Earnings Management and Annual Reports Complexity: The Role of Cash Holdings and Board Characteristics in Egyptian Companies

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Abstract

This research examines the relationship between earnings management (EM) and annual financial reports complexity (Lower readability) in the Egyptian publicly listed firms. Utilizing a panel dataset of 125 non-financial firms listed on the Egyptian Exchange (EGX) from 2018 to 2023, we investigate whether firms engaging in accrual-based earnings management (AEM) and real earnings management (REM) produce more complex financial disclosures. Current research employs LIX Index to measure the complexity, while Fog Index and ARI are used for robustness checks. Our results show that AEM has a weak, marginally significant impact on complexity, while REM is consistently associated with increased report complexity. Specifically, abnormal levels of production costs and discretionary spending significantly increase the textual complexity, whereas abnormal cash flow has a weaker effect. Further, our results show that board governance characteristics and cash holdings influence the EM-complexity relationship. Board independence, female representation, and frequent board meetings mitigate the complexity introduced by REM. Additionally, we find that cash-rich firms engaging in REM produce significantly more complex financial reports, suggesting that financial flexibility enables firms to obscure earnings manipulation through verbose or convoluted disclosures. This study complements earnings management and financial disclosure literature by presenting empirical evidence on how corporate governance and liquidity conditions shape financial reporting transparency in an emerging market. The findings have practical consequences for regulators, investors, and corporate boards, emphasizing the need for stronger governance oversight and targeted regulatory measures to improve financial report readability.

Keywords: Earnings Management, Readability, Board Governance, Cash Holdings, Textual Analysis.

1. Introduction

Corporate disclosures generally involve what content is disclosed, when it is released, and how it is presented (Curtis, 2004). Their effectiveness rests heavily on readability, understandability, and comprehensibility. Increasingly, annual reports devote considerable space to narrative information (Ajina et al., 2016), reflecting an "emerging trend" in accounting communications (Herenia et al., 2024). When these narratives are clear and concise, stakeholders can more readily assess corporate health and prospects (Lawrence, 2013, Lim et al., 2018). Conversely, complex or opaque disclosures can obscure key details, hindering investor decision-making and accountability. A key factor influencing complexity is earnings management (EM), managers' use of accrual-based (AEM) or real (REM) methods to meet reporting objectives (Dechow et al., 1995; Roychowdhury, 2006). Studies suggest that when firms have adverse information or wish to conceal aggressive accounting or operational manipulations, they may intentionally produce more complex language (Lo et al., 2017; Nguyen, 2021). On the other hand, some managers might simplify disclosures under EM to convey an illusion of transparency. Consequently, the association between EM and complexity can be mixed, a point underexplored in emerging markets (Chatterjee, 2024).

According to signaling theory, companies operating under instability or weak governance may obscure negative events through language complexity (Bushee et al. (2018); Lo et al., 2017; Braun et al., 2023). This challenge is heightened in emerging markets, such as Egypt, where corporate governance (CG) systems can be weaker (Balboula and Shemes, 2025; Balboula and Elfar, 2023, 2024; Alm El-Din, 2024). Indeed, research indicates many Egyptian firms exhibit high ownership concentration and limited board independence, factors that may foster managerial opportunism (Balboula and Shemes, 2025). Regulators and scholars thus emphasize enhanced disclosure readability to counter information asymmetry and uphold investor confidence (Arora and Chauhan, 2022; Abdelazim et al., 2023). Board of directors is the most crucial CG mechanism for protecting stakeholders' interests (Fama & Jensen, 1983). Attributes like board independence, size, gender diversity, and meeting frequency can either mitigate or exacerbate obfuscation. Likewise, cash holdings may

magnify the scope for opportunistic EM, firms with excess liquidity can more readily mask inefficiencies, potentially employing complex disclosures to hide real activities manipulation (Lestari & Hanifah, 2020; Hasan & Habib, 2020). Despite the centrality of these factors, limited research in Egyptian contexts examines how they jointly moderate the EM–complexity link. Examining these dynamics in Egyptian firms addresses a significant gap in the literature and extends our understanding of how EM strategies shape report readability in diverse institutional settings. Consequently, to fill this gap, we address the following central research questions:

RQ1: *Does earnings management (AEM vs. REM) influence the complexity (readability) of annual reports of Egyptian firms?*

RQ2: *Do board characteristics and cash holdings moderate that EM–complexity relationship?*

To answer these questions, this study assesses a panel dataset of 125 Egyptian non-financial firms listed on the EGX throughout 2018 to 2023, generating 533 firm-year observations. We employ OCR technology (Tesseract) and NLP techniques to extract and preprocess Arabic text from annual PDF reports. Using a Python script, we compute readability scores based on the LIX formula, while the Fog Index and ARI are used for robustness checks. We estimate AEM (via a modified Jones model with ROA adjustment) and REM (via Roychowdhury's approach) and examine how board characteristics (including independence, size, gender diversity, meetings) and cash holdings moderate the EM–readability relationship.

This study adds a unique contribution into earnings management and corporate disclosure-related research by demonstrating the manner through which diverse forms of earnings manipulation can create annual report readability (accrual-based and real earning management) especially in the surroundings of Egypt. Leveraging the mechanisms by which board composition (e.g. independence, diversity) and excess cash reserves can compound or counteract this effect, our results provide concrete, actionable insights for regulators seeking to strengthen governance codes, for investors trying to identify obfuscation within disclosure, and for corporate boards seeking to create transparency. Such insights are particularly relevant in emerging markets, where less developed

governance frameworks and high ownership concentration may enable opportunistic managers to hide underperformance otherwise. These findings ultimately help to provide a bridge between managerial practices and the short-term impact of CG reform, suggesting a need for increased scrutiny and accountability in terms of financial reporting.

The paper is organized as follows: Section 2 for a review of relevant literature and the study's hypotheses. Section 3 details the research methodology design. Section 4 presents the empirical findings. Section 5 explores additional analyses to strengthen robustness. Finally, Section 6 discusses key conclusions.

2. Literature Review and Hypotheses Development

2.1 Earnings management and Readability

Readability of annual reports is a fundamental qualitative characteristic of accounting information and enhance ability to assimilate valuation-relevant information (Loughran and McDonald, 2014). It reflects the ease with which stakeholders can interpret valuation-relevant data, influencing how they evaluate firm performance and risk. Highly readable reports are crucial for effective communication between managers and stakeholders, enhancing investor comprehension (Rennekamp, 2012) and bolstering confidence in managerial integrity (Brochet et al., 2016). Specifically, readable reports improve valuation judgments (Lawrence, 2013), trading volumes (De Franco et al., 2015), credit ratings (Bonsall and Miller, 2017), reduce stock return volatility Braun et al. (2023) and stock liquidity, especially in emerging markets known for complex disclosures and wide information asymmetry (Aldoseri and Melegy, 2023). They also enhance informational efficiency (Hesarzadeh and Rajabalizadeh, 2019), analyst forecast accuracy and attract greater analyst coverage (Hope, 2003), and lower firm’s cost of debt and reduce the likelihood of future stock price crashes (Ertugrul et al., 2017). On the contrary, complex and difficult-to-read disclosures can lead suboptimal investor reactions (You and Zhang, 2009), greater forecast dispersion, and intensify the agency problem as, it is stronger for firms with higher information asymmetry (Hesarzadeh and Rajabalizadeh, 2019). Additionally, excessive complexity, whether in financial reports or footnotes, may overwhelm stakeholders and hinder effective decision-making. (Abernathy et al, 2019). Hence, report clarity is widely recognized as a cornerstone of effective communication in corporate settings.

Managers sometimes use earnings management (EM) to avoid disclosing losses or meet earnings benchmark (Lo et al., 2017; Tiwari et al., 2024), a behavior that can mislead financial statement users and this action will give a bad signal (Shauki and Oktavini, 2022). EM can take various forms, including accrual-based or real manipulations. Accrual-based EM involves manipulating accounting accruals, while real EM involves manipulating real activities to achieve desired earnings targets. Zang (2012) demonstrates that managers weigh the cost-benefit trade-offs between AEM and REM, opting for REM when constraints on accrual-based adjustments are high. Chi et al. (2011) further find that firms restricted in their ability to use AEM are more likely to engage in REM, reinforcing the substitutability of these two approaches. Li (2019) provides evidence that real earnings management weakens earnings persistence, mainly by distorting cash flow patterns rather than affecting accruals. Similarly, Anggono (2020) demonstrates that abusive earnings management negatively affects annual report readability. Regardless of the form, the net effect of EM is often a distorted view of true operating performance. To hide or justify these distortions, managers may resort to complex narrative disclosures, thereby making annual reports less transparent (Shauki and Oktavini, 2022).

Additionally, prior research (e.g., Leuz et al., 2003) suggests that in weaker legal enforcement settings, managers are more likely to engage in EM, particularly through discretionary accruals, as investor protections are weaker and financial reporting discretion is greater. Dechow and Skinner (2000) argue that AEM is often conducted within acceptable thresholds, particularly in settings with limited regulatory oversight, making it more accessible compared to REM. Healy and Wahlen, (1999) highlight that AEM techniques, like adjustments in depreciation, bad debt provisions, and deferred revenues, are widely recognized by financial statement preparers and auditors, meaning that their impact on transparency is relatively well understood.

According to Bushee et al. (2018), there are two distinct motives for complex narrative disclosures: information and obfuscation. "Information" motives aim to provide more extensive disclosures for stakeholders to improve comprehension through detailed jargon and wordy explanations, which ideally reduces information asymmetry. "Obfuscation" motives, on the other hand, aim

to hide poor performance from stakeholders, thereby increasing information asymmetry between managers and stakeholders. When firms perceive a high incentive to engage in earnings management, they are more likely to use complexity as an obfuscation tool. As financial manipulation intensifies, corporate reports become increasingly difficult for stakeholders to interpret, reducing transparency and readability.

Numerous studies confirm that firms practicing EM tend to produce less readable disclosures (Ajina et al., 2016; Lo et al., 2017). For instance, an analysis of French firms' MD&A sections from 2010 to 2013, involving 163 listed firms, found that managers alter readability to conceal real financial outcomes (Ajina et al., 2016). Lo et al. (2017), using MD&A reports from 2017 to 2022 of 2,184 unique firms, reported similar evidence. Cheng et al. (2018) Documented a significant positive correlation between manipulative accruals and the FOG Index in 1,163 Chinese firms from 2012 to 2016, implying that lower profits often prompt managers to raise textual complexity. Arora and Chauhan (2022) benchmark a negative relationship between readability and EM in 5,446 sample in India from 2007 to 2019, especially among distressed and financially constrained firms. Related work in Europe (Ponce et al., 2023) and other emerging economies (Dau et al., 2024) supports the conclusion that aggressive EM is consistently tied to more convoluted annual reports, and consequently less readable. Braun et al. (2023) found that readability reduced the uncertainty and mispricing when firms have managed earnings, also their findings suggest that some firms may deliberately enhance the readability of their financial reports to signal strong earnings quality. By doing so, they differentiate themselves from companies that rely on aggressive earnings management to meet market expectations.

According to agency theory standpoint, managers, acting as agents, may take actions to maximize personal benefits at the expense of shareholders (Jensen and Meckling, 1976). When ownership and control are separated, information asymmetry increases, allowing opportunistic behaviors including earnings manipulation to the extent that their actions will increase their wealth (Boachie and Mensah, 2022). In this regard, the agency theory seeks to mitigate the information asymmetry among the internal parties of the firm, which are more

familiar with the financial information than the external parties (Alm El-Din, 2024). Under these circumstances, report complexity serves as a strategic tool to obscure suboptimal decisions or financial underperformance, aggravating the agency problem. Since investors often lack direct access to internal data, they rely heavily on narrative disclosures; when those disclosures become less readable, shareholders are further hindered from assessing the firm's true condition. Hence, agency theory helps explain why firms with greater EM incentives might systematically produce more complex reports (Ajina et al., 2016).

Prior findings suggest that manipulating earnings typically correlates with heightened disclosure complexity (Arora and Chauhan, 2022). Despite a growing body of evidence on EM–readability interactions in developed markets, fewer studies address emerging economies, where weaker governance frameworks might exacerbate obfuscation. Based on the arguments above, this study hypothesizes:

H1*: Earnings management (EM) is positively associated with the complexity of the annual reports (lower readability), as Egyptian firms engaging in EM are more likely to produce less transparent disclosures.*

2.2 Board Characteristics Moderating Role

CG is a pillar of corporate prosperity that seeks to align managerial activities with those of shareholders. Various corporate scandals like those of Enron, WorldCom, Tyco and Satyam Computers highlighted the need to have strong CG structures and effective monitoring (Chatterjee, 2021). As presented in agency theory by Jensen and Meckling (1976), managers might engage in opportunistic behavior to maximize their own interests at the expense of stakeholders, creating agency costs. Hence, the CG mechanisms attempt to ensure that the managers act in the best interests of shareholders (Chatterjee, 2021). Essentially, through overcoming agency problems and limiting opportunistic behavior (Beasley, 1996), well-effected boards increase firm performance and push forward the interest of shareholders. For this reason, one of the key issues faced by boards is to achieve balance between preserving the interests of shareholders and granting autonomy to managers (Chatterjee, 2020). In addition, good boards are integral

to the oversight of how management works in the reporting process (Cohen et al., 2004), which enhances the quality of reported earnings (Beasley, 1996; Meeampol, et al., 2013). The clarity of financial reports may suffer when managers practice EM, whether accrual-based or real EM (Ajina et al., 2016; Lo et al., 2017). Strong board characteristics, however, have the potential to moderate (i.e., weaken or strengthen) this negative effect by enhancing the monitoring and/or demanding the transparent reporting.

2.2.1 Board Size

One important governance dimension is the board size (Nahum and Carmeli, 2020). There has been some controversy as to what is the best size for a board of directors. The rationale for larger boards is that they have more diversity and experience, are able to advise management more effectively, and provide perspective on management interactions (Ntim et al., 2014), while some researchers suggest that lower number of board memebers are more efficient (Darko et al., 2016). A bigger board may also offer more diversity of expertise, improve monitoring through subcommittees or specialized committees, and a wider pool of networks and resources (Saha and Kabra, 2022). A larger board may have a more developed committee structure that targets particular aspects of governance like financial reporting. Their committees can provide technical validation, and help to make sure that the report meets regulatory, as well as user needs. According to agency theory, this diversity and collective decision-making can enhance monitoring, and decrease opportunistic EM and promote clearer disclosures (Herenia et al. 2024). However, larger boards could fall short in terms of coordination, resulting in ineffective oversight and inconsistent decisions. Therefore, there are mixed empirical results for larger boards showing more or less quality of disclosure (Abeysekera, 2010) or no significant relation (Rodriguez-Fernandez et al., 2014; Wang et al., 2020). Overall, if a bigger board mobilizes its resources effectively, it can mitigate the potential obfuscation stemming from EM and enhance readability.

2.2.2 Board Independence

Independent directors are a vital check on the opportunism of managers (Fama and Jensen, 1983). Independent directors are carriers of reputational incentives to maintain their credibility, hence, boards with greater independence generally monitor the managers better. This reputational incentive propels independent directors to request for higher earnings quality because they are protecting themselves and shareholders from the potential abuse of power. It is believed that boards have large number of outside directors that serve as a protection against CEOs' opportunistic behavior by providing oversight and incentives to act in shareholders' preferences (Alves, 2023). Higher board independence has been found to decrease EM and to have negative associations with both accruals and real activity manipulations (Dechow et al., 1995; Xie et al., 2003), resulting in greater earnings quality, reducing information asymmetry between investors (Armstrong et al., 2010; Goh et al., 2016; Chatterjee, 2020). Therefore, as EM increases, an independent board may compel more accurate disclosures and clearer reports, which can weaken the negative impact of EM on readability. However, some researchers find extreme independence in the board may inadvertently trigger managerial efforts to obfuscate or circumvent strict monitoring (Adams and Ferreira, 2007), potentially leading to deterioration in readability. However, the major view in the literature is that board independence improves CG, decreases information asymmetry, and makes reporting clearer.

2.2.3 Female Representation

Board gender diversity (BGD) means the presence of female directors in the board, who contribute to the decision-making process with new perspectives, risk-averse attitudes, and ethical concerns (Post and Byron, 2015). Indeed, from a resource dependence perspective, female directors provide different views and problem-solving abilities (Abdelazim et al., 2023; Issa et al., 2021; Terjesen et al., 2016), leading to better access to various resources and consequently improved financial performance (Pucheta-Martínez et al., 2020). As per agency theory, female directors is considered a risk-averse (Abdelazim et al., 2023), thus help reduce agency conflicts through increased disclosures and crucially, by stricter monitoring (Zalata et al., 2019; El-Dyasty, and Elamer, 2023). The

representation of female directors is also linked to the mitigating of EM, as well as the overall reduction of financial statement restatements (Garcia-Sanchez et al., 2017; Zalata et al., 2019). Research in EU settings, where quotas are sometimes obligatory, further confirm this (Lakhal et al., 2015). These findings have also been shown to hold true globally (Belaounia et al., 2020). They also produce more readable disclosures (Ginesti et al., 2018; Nadeem, 2022). Moreover, female directors are more likely to promote information sharing and consider the interests of broader stakeholders (Nadeem, 2020). However, some studies do not report significant findings (Shauki and Oktavini, 2022; Abínzano, et al., 2024) suggesting possible contextual or cultural factors that might moderate this relation (for instance, the independence of female directors). The key overall finding is that BGD promotes transparency and decreases the chances that EM will degrade readability.

2.2.4 Board Meetings

The regularity of board meetings is an important indicator of effective oversight and active participation of board members in the governance and financial decision-making process. Previous studies indicate that frequent meetings improve the quality of financial disclosure and reduce information asymmetry (Li and Li, 2018). These meetings contribute to ensuring the accuracy of financial information provided to stakeholders, which improves the clarity of reports. Furthermore, Adams and Ferreira (2009) found that increased frequency of board meetings is associated with improved financial reporting and reduced earnings management practices in European companies, indicating the purpose of meetings for reducing financial manipulation and enhancing transparency. Agency theory also supports this relationship, as holding board meetings more frequently can reduce conflicts between management and stakeholders, leading to more accurate and comprehensive financial disclosures (Fama and Jensen, 1983). Moreover, in Egypt, Metwally, et al, (2024) found that companies that hold frequent board meetings achieve better readability for their annual reports, suggesting that strong governance contributes to improving the clarity of financial disclosures. However, Zaman (2022) argues that the number of meetings alone is not sufficient, as the effectiveness of meetings depends on the quality of discussions and planning, not just their frequency. In the Egyptian context, the CG Code stipulates that the board of directors meet at least once

every three months, reflecting the regulatory importance of these meetings in improving the quality of financial disclosure. Based on this we hypothesize that the number of board meetings plays a moderating role in the relationship between earnings management and financial report readability, such that frequent meetings reduce the negative impact of earnings management on report clarity.

To summarize, the two theoretical views of agency and resource-dependence theories suggest that the board characteristics, including independence, size, gender diversity, and board meetings can strengthen or weaken the Impact of EM on the readability of firm's reports. Particularly, the empirical findings show that strong boards when they are more independent, adequately sized, diverse, and meet more frequently demand more transparent disclosure and reduce the extent of opportunistic EM. However, in some contexts, there were mixed results. The present study enriches these existing studies by examining the effect of these board characteristics as moderators on the direct effect of EM on the financial reporting readability in the context of emerging markets like Egypt. As in Egypt, agency conflicts and governance structures may differ from developed markets, particularly given the unique regulatory environment of the Egyptian market and its evolving CG practices. Therefore, we propose the following hypothesis:

H2: *Board characteristics moderate the relationship between earnings management and readability of annual report, such that stronger board governance weakens the positive relation between earning management and complexity, leading to clearer financial disclosures.*

2.3 Cash holdings Moderating Role

Having established the significance of EM and financial reporting readability, it is also essential to investigate how cash holdings (CH) influence behavior. Financial constraints and CH can affect a firm's EM activities substantially. The evidence about the incidence of EM in financially constrained firms is mixed according to researchers. Some argue that EM is employed as a mechanism to obfuscate poor performance by financially constrained or distressed firms (Haga et al., 2022; Rakshit et al., 2024; Matonti et al., 2020). In contrast, other studies suggest that those firms have to provide accurate information to obtain more financing, thus having less room to manipulate earnings (Agustia et al., 2020; Christina and Alexander, 2020). This contradiction in the literature indicates that

financial constraint context is an important factor that can shape firms' behaviors, particularly those in relation to CH. CH is primarily considered a strategic asset that allows for monetary liquidity for new ventures or acts as a buffers against revenue shortfalls (La Rocca and Cambrea, 2019; Khuong et al., 2020). At the same time, holding too much cash can invite scrutiny over possible managerial opportunism, especially if managers cannot justify why funds remain uninvested (Alm El-Din, 2024).

Indeed, firms keep cash for various reasons, as the transaction motive manages regular outflows, the precautionary motive deals with unexpected shortages, and tax or predation motives could influence cash holdings in some jurisdictions (Tran, 2020). However, the agency motive is most relevant for the current study, where managers leave excess cash to pursue personal benefits or conceal inefficient decisions, behaviors that might then necessitate higher complex (less readable) disclosures in order to avoid scrutiny. Excess cash can worsen agency problems from an agency-theoretic perspective by providing managers with more resources to pursue personal interests (Jensen, 1986). Research indicates managers seek to use large cash reserves to mask inefficient decisions, engage in empire-building, or misappropriate resources (Lestari and Hanifah, 2020; Talebnia and Hadiseh, 2012). In such cases, complex disclosures may be exploited by managers to conceal these practices linking CH with low earnings quality and high financial obfuscation (Hasan and Habib, 2020; Nekhili et al., 2016). Conversely, other findings propose that sufficient CH can decrease the demand for EM, as with sufficient liquidity management are less likely to create opportunistic earnings, because managers are less pressured to manipulate earnings when liquidity is sufficient (Inayah and Izzaty, 2021; Al-Dhamari and Ku Ismail, 2015).

These contradictory results indicate that excessive CH may intensify or dampen the link between EM and readability. However, we expect higher cash holdings to increase the association between EM and complexity, consistent with the agency perspectives (Jensen, 1986) and previous research on managerial opportunism during surplus liquidity (Hasan and Habib, 2020; Nekhili et al., 2016); the managers have more freedom to engage in obfuscation of the inefficient decisions under less transparent reporting. Gryko et al., (2024) provide empirical evidence from the Polish market, showing that firms with higher cash reserves engage more extensively in REM, reinforcing the notion that financial

flexibility facilitates operational distortions and contributes to increased report complexity. This dynamic may be particularly pertinent in emerging markets like Egypt, where agency conflicts can be pronounced (Alm El-Din, 2024). As a result, excessive cash firms will demonstrate a stronger positive relationship between EM and complexity (low readability). Therefore, this study hypothesizes the following:

H3: *Cash holdings amplify the relationship between earnings management and readability of financial report, such that firms with higher cash levels exhibit a stronger positive earnings management-complexity link.*

3. Research Design and Methodology

3.1 Data and Sample

Our sample is based on publicly listed non-financial firms on the Egyptian stock exchange (EGX) and the period from 2018–2023. Data source for this study was obtained from EGX "www.egx.com.eg" and from "www.mubasher.info", a well-known financial information site offering company-level financial statements, annual reports, and relevant governance disclosures. The sample was originally 238 companies from the EGX that were all listed on the EGX during the research period. We then filtered this initial universe by excluding financial institutions and banks, which face a different environment for regulation and financial reporting; this left us with a reduced population of 184 non-financial firms. In ensuring completeness and reliability of the data, we further stratified the sample. First of all, we filtered out companies with no annual data over six years. Then, we removed any missing or not yet public firm-year records for annual and governance reports. Also, because a critical part of our analysis involves measuring annual report readability, we stipulated that all annual reports had to be retrievable as PDFs that were machine-readable for text extraction. Consequently, we excluded firms for which annual reports could not be processed for the readability measure. To ensure that the readability measure was accurate, only firm-year reports that had text successfully extracted and did not contain formatting errors were used in the analysis. Based on these exclusion criteria, our final sample comprises of 125 distinct non-financial firms which lead to a total of 620 firm-year observations of non-financial firms listed on EGX, which reduced after incorporating lags in our variables measurement to be 533 firm-year observations.

Table 1. Sample Distribution by Sector

Sector	Firm-Year Obs.	Percentage
Basic Resources	50	9.38%
Building Materials	20	3.75%
Construction & Engineering	27	5.07%
Educational Services	15	2.81%
Energy & Support Services	3	0.56%
Food, Beverages & Tobacco	100	18.76%
Healthcare & Pharmaceuticals	56	10.51%
Industrial Products & Automobiles	17	3.19%
Non-Banking Financial Services	31	5.82%
Paper, Packaging & Printing Materials	2	0.38%
Real Estate	109	20.45%
Telecommunications, Media & IT	16	3.00%
Textiles & Durable Goods	35	6.57%
Tourism & Leisure	18	3.38%
Trade & Distributors	11	2.06%
Transportation & Shipping Services	19	3.56%
Utilities	4	0.75%
Total	**533**	**100.00%**

3.2 Variables Measurement

3.2.1 Readability Measure

The readability of the annual reports, which is our dependent variable, is based on the Läsbarhetsindex (LIX) Index (Björnsson, 1968). Although several indexes, such as the FOG Index (Gunning, 1952) and Flesch Reading Ease (Flesch, 1948), have been widely used in accounting studies, we use the LIX Index due to its characteristics with respect to the Arabic language and used in Egyptian Studies (e.g., Ezzat, 2019). In contrast to English and many Western languages, Arabic has a morphologically rich structure and complex word formations which render readability assessment especially difficult. Many traditional readability metrics rely on syllable counts, an approach that does not

seamlessly apply to Arabic due to its unique linguistic properties. To overcome these issues, we leverage the LIX Index, which features a language-independent approach and is easy to calculate. Unlike phonetic-complexity-dependent models in the literature, the LIX text-based readability model calculates textual complexity relying on word count in the text, the size of sentences and the proportion of complex words, thus making it suitable for assessing Arabic corporate reports. The index has been used for cross-linguistic readability tests, especially in the case of non-Latin scripts.

Since the Egyptian corporate annual reports are mostly found in PDF form, and are often scanned images as opposed to search text, extracting and processing the content took multiple steps. For converting scanned files to machine-readable text, we relied on Tesseract OCR (Optical Character Recognition), a state-of-the-art open-source engine that boasts very high accuracy in processing Arab scripts. So, the extracted contents were converted to UTF-8 format and the Arabic Text was preserved without corruption. Arabic text recognition poses its own challenges that required further tweaks. Tuning the parameters of Tesseract to capture the nuances of the Arabic script, as well as preprocessing the images to improve their quality and effectiveness for text extraction were performed to ensure the text accuracy. After conversion with OCR, a cleaning step was applied to the extracted text, using a script based on Python. This means stripping numerical values, latin letters, and extraneous symbols to keep Arabic words, punctuation and structures of the sentence. To ensure uniformity of words and sentence segmentation, we leveraged regular expressions (regex) since it correctly identifies Arabic word boundaries. This proved to be an important step to maintain equal amounts of words and sentences present in each, needed for the calculation of the LIX Index. The text was then analyzed for readability, as calculated using the LIX formula, where a higher LIX Index indicates increased text complexity, suggesting lower readability:

$$LIX = \frac{N_w}{N_s} + 100 \times \frac{N_c}{N_w}$$

where:

- N_w: the overall word count within the text.

- N_s : the total count of complete sentences presents in the document.
- N_c : complex words, defined as those that contain more than six letters.

3.2.2 Earnings Management Measurement

For measuring EM, we adopt Accrual-Based (AEM) and Real Earnings Management (REM) approaches.

3.2.2.1 Accrual-Based Earnings Management (AEM):

To measure AEM, we apply the absolute Modified Jones Model (MJM) (Dechow et al., 1995), which classifies total accruals (TACC) into discretionary (DA) and non-discretionary (NDA) components. Following Kothari et al. (2005), this model accounts for firm performance by incorporating Return on Assets (ROA) as a control factor.

- Estimating Total Accruals (TACC)

$$TACC_{i,t} = \beta_0 + \beta_1\left(\frac{1}{TA_{i,t-1}}\right) + \beta_2\left(\frac{\Delta Rev_{i,t} - \Delta AR_{i,t}}{TA_{i,t-1}}\right) + \beta_3\left(\frac{PPE_{i,t}}{TA_{i,t-1}}\right) + \beta_4 ROA_{i,t} + \varepsilon_{i,t}$$

where:

- $TACC_{i,t}$= Total Accruals, represents the portion of earnings that do not involve direct cash transactions, obtained by subtracting operating cash flows from net income.
- $\frac{1}{TA_{i,t-1}}$ = Inverse of Lagged Total Assets, controlling for firm size
- $\Delta Rev_{i,t}$ = Change in Revenue
- $\Delta AR_{i,t}$ = Change in Accounts Receivable
- $PPE_{i,t}$ = The book value of tangible assets, including land, machinery, and buildings, adjusted relative to the firm's total assets from the previous period.
- $ROA_{i,t}$ = Firm's profitability ratio, calculated as net income divided by total assets
- $\varepsilon_{i,t}$ = Residuals, representing the unexplained component of accruals

- Computing Discretionary Accruals (DA)

After estimating the regression coefficients $\beta_0,\ \beta_1, \beta_2, \beta_3, \beta_4,$ we compute NDA and DA, which serve as the measure of EM:

$$NDA_{i,t} = \beta_0 + \beta_1\left(\frac{1}{TA_{i,t-1}}\right) + \beta_2\left(\frac{\Delta Rev_{i,t} - \Delta AR_{i,t}}{TA_{i,t-1}}\right) + \beta_3\left(\frac{PPE_{i,t}}{TA_{i,t-1}}\right) + \beta_4 ROA_{i,t}$$

$$DA_{i,t} = TACC_{i,t} - NDA_{i,t}$$

where:

- $NDA_{i,t}$ = Predicted Non-Discretionary Accruals, derived from the regression model
- $DA_{i,t}$= Discretionary Accruals, indicating potential EM

3.2.2.2 Real Earnings Management (REM)

With the REM, we follow Roychowdhury (2006), to measure deviations from normal financial activities, we compute three components: abnormal cash flows from operations "AbCFO", abnormal production expenditures "AbPROD", and discretionary expense deviations "AbDISX". Each abnormal component is obtained by regressing firm-year observations on fundamental determinants of real activity, which enables us to capture deviations that signal earnings manipulation. The REM Score sums these deviations up to reveal the degree of REM activities.

$$REM\_Score_{i,t} = -AbCFO_{i,t} + AbPROD_{i,t} - AbDISX_{i,t}$$

- Measuring Abnormal Operating Cash Flows (AbCFO)

$$CFO_{i,t} = \beta_0 + \beta_1\left(\frac{1}{TA_{i,t-1}}\right) + \beta_2\left(\frac{Rev_{i,t}}{TA_{i,t-1}}\right) + \beta_3\left(\frac{\Delta Rev_{i,t}}{TA_{i,t-1}}\right) + \varepsilon_{i,t}$$

where:

- $CFO_{i,t}$ = Cash inflows from operating activities, standardized by the firm's total assets in the prior year.
- $\frac{1}{TA_{i,t-1}}$ = Inverse of Lagged Total Assets
- $\frac{Rev_{i,t}}{TA_{i,t-1}}$ = The ratio of total revenue to lagged total assets

- $\frac{\Delta Rev_{i,t}}{TA_{i,t-1}}$ = The year-over-year revenue change relative to total assets from the previous period.
- $\varepsilon_{i,t}$ = Residuals (AbCFO) representing abnormal cash flow manipulation

- **Measuring Abnormal Costs of Production (AbPROD)**

$$PROD_{i,t} = \beta_0 + \beta_1\left(\frac{1}{TA_{i,t-1}}\right) + \beta_2\left(\frac{Rev_{i,t}}{TA_{i,t-1}}\right) + \beta_3\left(\frac{\Delta Rev_{i,t}}{TA_{i,t-1}}\right) + \beta_4\left(\frac{\Delta Rev_{i,t-1}}{TA_{i,t-1}}\right) + \varepsilon_{i,t}$$

where:

- $PROD_{i,t}$ = The total cost of production is derived by summing the cost of goods sold (COGS) and inventory fluctuations (ΔInventory), then normalizing the value using prior-period total assets.
- $\frac{Rev_{i,t}}{TA_{i,t-1}}$ = The ratio of total revenue to lagged total assets
- $\frac{\Delta Rev_{i,t}}{TA_{i,t-1}}$ = The year-over-year revenue change relative to total assets from the previous period.
- $\frac{\Delta Rev_{i,t-1}}{TA_{i,t-1}}$= The year-over-year variation in revenue is adjusted using total assets from the previous period, ensuring that past sales performance is accounted for in the analysis.
- $\varepsilon_{i,t}$= Residuals (AbPROD) representing abnormal production manipulation

- **Measuring Abnormal Discretionary Expenses (AbDISX)**

$$DISX_{i,t} = \beta_0 + \beta_1\left(\frac{1}{TA_{i,t-1}}\right) + \beta_2\left(\frac{Rev_{i,t-1}}{TA_{i,t-1}}\right) + \varepsilon_{i,t}$$

where:

- $DISX_{i,t}$ = Represents discretionary spending, including marketing, administrative, and distribution costs, along with miscellaneous operational expenses, all scaled relative to total assets from the preceding year.
- $\varepsilon_{i,t}$ = Residuals (AbDISX) representing abnormal discretionary expense manipulation

3.2.3 Moderator and Controls

Beyond the primary dependent and independent variables, additional firm-level characteristics are incorporated as control variables that may influence readability and EM. We also introduce moderator variables to examine how board characteristics influence these relationships. Table 2 summarizes the measurement of these variables.

Table 2. Variable Measurement

Variable	Measurement
LIX_Score	Textual Complexity (an inverse proxy for readability: is calculated as an index based on the total number of words, sentences, and complex (words > 6 letters) words in the text. A higher score indicates greater complexity.
AbsDA	Absolute value of residuals from a MJM model adjusted by ROA
AbPROD	Residual from regression of Production Costs on sales, change in sales, etc.
AbCFO	Residual from regression of CFO on sales, change in sales, etc.
AbDISX	Residual from regression of discretionary expenses on lagged sales, etc.
REM	Sum or factor score of (AbCFO + AbPROD + AbDISX), each derived from regression-based expected values
FirmSize	Natural logarithm for total assets
ROA	Net earnings divided by total assets
Leverage	Total Debt relative to total Assets
FirmAge	Number of years since public listing
Big4	Binary variable = 1 if audited by “Big 4”; 0 otherwise
Liquidity	Current Ratio
Cash	Cash & Equivalents relative to total Assets)
ROE	Net earnings divided by shareholders’ equity
OwnCon	% of outstanding shares owned by the largest shareholder (more than 5%)
BoardSize	Number of directors in the board
BoardInd	Proportion of independent directors relative to total board members.
Female	Number of female members in the board
BoardMet	Count of board meetings held within the fiscal year

3.3 Model Specification

This part describes the models used to investigate the impact of EM on readability in Egyptian Firms and the moderator variables. We run two main models, one on Accrual-Based (AEM) related to readability and Real Earnings Management (REM)-related readability metrics. We also perform moderation and sub-group analyses study the impact of board governance and cash holdings on these relationships.

3.2.1 Accrual-Based Earnings Management (AEM) and Readability

For the impact of AEM on the readability analysis, the baseline regression model is specified as follows:

$$LIX\_Score_{i,t} = \beta_0 + \beta_1 AbsDA_{i,t} + \sum \beta_k \text{Controls}_{i,t} + \text{Industry FE} + \text{Year FE} + \varepsilon_{i,t}$$

Where, LIX Score is the readability measure, and AbsDA is the absolute value of DA, estimated using the MJM with ROA adjustment.

3.2.2 Real Earnings Management (REM) and Readability

For the impact of REM on readability analysis, we estimate the following model:

$$LIX\_Score_{i,t} = \beta_0 + \beta_1 REM_{i,t} + \sum \beta_k \text{Controls}_{i,t} + \text{Industry FE} + \text{Year FE} + \varepsilon_{i,t}$$

Where REM Score is computed as the aggregate of the three abnormal REM components.

To determine which specific REM component drives readability differences, we estimate separate regressions by replacing the REM Score with its individual components (AbCFO, AbPROD, and AbDISX) as follows:

$$LIX\_Score_{i,t} = \beta_0 + \beta_1 \text{AbCFO}_{i,t} + \sum \beta_k \text{Controls}_{i,t} + \text{Industry FE} + \text{Year FE} + \varepsilon_{i,t}$$

$$LIX\_Score_{i,t} = \beta_0 + \beta_1 \text{AbPROD}_{i,t} + \sum \beta_k \text{Controls}_{i,t} + \text{Industry FE} + \text{Year FE} + \varepsilon_{i,t}$$

$$LIX\_Score_{i,t} = \beta_0 + \beta_1 \text{AbDISX}_{i,t} + \sum \beta_k \text{Controls}_{i,t} + \text{Industry FE} + \text{Year FE} + \varepsilon_{i,t}$$

3.2.3 Moderation and Sub-Group Analysis:

For the moderating effect analysis, we extend the models by including interaction terms:

$$LIX\_Score_{i,t} = \beta_0 + \beta_1 EM_{i,t} + \beta_2 Board_{i,t} + \beta_3 (EM\ x\ Board)_{i,t} + \sum \beta_k \text{Controls}_{i,t} + \text{Industry FE} + \text{Year FE} + \varepsilon_{i,t}$$

where: EM is Earning management which is represented by AbsDA for AEM models and REM Score for REM models. Board includes Board Size, Independence, Female Representation, Meeting Frequency. The interaction term (EM × Board) captures whether CG mechanisms strengthen or weaken the impact of EM on readability.

Additionally, to examine firm-specific differences, we split the sample based on cash holdings (CH) to conduct a sub-group analysis. We classify the firms into low-cash and high-cash groups according to their median CHs. Cash availability is used to further split the sample, and separate regressions are thereafter estimated for each sub-group to assess whether cash availability influences the EM–readability relationship.

4. Empirical results

4.1 Descriptive statistics

Table 3 shows the descriptive summary of the study variables. The LIX Score, which measures readability/complexity, has an average of 59.37, with a range from 37.12 (simpler text) to 102.45 (more complex text). For EM, the absolute discretionary accruals (AbsDA) has a mean of 0.096, with notable variation (std. dev. 0.113), suggesting firms differ in their use of AEM. The REM Score, which captures the real earnings management, shows an average of -0.199, with a wider spread (std. dev. 1.188), indicating significant variation in real earnings manipulation across firms. Among REM components, AbPROD (abnormal production costs) has a mean of -0.270, while AbCFO (abnormal cash flows) and AbDISX (abnormal discretionary expenses) are near zero, suggesting that, on average, firms do not heavily rely on these strategies, though individual firms show wide variations. Regarding governance, Board Size averages 8.34

members, with 19.9% of directors classified as independent. Female board representation is low, with an average of 1.52 female members, and board meetings occur about 8.66 times per year, though some firms hold as many as 24 meetings annually. For firm characteristics, Firm Size (measured by total assets) has an average log value of 20.65, while Firm Age averages 34.2 years, indicating a sample of relatively mature firms. ROA (profitability) is 5.8% on average, and Leverage remains low at 4.5%, suggesting that firms in the sample are not highly leveraged. Lastly, Ownership Concentration is high, averaging 64.5%, implying a significant portion of shares are controlled by a few major stakeholders. Cash holdings are 10% of total assets on average, though some firms hold very little liquidity (0.1%).

Table 3. Summary Statistics

Variable	**Obs.**	**Mean**	**Std. Dev.**	**Min**	**Max**
LIX_Score	533	59.371	7.613	37.122	102.447
AbsDA	533	0.096	0.113	0.000	0.626
REM	533	-0.199	1.188	-4.190	7.732
AbPROD	533	-0.270	0.772	-2.746	2.749
AbCFO	533	-0.002	0.151	-1.040	1.035
AbDISX	533	-0.003	0.494	-2.829	5.418
FirmSize	533	20.650	1.813	17.227	23.733
ROA	533	0.058	0.093	-0.136	0.257
Leverage	533	0.045	0.083	0.000	0.304
FirmAge	533	34.199	18.524	9.000	54.000
Big4	533	0.327	0.469	0.000	1.000
Liquidity	533	1.895	1.027	0.432	3.495
Cash	533	0.100	0.119	0.001	0.427
ROE	533	0.126	0.164	-0.185	0.524
OwnCon	533	0.645	0.235	0.253	1.000
BoardSize	533	8.336	2.524	4.000	17.000
BoardInd	533	0.199	0.184	0.000	0.889
Female	533	1.516	0.931	0.000	6.000
BoardMet	533	8.662	4.185	1.000	24.000

4.2 Correlation Matrix

The correlation matrix in Table 4 provides insights into the relationships of our study variables and the complexity. AEM, which is measured by the absolute discretionary accruals (AbsDA) exhibits a weak negative correlation with the LIX Score (-0.06), suggesting that firms engaging in accrual manipulations may produce slightly less complex financial disclosures, though this relationship lacks strong significance. On the other hand, REM has a small but significant positive correlation with Lix Score (complexity) (0.07), indicating that firms engaging in REM tend to produce more complex reports. This suggests that firms using operational decisions to manipulate earnings, such as overproduction or discretionary expense reductions, may generate financial disclosures that are harder to interpret. Firm size is negatively correlated with complexity (-0.21), suggesting that larger firms produce clearer reports, possibly due to greater reporting standardization and regulatory oversight. Leverage also shows a weak negative correlation with complexity (-0.09), implying that firms with higher debt levels might present their reports in a more transparent manner, possibly to maintain investor confidence. While cash holdings do not show a significant direct relationship with readability, they have a positive correlation with REM (0.10), indicating that firms with higher cash reserves may be more inclined to engage in REM strategies. In terms of governance characteristics, firms audited by Big 4 firms are associated with significantly clearer disclosures, as indicated by the strong negative correlation with complexity (-0.25). This reinforces the idea that higher-quality auditors play a role in ensuring transparency and regulatory compliance. Board independence, however, has a weak positive correlation with complexity (0.13), suggesting that firms with more independent directors may produce more complex reports. Board size does not show a direct correlation with complexity. The number of female board members is slightly negatively correlated with complexity (-0.08), though the effect is weak. The frequency of board meetings does not show a strong direct influence on complexity.

Table 4. Correlation Matrix

Variable	***(1)***	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***	***(7)***	***(8)***	***(9)***	***(10)***	***(11)***	***(12)***	***(13)***	***(14)***	***(15)***	***(16)***
(1) LIX_Score	1															
(2) Abs_DA	-0.06	1														
(3) REM_Score	0.07*	-0.05	1													
(4) FirmSize	-0.21*	-0.01	-0.05	1												
(5) ROA	-0.07	0.29*	-0.06	0.11*	1											
(6) Leverage	-0.09*	0.01	0.08*	0.11*	-0.16*	1										
(7) FirmAge	0.04	-0.03	-0.05	0.06	-0.11*	-0.05	1									
(8) Big4	-0.25*	-0.12*	0.13*	0.36*	0.05	0.25*	0.08*	1								
(9) Liquidity	0.13*	-0.09*	-0.1*	-0.31*	0.06	-0.25*	-0.13*	-0.2*	1							
(10) Cash	-0.04	0.2*	0.1*	-0.09*	0.36*	-0.14*	-0.12*	-0.15*	0.14*	1						
(11) ROE	-0.05	0.3*	-0.01	0.19*	0.73*	0.1*	-0.03	0.1*	-0.12*	0.26*	1					
(12) OwnCon	-0.07*	0.12*	-0.16*	0.06	0.19*	0.02	0.04	-0.09*	-0.04	0.15*	0.21*	1				
(13) BoardSize	-0.05	-0.05	-0.09*	0.32*	0.12*	0.11*	0.001	0.14*	-0.11*	0.01	0.11*	0.09*	1			
(14) BoardInd	0.13*	0.04	-0.27*	0.03	0.002	-0.14*	-0.06	-0.07	0.12*	-0.13*	0.04	0.11*	-0.04	1		
(15) Female	-0.08*	-0.02	0.01	-0.01	0.04	0.04	-0.07	0.01	-0.04	-0.02	-0.03	-0.06	0.22*	-0.1*	1	
(16) BoardMet	-0.02	0.08*	-0.002	0.13*	0.18*	0.001	0.09*	-0.08*	-0.15*	0.16*	0.16*	0.21*	0.08*	-0.12*	-0.06	1

Note: * significant at 5%

4.3 Direct Effects: Earnings Management and Complexity

The results in Table 5 provide insights into the direct relationship between earnings management and the complexity of annual reports in the Egyptian context. Absolute discretionary accruals (AbsDA) exhibits a negative and significant effect on complexity (lower readability) (-5.317, $p<0.1$), suggesting that firms engaging in discretionary accruals tend to produce less complex reports. This aligns with the idea that managers using accruals for EM may prefer simplified disclosures to reduce scrutiny or enhance perceived transparency. In contrast, in Model 2, REM shows a significant positive impact on complexity (0.185, $p<0.01$), indicating that firms engaging in REM strategies produce more complex reports. This may be due to operational manipulations, such as overproduction or discretionary expense reductions, creating a need for more convoluted reporting to obscure earnings distortions. Therefore, H1 is partially supported. While REM is positively correlated with complexity (consistent with expectations), AEM shows a negative association, suggesting that firms managing earnings through accruals may produce more readable disclosures, possibly to mask aggressive accounting choices through transparency and to reduce scrutiny.

Table 5: Impact of EM on Complexity Metrics

Dep Var: LIX_Score	**Model 1** **AbsDA**	**Model 2** **REM**
Intercept	72.797***	70.137***
	(16.511)	(15.786)
AbsDA	-5.317*	
	-(1.806)	
REM		0.185***
		(2.753)
FirmSize	-0.400*	-0.287
	-(1.906)	-(1.355)
ROA	-1.932	-3.190
	-(0.349)	-(0.583)
Leverage	2.342	1.557
	(0.529)	(0.354)
FirmAge	0.033*	0.033*
	(1.920)	(1.905)
Big4	-3.846***	-4.001***
	-(4.780)	-(4.980)
Liquidity	0.316***	0.366***
	(3.315)	(3.840)
Cash	-6.620**	-8.487***
	-(2.152)	-(2.739)
ROE	3.420	2.946
	(1.151)	(0.998)
OwnCon	-4.306***	-3.881***
	-(3.044)	-(2.737)
Industry FE	Yes	Yes
Year FE	Yes	Yes
R-squared:	0.227	0.234
Adj. R-squared:	0.179	0.186
F-statistic:	4.747	4.925
No. Observations:	533	533

The results in Table 6 break down the impact of REM into its key components, abnormal cash flow from operations (AbCFO), abnormal costs of production (AbPROD), and abnormal discretionary expenses (AbDISX), to identify which REM activity contributes most to financial reports complexity. The findings reveal that all three REM components significantly increase complexity, suggesting that firms engaging in these earnings manipulation strategies tend to produce more complex disclosures. AbCFO has a positive and marginally significant effect on complexity (3.535, $p<0.1$), implying that firms manipulating cash flows may use convoluted reporting to obscure the effects of their EM. AbPROD has a stronger and highly significant effect (0.175, $p<0.01$), indicating that firms using overproduction to manipulate earnings tend to introduce more complexity in their disclosures, possibly due to inventory management distortions that require additional explanation. Similarly, AbDISX shows a significant positive association with complexity (1.951, $p<0.01$), highlighting that firms reducing discretionary expenses to manage earnings tend to produce harder-to-read reports, potentially due to the need to justify cuts in key expenditures like R&D or marketing. The strong significance of AbPROD and AbDISX suggests that production and discretionary expense manipulation are the primary drivers of increased reporting complexity, whereas cash flow manipulation has a weaker but still relevant effect. This supports the argument that REM strategies often lead to obfuscation in financial disclosures, making it harder for investors and regulators to assess the true financial health of the firm.

Table 6: Disaggregated Effect of REM Components on Complexity

Dep Var: **LIX_Score**	**Model 1** AbCFO	**Model 2** AbPROD	**Model 3** AbDISX
Intercept	72.449***	70.102***	70.544***
	(16.460)	(15.786)	(15.967)
AbCFO	3.535*		
	(1.658)		
AbPROD		0.175***	
		(2.818)	
AbDISX			1.951***
			(2.794)
FirmSize	-0.402*	-0.285	-0.305
	-(1.915)	-(1.345)	-(1.446)
ROA	-4.612	-3.255	-3.063
	-(0.829)	-(0.595)	-(0.560)
Leverage	2.000	1.529	1.157
	(0.452)	(0.347)	(0.262)
FirmAge	0.035**	0.033*	0.035**
	(2.011)	(1.917)	(2.013)
Big4	-3.697***	-4.023***	-4.114***
	-(4.640)	-(5.004)	-(5.075)
Liquidity	0.342***	0.367***	0.360***
	(3.597)	(3.853)	(3.786)
Cash	-7.629**	-8.571***	-8.869***
	-(2.470)	-(2.764)	-(2.840)
ROE	3.300	2.957	3.031
	(1.111)	(1.002)	(1.027)
OwnCon	-4.360***	-3.874***	-3.846***
	-(3.081)	-(2.733)	-(2.711)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
R-squared:	0.226	0.234	0.234
Adj. R-squared:	0.178	0.187	0.187
F-statistic:	4.725	4.94	4.935
No. Observations:	533	533	533

4.4 Moderation Effects: Board Characteristics

The results in Table 7 suggest that board characteristics do not significantly moderate the relationship between AEM and complexity. The interaction terms between absolute discretionary accruals (AbsDA) and board size, board independence, female board presence, and board meeting frequency all show statistically insignificant effects ($p>0.1$) on the LIX Score. This indicates that variations in board composition and governance structure do not meaningfully alter the impact of AEM on the complexity. This finding suggests that firms using AEM do not necessarily adjust the readability of their reports based on board monitoring, potentially because AEM is a more discreet form of earnings manipulation that does not immediately reflect in reporting clarity.

In contrast, Table 8 reveals a significant moderating role of board characteristics in the relationship between REM and complexity. The interaction between REM and board independence (REM x BoardInd) is negative and highly significant (-0.668, $p<0.01$), suggesting that firms with a more independent board tend to mitigate the complexity associated with REM practices. This aligns with the expectation that independent directors exercise stronger oversight, discouraging obfuscation in financial disclosures. Similarly, the interaction between REM and female board presence (REM x Female) is also negative and significant (-0.196, $p<0.01$), indicating that firms with greater female representation on boards are less likely to produce complex reports in response to REM. This supports the argument that female directors may enhance transparency and discourage excessive complexity in financial reporting. The interaction between REM and board meeting frequency (REM x BoardMet) follows the same pattern, showing a significant negative effect (-0.057, $p<0.01$). This implies that more frequent board meetings help curb the increase in report complexity associated with REM, reinforcing the role of active governance in ensuring clear and accessible financial disclosures. However, BoardSize moderating effect is insignificant (-0.020, $p>0.1$).

Overall, these results highlight a clear distinction between AEM and REM in their interaction with board characteristics. While board structure appears to have little influence on the link between AEM and complexity, it plays a crucial role in mitigating the complexity associated with REM. Therefore, H2 is supported. This underscores the importance of independent and diverse board composition, as well as active board engagement, in promoting transparent and readable financial disclosures when firms engage in real earnings manipulation.

Table 7: Moderating Effect of Board Characteristics on the AEM-Complexity Relationship

Dep Var: LIX_Score	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Intercept	73.470***	71.123***	73.536***	71.856***
	(11.442)	(8.582)	(11.942)	(10.148)
AbsDA	-10.370	-21.244	-5.709	1.893
	-(0.880)	-(1.454)	-(0.683)	(0.255)
BoardSize	0.064			
	(0.311)			
AbsDA x BoardSize	0.636			
	(0.446)			
BoardInd		2.580		
		(0.564)		
AbsDA x BoardInd		16.103		
		(1.042)		
Female			-0.446	
			-(0.678)	
AbsDA x Female			0.251	
			(0.059)	
BoardMet				0.066
				(0.269)
AbsDA x BoardMet				-0.772
				-(0.873)
FirmSize	-0.457	-0.434	-0.397	-0.384
	-(1.316)	-(1.356)	-(1.289)	-(1.296)
ROA	-2.211	-0.885	-1.521	-2.176
	-(0.228)	-(0.090)	-(0.152)	-(0.232)
Leverage	2.290	3.361	1.913	1.894

	(0.446)	(0.672)	(0.360)	(0.369)
FirmAge	0.034	0.037	0.032	0.033
	(1.194)	(1.298)	(1.131)	(1.234)
Big4	-3.871***	-3.765***	-3.809***	-3.859***
	-(2.646)	-(2.587)	-(2.636)	-(2.823)
Liquidity	0.313**	0.294*	0.312**	0.325*
	(1.974)	(1.865)	(2.004)	(1.935)
Cash	-6.478*	-5.166	-6.931*	-6.674*
	-(1.668)	-(1.404)	-(1.750)	-(1.658)
ROE	3.532	2.965	3.187	3.754
	(1.079)	(0.890)	(0.963)	(1.156)
OwnCon	-4.383*	-4.605*	-4.348*	-4.250*
	-(1.868)	-(1.919)	-(1.838)	-(1.726)
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
R-squared	0.228	0.232	0.229	0.23
Adj. R-squared	0.177	0.182	0.178	0.179
F-statistic	73.1	73.832	75.129	77.691
Observations	533	533	533	533

Table 8: Moderating Effect of Board Characteristics on the REM-Complexity Relationship

LIX_Score	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Intercept	70.030***	63.030***	70.919***	70.371***
	(10.539)	(8.851)	(11.292)	(10.917)
REM	0.376**	0.625***	0.429***	0.621***
	(2.174)	(4.220)	(3.827)	(3.621)
BoardSize	0.113			
	(0.601)			
REM x BoardSize	-0.020			
	-(1.249)			
BoardInd		6.193*		
		(1.945)		
REM x BoardInd		-0.668***		
		-(2.614)		
Female			-0.526	
			-(1.018)	
REM x Female			-0.196***	
			-(3.433)	
BoardMet				-0.023

				-(0.138)
REM x BoardMet				-0.057***
				-(3.479)
FirmSize	-0.322	-0.217	-0.282	-0.290
	-(0.892)	-(0.684)	-(0.907)	-(1.005)
ROA	-3.735	-2.845	-2.627	-3.516
	-(0.382)	-(0.289)	-(0.264)	-(0.370)
Leverage	1.564	2.734	1.290	2.227
	(0.305)	(0.566)	(0.241)	(0.441)
FirmAge	0.034	0.040	0.030	0.033
	(1.185)	(1.421)	(1.101)	(1.221)
Big4	-4.025***	-4.082***	-4.004***	-4.011***
	-(2.793)	-(2.870)	-(2.810)	-(2.974)
Liquidity	0.371**	0.330**	0.362**	0.371**
	(2.265)	(2.058)	(2.292)	(2.221)
Cash	-8.775**	-7.907**	-8.431**	-7.935**
	-(2.336)	-(2.214)	-(2.222)	-(2.107)
ROE	3.079	2.443	2.559	2.679
	(0.905)	(0.717)	(0.747)	(0.804)
OwnCon	-3.946*	-4.153*	-3.913*	-3.915
	-(1.684)	-(1.749)	-(1.656)	-(1.577)
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
R-squared	0.236	0.25	0.239	0.243
Adj. R-squared	0.186	0.2	0.189	0.193
F-statistic	1209.825	5865.876	88.659	144.669
Observations	533	533	533	533

4.5 Sub analysis, Split by Cash holdings

The results in Table 9 and Table 10 highlight the moderating role of CH in the relationship between EM and Complexity. When firms are categorized based on their CH, distinct patterns emerge. For AEM in Table 9, absolute discretionary accruals (AbsDA) remain negatively associated with complexity in both low- and high-cash firms. However, the coefficients are insignificant ($p>0.1$), suggesting that AEM does not meaningfully alter the complexity of financial disclosures, regardless of cash reserves. This could imply that accrual manipulations are designed to be subtle and do not significantly affect the overall readability of reports. For REM in Table 10, the impact on readability is contingent on cash levels. In firms with high CH, REM has a significant positive association with

LIX Score (0.191, $p<0.05$), indicating that real earnings manipulation leads to increased complexity in financial reports. This suggests that cash-rich firms engaging in REM may strategically obscure their reporting to mask the underlying impact of earnings manipulation. In contrast, the relationship between REM and readability is insignificant for low-cash firms, implying that firms with limited cash reserves do not exhibit the same complexity-inducing effects when engaging in REM practices.

Table 9: AEM and Complexity, Split by Cash Holdings

	Low-CH	**High-CH**
Intercept	70.685***	68.370***
	(11.631)	(9.398)
AbsDA	-5.647	-7.048
	-(1.463)	-(1.526)
FirmSize	-0.392	-0.121
	-(1.296)	-(0.357)
ROA	-5.919	0.244
	-(0.865)	(0.025)
Leverage	-6.010	5.589
	-(0.956)	(0.789)
FirmAge	0.062***	0.015
	(2.895)	(0.507)
Big4	-4.966***	-3.740***
	-(4.464)	-(2.798)
Liquidity	0.241**	0.286
	(2.152)	(1.605)
Cash	-25.242	-1.719
	(1.097)	-(0.340)
ROE	1.627	1.808
	(2.468)	(0.310)
OwnCon	-4.674	-7.157***
	-(0.733)	-(2.953)
Industry FE	Yes	Yes
Year FE	Yes	Yes
R-squared:	0.369	0.206
Adj. R-squared:	0.285	0.112
F-statistic:	4.427	2.192
Observations:	267	266

Table 10: Real Earnings Management and Complexity, Split by Cash Holdings

	Low-CH	**High-CH**
	70.732***	64.370***
Intercept	(11.436)	(8.830)
	0.023	0.191**
REM	(0.044)	(2.197)
	-0.413	0.068
FirmSize	-(1.343)	(0.198)
	-8.393	0.723
ROA	-(1.259)	(0.074)
	-7.144	5.784
Leverage	-(1.136)	(0.822)
	0.061***	0.012
FirmAge	(2.835)	(0.400)
	-4.546***	-4.070***
Big4	-(4.186)	-(3.028)
	0.262**	0.347*
Liquidity	(2.260)	(1.942)
	-29.856	-4.940
Cash	(0.937)	-(0.968)
	1.335	-0.248
ROE	(2.377)	-(0.043)
	-4.751	-6.078**
OwnCon	-(0.762)	-(2.470)
Industry FE	Yes	Yes
Year FE	Yes	Yes
R-squared:	0.363	0.214
Adj. R-squared:	0.279	0.121
F-statistic:	4.319	2.303
Observations:	267	266

Table 11 further disaggregates REM into its individual components, abnormal cash flow from operations "AbCFO", abnormal costs of the production "AbPROD", and abnormal discretionary expenses "AbDISX", to determine which aspect of REM drives the increase in complexity. In high-cash firms, both AbPROD (0.175, $p<0.05$) and AbDISX (1.816, $p<0.10$) significantly contribute to higher complexity, reinforcing the idea that firms with financial flexibility use these mechanisms to manipulate earnings in a way that obfuscates financial disclosures. In contrast, AbCFO has no significant impact, suggesting that cash flow manipulations do not directly influence readability/ complexity. The distinction between low- and high-cash firms suggests that cash availability plays a crucial role in shaping the nature and transparency of EM. Firms with higher cash reserves appear to engage in more complex reporting when manipulating earnings through real activities, while those with lower cash reserves do not exhibit the same trend. Therefore, H3 is supported, as the results of Table 10 and 11 indicate that the positive impact of REM on complexity is significantly stronger in high-cash firms and that AbPROD and AbDISX drive this complexity effect in high-cash firms, reinforcing the idea that firms with financial flexibility strategically use REM to obfuscate financial information.

Table 11: Real Earnings Management Individual Components and Complexity, Split by Cash Holdings

	AbCFO		**AbPROD**		**AbDISX**	
	Low-CH	**High-CH**	**Low-CH**	**High-CH**	**Low-CH**	**High-CH**
Intercept	71.184***	67.042***	71.370***	64.401***	71.301***	65.425***
	(11.847)	(9.233)	(11.516)	(8.835)	(11.705)	(9.017)
AbCFO	7.878***	-0.422				
	(2.787)	-(0.128)				
AbPROD			0.305	0.175**		
			(0.622)	(2.186)		
AbDISX					3.812	1.816*
					(1.466)	(1.900)
FirmSize	-0.432	-0.072	-0.446	0.067	-0.443	0.025
	-(1.449)	-(0.212)	-(1.448)	(0.195)	-(1.465)	(0.074)
ROA	-10.375	0.286	-8.626	0.630	-8.721	0.957
	-(1.574)	(0.028)	-(1.294)	(0.065)	-(1.314)	(0.098)
Leverage	-7.793	5.985	-6.897	5.760	-7.791	5.487
	-(1.263)	(0.842)	-(1.099)	(0.818)	-(1.246)	(0.777)
FirmAge	0.066***	0.014	0.062***	0.012	0.065***	0.014
	(3.086)	(0.456)	(2.868)	(0.411)	(3.004)	(0.459)
Big4	-4.619***	-3.573***	-4.490***	-4.088***	-4.559***	-4.206***
	-(4.343)	-(2.665)	-(4.142)	-(3.037)	-(4.238)	-(3.073)
Liquidity	0.275**	0.296	0.282**	0.347*	0.280**	0.330*
	(2.505)	(1.644)	(2.418)	(1.944)	(2.503)	(1.851)
Cash	-26.16	-2.507	-28.882	-4.998	-32.509	-5.185
	(1.049)	-(0.491)	(0.970)	-(0.978)	(0.841)	-(1.000)
ROE	1.732	0.563	1.286	-0.234	1.321	-0.155
	(2.507)	(0.096)	(2.363)	-(0.041)	(2.375)	-(0.027)
OwnCon	-4.952	-7.183***	-4.821	-6.078**	-4.793	-6.183**
	-(0.924)	-(2.939)	-(0.802)	-(2.470)	-(0.801)	-(2.503)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
R-squared:	0.383	0.198	0.364	0.214	0.369	0.21
Adj. R-squared:	0.302	0.103	0.28	0.121	0.285	0.117
F-statistic:	4.712	2.089	4.339	2.301	4.428	2.249
No. Obs:	267	266	267	266	267	266

5. Additional analysis

To test the robustness of the primary results, this section employs two additional complexity measures: the Fog Index (Gunning, 1952) and the Automated Readability Index (ARI) (Smith & Senter, 1967). These indices provide complementary perspectives on textual complexity of the annual reports. The Fog Index, which accounts for sentence length and complex word usage, captures the overall difficulty of comprehension. A higher Fog Index suggests a more challenging text:

$$Fog\ Index = 0.4 \times \left(\frac{N_w}{N_s} + 100 \times \frac{N_c}{N_w}\right)$$

where:

- N_w : the overall word count in the text,
- N_s: the total count of complete sentences presents in the document.
- N_c: complex words, defined as those that contain more than six letters.

Similarly, the ARI estimates the education level required to understand a given text, incorporating character count per word and sentence structure to assess complexity.

$$ARI\ Index = 4.71 \times \frac{N_{char}}{N_w} + 0.5 \times \frac{N_w}{N_s} - 21.43$$

where:

- N_{char}: total character count within the text,
- N_w: the overall word count in the text,
- N_s: the total count of complete sentences present in the document.

Tables 12–18 confirm that EM affects complexity across multiple readability measures. The direction and significance of the effects are consistent with the primary analysis, reinforcing that REM contributes to higher complexity, while AEM has a weaker or negative impact. Governance factors (Tables 14–17) and CH (Table 18) continue to moderate these effects in a similar manner. Specifically, board independence and female representation has statistically

significant influence in shaping the association between EM and the readability by reducing the textual complexity of the annual report, underscoring the role of governance in shaping financial reports transparency. Table 18 suggests that in high-cash firms, AEM negatively impacts reports complexity and mostly insignificant, while REM significantly increases the complexity in firms with high cash holdings (in both measures; FOG and ARI). In contrast, the effects of REM are weaker in low-cash firms, indicating that financial constraints limit the extent of REM without sacrificing readability.

Table 12. Direct Effects of Earnings Management on Complexity using the Fog Index

Model	Dep. Var	Indep. Var	Coef (t-statistics)	Adj. R-sq	Obs.
Model 1	FOG_Index	AbsDA	-2.127* (-1.806)	0.179	533
Model 2	FOG_Index	REM	0.074*** (2.753)	0.179	533
Model 3	FOG_Index	AbCFO	1.414* (1.658)	0.200	533
Model 4	FOG_Index	AbPROD	0.070*** (2.818)	0.200	533
Model 5	FOG_Index	AbDISX	0.781*** (2.794)	0.195	533

Notes: All models control for firm-level characteristics, industry fixed effects, and year fixed effects. Control variables are not displayed for brevity but are included in all regressions. Significance levels: ****p < 0.01; **p < 0.05; *p < 0.1*. t-statistics are presented in parentheses.

Table 13. Direct Effects of Earnings Management on Complexity using the ARI Index

Model	Dep. Var	Indep. Var	Coef (t-statistics)	Adj. R-sq	Obs.
Model 1	ARI_Index	AbsDA	-3.432** (-2.350)	0.186	533
Model 2	ARI_Index	REM	0.145*** (4.392)	0.186	533
Model 3	ARI_Index	AbCFO	1.490 (1.403)	0.221	533
Model 4	ARI_Index	AbPROD	0.070*** (2.818)	0.221	533
Model 5	ARI_Index	AbDISX	1.471*** (4.278)	0.220	533

Notes: All models control for firm-level characteristics, industry fixed effects, and year fixed effects. Control variables are not displayed for brevity but are included in all regressions. Significance levels: ****p < 0.01; **p < 0.05; *p < 0.1*. t-statistics are presented in parentheses.

Table 14. Moderation of Board Characteristics in the Accrual-Based Earnings Management- Complexity Relationship using the Fog Index

Model	Dep. Var	Indep. Var	Coef (t-statistics)	Adj. R-sq	Obs.
Model 1	FOG_Index	AbsDA	-4.148 (-0.880)	0.177	533
		BoardSize	0.026 (0.311)		
		AbsDA x BoardSize	0.254 (0.446)		
Model 2	FOG_Index	AbsDA	-8.498 (-1.454)	0.182	533
		BoardInd	1.032 (0.564)		
		AbsDA x BoardInd	6.441 (1.042)		
Model 3	FOG_Index	AbsDA	-2.284 (-0.683)	0.178	533
		Female	-0.178 (-0.678)		
		AbsDA x Female	0.101 (0.059)		
Model 4	FOG_Index	AbsDA	0.757 (0.255)	0.179	533
		BoardMet	0.026 (0.269)		
		AbsDA x BoardMet	-0.309 (-0.873)		

Notes: All models control for firm-level characteristics, industry fixed effects, and year fixed effects. Control variables are not displayed for brevity but are included in all regressions. Significance levels: ****p < 0.01; **p < 0.05; *p < 0.1*. t-statistics are presented in parentheses.

Table 15. Moderation of Board Characteristics in the Real Earnings Management- Complexity Relationship using the Fog Index

Model	Dep. Var	Indep. Var	Coef (t-statistics)	Adj. R-sq	Obs.
Model 1	FOG_Index	REM	0.150** (2.174)	0.186	533
		BoardSize	0.045 (0.601)		
		REM x BoardSize	-0.008 (-1.249)		
Model 2	FOG_Index	REM	0.250*** (4.22)	0.200	533
		BoardInd	2.477* (1.945)		
		REM x BoardInd	-0.267*** (-2.614)		
Model 3	FOG_Index	REM	0.172*** (3.827)	0.189	533
		Female	-0.210 (-1.018)		
		REM x Female	-0.078*** (-3.433)		
Model 4	FOG_Index	REM	0.248*** (3.621)	0.193	533
		BoardMet	-0.009 (-0.138)		
		REM x BoardMet	-0.023*** (-3.479)		

Notes: All models control for firm-level characteristics, industry fixed effects, and year fixed effects. Control variables are not displayed for brevity but are included in all regressions. Significance levels: ****p < 0.01; **p < 0.05; *p < 0.1*. t-statistics are presented in parentheses.

Table 16. Moderation of Board Characteristics in the Accrual-Based Earnings Management- Complexity Relationship using the ARI Index

Model	Dep. Var	Indep. Var	Coef (t-statistics)	Adj. R-sq	Obs.
Model 1	ARI_Index	AbsDA	-6.671 (-1.179)	0.198	533
		BoardSize	-0.042 (-0.452)		
		AbsDA x BoardSize	0.394 (0.587)		
Model 2	ARI_Index	AbsDA	-21.254*** (-2.779)	0.202	533
		BoardInd	-1.771 (-0.623)		
		AbsDA x BoardInd	18.336** (2.325)		
Model 3	ARI_Index	AbsDA	-4.392 (-1.035)	0.207	533
		Female	-0.503 (-1.528)		
		AbsDA x Female	0.616 (0.283)		
Model 4	ARI_Index	AbsDA	-0.888 (-0.232)	0.200	533
		BoardMet	0.070 (0.628)		
		AbsDA x BoardMet	-0.269 (-0.633)		

Notes: All models control for firm-level characteristics, industry fixed effects, and year fixed effects. Control variables are not displayed for brevity but are included in all regressions. Significance levels: ****p < 0.01; **p < 0.05; *p < 0.1*. t-statistics are presented in parentheses.

Table 17. Moderation of Board Characteristics in the Real Earnings Management- Complexity Relationship using the ARI Index

Model	Dep. Var	Indep. Var	Coef (t-statistics)	Adj. R-sq	Obs.
Model 1	ARI_Index	REM	0.427*** (5.11)	0.228	533
		BoardSize	-0.040 (-0.463)	0.228	533
		REM x BoardSize	-0.030*** (-4.057)	0.228	533
Model 2	ARI_Index	REM	0.502*** (6.141)	0.246	533
		BoardInd	1.587 (0.998)	0.246	533
		REM x BoardInd	-0.574*** (-3.774)	0.246	533
Model 3	ARI_Index	REM	0.301*** (2.794)	0.234	533
		Female	-0.522* (-1.936)	0.234	533
		REM x Female	-0.124** (-2.51)	0.234	533
Model 4	ARI_Index	REM	0.434*** (3.58)	0.236	533
		BoardMet	0.039 (0.494)	0.236	533
		REM x BoardMet	-0.038*** (-3.858)	0.236	533

Notes: All models control for firm-level characteristics, industry fixed effects, and year fixed effects. Control variables are not displayed for brevity but are included in all regressions. Significance levels: ****p < 0.01; **p < 0.05; *p < 0.1*. t-statistics are presented in parentheses.

Table 18. Cash Holdings Split Analysis: The Effect of Earnings Management on Complexity

Model	Dep. Var	Indep. Var	Coef (t-statistics)	Adj. R-sq	Obs.
Model 1	FOG_Index (Low Cash)	AbsDA	-2.259 (-1.463)	0.285	267
Model 2	FOG_Index (High Cash)	AbsDA	-2.819 (-1.526)	0.112	266
Model 3	FOG_Index (Low Cash)	REM	0.009 (0.044)	0.279	267
Model 4	FOG_Index (High Cash)	REM	0.077** (2.197)	0.121	266
Model 5	ARI_Index (Low Cash)	AbsDA	-2.024 (-1.021)	0.302	267
Model 6	ARI_Index (High Cash)	AbsDA	-5.613** (-2.505)	0.132	266
Model 7	ARI_Index (Low Cash)	REM	-0.105 (-0.403)	0.300	267
Model 8	ARI_Index (High Cash)	REM	0.156*** (3.737)	0.159	266

Notes: All models control for firm-level characteristics, industry fixed effects, and year fixed effects. Control variables are not displayed for brevity but are included in all regressions. Significance levels: ****p < 0.01; **p < 0.05; *p < 0.1*. t-statistics are presented in parentheses.

6. Discussion and Conclusion

This study explores the relationship the impact of EM practices on the complexity of Egyptian firms' annual reports. More specifically, it investigates the impact of both AEM and REM on financial reporting complexity as reflected in different readability indices. International literature generally indicates that EM could mask financial disclosures but the empirical results present new insights pertaining to the Egyptian corporations. The results suggest that AEM (measured by absolute DA) have a weak and marginally significant positive effect on readability (a negative on complexity), while REM is associated with a consistently greater report complexity. Also, among REM proxies AbPROD and AbDISX significantly increase report complexity, and AbCFO has a similar, but marginally significant impact. Moreover, for cash rich firms, REM strategies have a significant impact on readability, as they have higher complexity, which indicates that firms with higher financial flexibility are more active in engaging in REM and thus, incorporate REM in more complex reporting.

The observed differences in the effects of AEM and REM on readability, in the Egyptian market, can be explained through several accounting, CG, and institutional factors While AEM is seen as obfuscation in developed markets, in Egypt, AEM seems to slightly improve readability. Weak or still developing regulatory environment, could enable managers to smooth earnings without having to justify their financial engineering through complex disclosures. There are, however, some reason for this pattern in Egyptian firms. Egypt has a less developed financial reporting environment and a weaker enforcement of accounting standards makes firms practice AEM within acceptable thresholds. While REM requires direct actions to alter operating decisions, AEM is carried out through accrual manipulation, which often requires less sophistication or narrative complexity in annual reports. Prior research (e.g., Leuz et al., 2003) indicates that in weak legal enforcement settings, managers are more likely to engage in EM, often through discretionary accruals, as investor protections are weaker and financial reporting discretion is greater. This indicates that although firms use accruals to meet earnings targets, they do not use alternative measures to conceal the financial statements (Dechow and Skinner, 2000). Moreover, AEM techniques, at least those related to manipulation of depreciation, bad debt provisions, and deferred revenues, are already well known to financial statement preparers and auditors (Healy and Wahlen, 1999). Consequently, the incremental adjustments made by Egyptian firms based on the accrual basis are likely to be disclosed to investors in a more transparent manner, which may lead to negligible readability improvements rather than an increase in complexity.

Whereas AEM is not particularly complex, REM introduces significant complexity that we find to be strongest for AbPROD and AbDISX. The results are in line with theoretical expectations that REM is less easy to justify on the financial statement, leading to vaguer and potentially lengthier disclosures. There are several reasons for this. REM management is an accounting technique where managers inflate reported profits in the short run by Increasing production levels beyond demand to artificially lower the reported cost of goods sold (COGS). As a further consequence, this results in seasonally over-explaining in the annual report, which leads to even more complexity. MOREOVER, firms involved in REM reduces important discretionary costs (e.g., R&D, other

expenditure, training employee) in order to boost earnings. These reductions will need extra disclosure walk-throughs, especially if investors ask why operational spending looks dramatically different. This is in line with prior research showing that firms engaged in REM tend to produce less readable financial reports due to the need for additional justification (Li, 2008). The study of Zang's (2012) indicate that REM decisions are usually locked in before the end of the fiscal year, while AEM can be adjusted after. This helps explain why REM often arises in tandem with lengthier or more complex explanations later if it materially alters operational items (e.g., inventory or cost structures), but with a time lag. In addition, while AEM follows consistent accrual accounting practices, REM strategies lack formal regulatory oversight. Without clear guidance, firms may rely on operational adjustments that are harder to detect, potentially influencing the way financial reports are presented. Studies like Zang (2012) and Chi et al. (2011) provide empirical evidence that firms constrained in their ability to engage in AEM are more likely to engage in REM. A second possible explanation is that in emerging markets like Egypt, retail investors are less able to decode complex disclosures. This might also encourage managing more verbose reporting manipulations especially under REM.

In conclusion, consistent with Zang (2012), which highlights that managers weigh the cost trade-offs between AEM and REM, Egyptian firms appear to favor AEM when regulatory oversight is weaker, and only resort to significant REM, and its associated disclosure complexity, when accruals are insufficient to meet earnings targets. This idea of substitutability, though originally shown in a U.S. setting, resonates with our results that, in Egypt's weaker enforcement environment, managers still weigh the relative costs of each approach.

The moderation analysis reveals that certain board characteristics can moderate the effects of EM on complexity, particularly for REM. Overall, board factors (size, independence, female directors, frequency of meetings) do not meaningfully alter the weak AEM–complexity relationship under the all readability indexes. However, several board characteristics consistently mitigate the impact of REM on complexity. Across Lix, Fog and ARI measures, higher board independence, female representation on the board, and more frequent board meetings are each associated with less pronounced REM-driven complexity. In

other words, board characteristics appear to temper the tendency of REM to obscure disclosures, possibly by demanding clearer justifications or closer o9versight of operational tactics. These moderation findings suggest that robust board governance can be especially crucial in limiting how real earnings manipulations inflate annual-report complexity. Strengthening board independence, improving gender diversity, and encouraging more frequent board engagement may all play a role in preserving readable, transparent reports, particularly in contexts where REM is prevalent in Egyptian firms.

A notable finding is that cash-rich firms have larger demand for REM effects on complexity. This implies that financially flexible firms practice REM more extensively, which becomes entrenched into complex disclosures. High cash firms have fewer constraints in manipulating real activities, as they can afford temporary revenue losses from production changes or discretionary expense cuts. In these firms, managers may use complex reporting as a strategy to conceal aggressive REM practices. Recent evidence from a Polish setting (Gryko et al., 2024) similarly finds that companies with higher cash reserves engage more in real earnings manipulation, reinforcing the broader notion that financial flexibility facilitates operational distortions. Also, companies with large cash balances attract greater investor scrutiny, especially in emerging markets where corporate capital allocation is of paramount importance. With an increasing focus on these cash-rich firms, managers might also intentionally design more complex disclosures to provide a form of defensive protection from external oversight and skepticism, obfuscating any potential REM-induced earnings distortions.

The findings offer several actionable insights for both regulators and practitioners. First, regulators and auditors can use textual complexity as a red flag, especially when firms have high production/discretionary costs and high cash reserves. It helps triage which firms might require deeper scrutiny. Regulators in Egypt and similar emerging markets could enhance oversight of REM by issuing clearer guidelines on operational adjustments (e.g., overproduction or discretionary expense cuts) and by strengthening enforcement of disclosure requirements. Heightened monitoring of “cash-rich” firms may be especially valuable, given their more pronounced tendency to engage in REM.

Second, corporate boards and audit committees should encourage robust internal controls that identify potential operational manipulations early. Training financial staff and auditors to spot signals of REM, particularly unusual inventory build-ups or significant discretionary expense cuts, can help ensure that report readability is not compromised by excessive complexity. Third, investors would benefit from scrutinizing high-cash firms' operational choices and the clarity of their disclosures. Complex or lengthier sections explaining inventory changes or discretionary spending may signal REM usage. Vigilance by analysts and shareholders can, in turn, deter overreliance on operational manipulations. Collectively, these measures can help preserve the integrity and readability of annual reports, maintaining investor confidence and bolstering the transparency of financial statements in emerging markets.

The study presents some limitations that should caution readers and draw their attention to future research prospects despite its significance in understanding how accrual-based and Real EM affect the complexity of corporate financial reports in Egypt. First, the data are derived from a single emerging market, which could limit the results generalization to other institutional or cultural settings. Second, our measures of REM focus on production costs and discretionary expenses; future research can extend these results to other operational areas (e.g., sales channel decisions) or use more granular firm-level data. Third, although we focus on certain board characteristics (e.g., board size, independence, and female representation), other internal governance mechanisms, including CEO duality or audit committee could provide additional clarity around the role of internal controls on EM and disclosure complexity. Third, the study employs annual report readability indices that may miss qualitative nuances (e.g., the tone or sentiment of text). In contrast, future research may use state-of-the-art textual analysis methods to look in more detail at how managers influence the reported appearance of financial results.

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العلاقة بين إدارة الأرباح وتعقيد التقارير المالية: دور الاحتفاظ بالنقدية وخصائص مجلس الإدارة في الشركات المصرية

الملخص

تهدف هذه الدراسة إلى بحث العلاقة بين إدارة الأرباح وتعقيد التقارير المالية (انخفاض القابلية للقراءة)، من خلال تحليل بيانات ١٢٥ شركة غير مالية مدرجة في البورصة المصرية خلال الفترة من ٢٠١٨ إلى ٢٠٢٣ .وتفحص الدراسة ما إذا كانت الشركات التي تعتمد على إدارة الأرباح على أساس الاستحقاق وإدارة الأرباح الحقيقية تنتج إفصاحات مالية أكثر تعقيدًا. وقد تم استخدام مؤشر LIX لقياس قابلية التقارير المالية للقراءة، بينما تم الاستعانة بمؤشري FOG و ARI لاختبار متانة النتائج. أظهرت النتائج أن إدارة الأرباح على أساس الاستحقاق لها تأثير ضعيف وهامشي على تعقيد التقارير المالية، في حين أن إدارة الأرباح الحقيقية تؤدي باستمرار إلى زيادة تعقيد الإفصاح المالي .على وجه التحديد، تعمل كل من تكاليف الإنتاج غير العادية والنفقات التقديرية غير العادية على زيادة التعقيد بشكل كبير، بينما كان تأثير التدفق النقدي غير العادي أقل معنوية. كما أظهرت النتائج أن خصائص حوكمة مجلس الإدارة والاحتفاظ بالنقدية تؤثر على العلاقة بين إدارة الأرباح الحقيقية ودرجة تعقيد التقارير المالية، حيث تساهم استقلالية مجلس الإدارة، وتمثيل المرأة، وكثرة اجتماعات المجلس في الحد من التعقيد الناتج عن إدارة الأرباح على الحقيقية. علاوة على ذلك، تبين أن الشركات ذات مستويات الاحتفاظ بالنقدية المرتفعة والتي تمارس إدارة الأرباح تميل إلى إصدار تقارير مالية أكثر تعقيدًا، مما يشير إلى أن المرونة المالية قد تمكن الشركات من إخفاء التلاعب بالأرباح من خلال إفصاحات مطولة أو معقدة. تساهم هذه الدراسة في إثراء الأدبيات المتعلقة بـإدارة الأرباح والإفصاح المالي من خلال تقديم أدلة تجريبية حول كيفية تأثير حوكمة الشركات وحالة السيولة على شفافية التقارير المالية في الأسواق الناشئة .كما أن للنتائج آثارًا عملية على الجهات التنظيمية والمستثمرين ومجالس إدارة الشركات، مما يؤكد على أهمية تعزيز الحوكمة واتخاذ تدابير تنظيمية مستهدفة لتحسين قابلية التقارير المالية للقراءة.

الكلمات الافتتاحية: إدارة الأرباح، القابلية للقراءة، حوكمة مجلس الإدارة، الاحتفاظ بالنقدية، التحليل النصي.