,754. This indicates that these control variables also have no significant relationship with annual report readability. At this point, *LOSS* variable demonstrates that whether firms made a profit or loss during the relevant period is not substantial in terms of readability.

Finally, the coefficient for *SIZE* variable is -0,411 and the p-value is 0,009. The correlation between this control variable and *FOG* is negative and significant. That is, as the magnitude of firm size increases, Fog Index score decreases thus enhancing annual report readability.

4.6. Robustness of Estimation

In addition to the primary econometric model, three supplementary regression models were estimated based on alternative models constituted using different readability index and discretionary accrual model, with the aim of obtaining more robust results. According to the analysis results not reported here, the research hypothesis was rejected in two of three alternative models. Solely, in the model using the Flesch-Kincaid Index and the Jones model together, even though the relationship between annual report readability and discretionary accruals was not significant, the results were almost consistent with other three models including primary model as well. Also, in terms of control variables, all four models revealed consistent results.

4.7. Discussion

Descriptive statistics indicate that annual reports of Turkish firms can generally be classified as "difficult" to read. This result is consistent with relevant literature. Both prior (Courtis, 1986; Hoskins, 1984; Pashalian and Crissy, 1950) and more recent (Ajina et al., 2016; Arora and Chauhan, 2022; Lo et al., 2017; Shauki and Oktavini, 2022) studies show that annual report readability has not improved in the long term. In this context, it seems that 2012 regulation of the Ministry of Trade has not been sufficiently effective in enhancing readability. Regulatory bodies should focus on either ensuring current legal framework is implemented more effectively or implementing further regulations on this subject.

The findings of panel regression support Bloomfield (2008)'s interpretation regarding obfuscation. This is due to the fact that, as a consequence of the analysis, the null hypothesis representing the ontological interpretation was rejected. Eventually, it was determined that the reason of less readable annual reports was not attributable to the nature of negative processes, but rather to the managers' endeavours to obfuscate earnings manipulation.

Furthermore; similarly with Ajina et al. (2016), Arora and Chauhan (2022), Lo et al. (2017) and Shauki and Oktavini (2022), the result that firms managing their earnings publish less readable reports aligns with the belief asserted by Hancock et al. (2007) that "*telling the truth is easier than telling lies*". That is, the creation of quasi truths and their presentation in a consistent pattern is more arduous task than the direct statement of facts. In this context, earnings management can also be evaluated under this category since it involves managed performance that does not reflect the truth. The discrepancy between managed and unmanaged performance creates cognitive dissonance for management,

making the reporting of managed performance more challenging on a mental level. Consequently, this aspect contributes to reduced readability in the disclosure (Lo et al., 2017, p.24).

5. LIMITATIONS

There are certain differences between countries regarding aspects such as file format or layout in the publication process of corporate disclosures, especially annual reports. Therefore, this study has examined the relationship between annual report readability and discretionary accruals on a country basis as in previous researches.

Furthermore, the fact that annual reports are published in .pdf format means that extracting readability data from the text must be carried out manually for Turkish sample, thereby making it striving process. Ipso facto, the sample was limited to ten years of data.

6. CONCLUSION

The aim of this study is to investigate whether earnings management affects annual report readability in Türkiye. The findings of panel regression analysis, which was conducted using four different models, indicated that discretionary accruals have a positive and significant effect on Fog Index scores. This result suggests, firms with more discretionary accruals have higher Fog Index scores in their annual reports. Thus, it was concluded that firms managing their earnings are in tendency to publish less readable annual reports. Besides, the present outcome is consistent with the results of Ajina et al. (2016) and Lo et al. (2017).

According to the research findings, it can be concluded that annual report readability could be considered as an indicator for detecting earnings management. This is because earnings management may be one of the factors contributing to the relatively higher level of complexity observed in annual reports. Hence, investors can draw material conclusions about earnings management practices of firms by interpreting readability in their annual reports.

The present study was conducted using a sample from Türkiye and in this respect, it is a pioneering contribution to the Turkish capital market. Besides; given its prevailing economic conditions, the fact that Türkiye provides the most viable environment for investigating the relationship between annual report readability and earnings management is substantial in terms of its contribution to the extant literature. Moreover, a parsing procedure that can be used in .pdf formatted disclosures has been introduced not only to the accounting literature but also to the readability theory as a practical contribution.

This study investigated the relationship between readability and earnings management through annual reports. However, it should be remembered that the reversal of discretionary accruals may also occur within a period. Accordingly, further studies may investigate this relationship through interim reports.

Appendices

Appendix 1. Parsing Procedure

Step	References
• Tables, images etc. are removed.	Bonsall IV et al., 2017; Li, 2008; McDonald, 2013; MDN, n.d.
• All headings are removed.	Li, 2008; MDN, n.d.
• Replace; pilcrow to nonbreak space.	
• Justify.	
• Font; Times New Roman.	Bonsall IV et al., 2017; McDonald, 2013; MDN, n.d.
• Font Size; 11.	Bonsall IV et al., 2017; McDonald, 2013; MDN, n.d.
• Font Colour; Black.	Bonsall IV et al., 2017; McDonald, 2013; MDN, n.d.
• Bold formattings are removed.	MDN, n.d.
• Italic formattings are removed.	MDN, n.d.
• Non-sentence texts are removed.	
• Paragraphs shorter than one line are removed.	Li, 2008.
• Bullets are converted to sentences.	Loughran and McDonald, 2014; MDN, n.d.
• Spacing between paragraphs is removed.	McDonald, 2013.
• Quotation marks are removed.	MDN, n.d.
• “and/or” terms are replaced with “and or”.	Bonsall IV et al., 2017; McDonald, 2013.

*The texts in .pdf format are transferred to the Microsoft Word for running of the steps.

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