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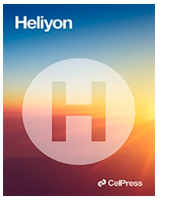

Real earnings management and ESG disclosure in emerging markets: The moderating effect of managerial ownership from a social norm perspective

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ABSTRACT

Drawing on social norm theory, this study delves into the nexus between real earnings manipulation (REM) and Environmental, Social, and Governance (ESG) disclosure within Egypt's emerging capital market. By analyzing data from the S&P/EGX ESG index (2013–2018) through a two-stage regression analysis, we unearth a noteworthy pattern: heightened REM practices correspond with reduced tendencies for ESG sustainability disclosure. Notably, this association is moderated by managerial ownership, which diminishes the negative linkage between REM and ESG transparency. A unique cultural insight emerges, revealing that religiously-aligned firms leverage REM as a risk-mitigation mechanism, leading to curtailed ESG disclosures. Our findings cast a spotlight on a possible managerial tilt towards short-term gains, often overshadowing long-term sustainability imperatives, especially in religiously influenced contexts. As we advance understanding of REM-ESG dynamics in religious emerging markets, our study highlights the pressing need for enhanced sustainability consciousness and accountability in these regions.

1. Introduction

The disclosure of Environmental, Social, and Governance (ESG) information is gaining significance for companies to address the concerns of external stakeholders and regulators [1–8]. However, there have been concerns raised regarding how earnings management can affect the reliability and accuracy of ESG disclosures. Companies often use earnings manipulation practices such as accruals-based or real earnings management to surpass market expectations, which can be viewed as an agency cost that prioritizes managerial interests over those of stakeholders [9–11]. Earnings management manipulates financial information to achieve a particular outcome, such as meeting earnings targets or hiding negative information [12]. While prior research has primarily focused on accrual-based earnings management (AEM), recent studies have highlighted the importance of real earnings management (REM) in influencing sustainability disclosures [13–17]. However, much of this research has been conducted in developed capital markets, with

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limited focus on emerging markets, such as Egypt.

Egypt provides a unique context to investigate the association between REM and ESG disclosure, given its cultural uniqueness and high religiosity [18]. The social norm theory suggests that religion influences individuals' behaviors and decision-making processes through shared values and beliefs [19]. Consequently, managers in religious countries may use REM as a risk-aversion tool and use less ESG disclosure [20,21]. Similarly, companies have been increasingly disclosing ESG information to address the concerns of external stakeholders and regulators [15,22–24]. Scholars have noted that ESG disclosure serves as a mechanism for meeting societal expectations and gives market participants important information to assess risk profiles and improve their reputation [3,5,25]. Building upon the social norm theory, ESG disclosure can also be seen as a means to gain legitimacy in the market. As such, it acts as a form of "insurance" for businesses. Against this backdrop, this study examines the association between real earnings manipulation (REM) practices and ESG sustainability disclosure. Several scholars have addressed this topic, examining how managers may use ESG instruments to mask opportunistic REM practices. However, this relationship has not been thoroughly explored in the context of Egypt. Despite the expectation that companies with higher ESG ratings will prioritize transparency and ethical behavior, some managers may need to use ESG practices as a shield against stakeholder vigilance or to conceal earnings manipulation activities, which leads to a positive association between earnings manipulation and ESG ratings [26]. By adopting a social norm theory perspective, this study seeks to shed more light on the complex interplay between REM and ESG disclosure.

This study addresses the requests made by Cai et al. [18] and Terzani and Turzo [21] to investigate the association between REM and ESG sustainability disclosure within a framework of social norms rather than ethical ones. Using data from the Egyptian firms from 2013 to 2018, the study employs two linear simultaneous equations regression technique to investigate the influence of REM on ESG disclosure in the Egyptian firms. The study employs two measures of REM and examines the moderating effect of managerial ownership, loss-making firms, firm leverage, and the Big Four audit firm on the relationship between REM and ESG disclosure. The results indicate that firms with a higher level of REM in Egypt provided a lower level of ESG disclosure, and managerial ownership assuages the association between REM and ESG disclosure. The study also finds that REM is negatively related to ESG disclosure after correcting for potential simultaneity bias. The study provides evidence that religious firms use REM as a risk-aversion tool and disclose less ESG information. These findings have significant implications for researchers and policymakers to understand the role of REM in ESG disclosure in religious countries.

This study makes various contributions to the existing literature on earnings management and sustainability disclosure. First, while most prior studies focus on accrual earnings management, this study examines the relationship between REM and ESG disclosure. As pointed out by previous researchers, real earnings management is another type of earnings management that can affect sustainability disclosure [14,17,27]. By investigating the empirical association between REM and ESG disclosure, this study responds to the call for further research into the relationship between EM and CSR using real earnings management measures. Second, the study extends the literature on the role of social norms in shaping firm outcomes, particularly in the context of a religious country. The study findings indicate that managers in highly religious areas may use real earnings management as a risk-aversion tool and disclose less ESG information. These findings support the social norm theory, which indicates that social norms and cultural values influence individuals' behavior [18,20,21]. Thus, the study makes a contribution to the existing psychological and sociological literature by examining the impact of religious social norms on individual behavior.

Third, the study demonstrates that firms may prioritize short-term performance over long-term sustainability by using real earnings management. The findings of our study suggest that firms with higher levels of REM disclose less ESG information, indicating that REM may impede sustainability disclosure. This finding highlights the importance of monitoring how firms manage their real earnings, as it can have implications for their ESG disclosure. Fourth, this study adds to prior studies on the relationship between earnings management and sustainability disclosure by investigating the impact of real activities manipulation on ESG disclosure. The study findings suggest that real earnings management level can influence the extent of ESG sustainability disclosure, and the two factors complement each other. Finally, this study extends the literature on the role of managerial ownership in driving ESG disclosure. The study results show that managerial ownership weakens the association between REM and ESG disclosure. This finding contributes to understanding how internal corporate governance mechanisms, such as managerial ownership, can affect the relationship between sustainability disclosure and earnings management. Overall, this study contributes to filling the gap in the literature by examining the relationship between real earnings management and ESG disclosure in a religious country and highlighting the importance of considering social norms and cultural values in shaping firms' behavior.

The rest of our study will be organized as follows: Section 2 discusses the Egyptian context in a brief profile of Egypt. Section 3 presents the theoretical analysis, reviews the related literature and develops a hypothesis. Section 4 describes the samples and models and identifies the variables' measurements. Section 5 reports the results, and the final section is the conclusion.

2. Background

Egypt began a well-planned economic reform program in the late 1990s, which included deregulation and privatization, stimulating the stock market in Egypt [28]. However, the revolution of January 25th, 2011, resulted in frequent political transitions, leading to political and economic stability in Egypt [29]. This instability has reduced citizens' investment and savings, leading Egyptian firms to make voluntary disclosure in order to increase their stock value [29]. Consequently, Egypt has made significant economic and regulatory changes. For example, the Egyptian Environmental Affairs Agency initiated Environmental Law No. 4/1994, and the Minister for Environmental Affairs was established in June 1997 [30] The Minister for Environmental Affairs focused on making initiatives and policies to recognize and mitigate the negative environmental effects of business activities and deliver sustainable development. Therefore, a corporate governance code was released in 2005, which is considered the first step in improving Corporate

social responsibility in Egypt to improve the quality of information presented by listed firms, facilitate decision-making, and improve investors' confidence in the Egyptian capital market. In addition, the Egyptian corporate responsibility center has cooperated with Standard and Poor's (S&P), the Credit Rating and Information Services CRISIL, and the EGX to launch the S&P ESG Index in 2007, which evaluates and reports on the environmental performance of firms [31]. The Egyptian ESG index was launched to address investor concerns about Egypt's environmental, social, and corporate governance (ESG) issues, improve the quality of information presented by listed firms, facilitate decision-making, and improve investors' confidence in the Egyptian capital market [32,33]. Each year, the top 30 firms out of the 100 largest listed firms are evaluated and included in the ESG index [33]. Lastly, the Egyptian government launched Sustainable Development Strategy called "The Egyptian Vision 2030". The Sustainable Development Strategy is a fundamental step to link the present to the future and restore Egypt as a regional leader. Therefore, the Egyptian government has taken several initiatives to promote social justice and sustainable development and enhance the investment climate [34]. However, most Egyptian firms use a stakeholder-information strategy, which favors a one-way strategy to communicate CSR information without permitting feedback or encouraging stakeholder participation [35].

On the other hand, El-Sayed Ebaid [36] found that managers of Egyptian listed firms involve in earnings manipulation to avert losses and decline in earnings. Specifically, Makhaiel and Sherer [37] suggest that Egyptian managers engage in real earnings management (REM) techniques, including adjusting advertising expenditures, inventory valuation and depreciation methods, and the disposal of fixed assets. The emergence of powerful Egyptian authorities, such as an activated stock exchange and the EGX's regulatory rules, provide firms with exceptional credibility and legitimacy, leading managers to prefer REM to accrual earnings management [38]. Moreover, Egyptian culture is influenced by Islamic religious origins, which affects business activities [39,40]. McGuire et al. [41] observed that religiosity is adversely related to abnormal accruals, however positively connected with proxies for REM, consistent with the idea that religion affects how managers handle pressures from the capital market. Managers in highly religious areas are still under pressure from the capital market to meet earnings targets. However, they believe that REM is less risky and more ethical than accrual earnings management, leading to improved external reputation and credibility with the capital market [42]. Halabi [43] indicate companies operating in nations with robust formal institutions and religious beliefs tend to choose earnings management techniques through real earnings management (REM). In highly litigious environments, company managers are more likely to follow REM to manipulate earnings instead of manipulating accruals, which supports the "penalty" theory proposed by Refs. [9,10,18,42].

Despite the existing research on the relationship between earnings management and sustainability disclosure, most studies focus on accrual earnings management, especially in emerging capital markets [27,44–46]. Furthermore, there is a call for further research into the relationship between REM and CSR [14]. Our study employs Egypt's unique culture and context to provide new evidence regarding the motivation and determinants of ESG disclosure. This study examines how REM affects ESG disclosure in Egypt.

3. Theoretical analysis, literature review and hypothesis development

3.1. Social norm theoretical framework

The concept of "Social norm theory" has been interpreted in several ways [47,48], but it mainly refers to a set of external regulations that are commonly agreed upon by a particular community. These rules are upheld by both punishment and feelings of remorse and disgrace, and their key feature is that they require individuals to sacrifice personal gains for the betterment of the group [49]. Economists have focused on social norms as a significant driving force or motivational mechanism for individual behavior [50]. Social norm theory, from an economic standpoint, can improve the economic system's efficiency in that it suggests that individuals in a society typically aim to maximize their own interests through the pursuit of resources by means of competition [51]. At the same time, research on social norms in social psychology has established that social norms direct action in "meaningful ways" [52].

According to Suchman [53], the notion of legitimacy is created through social interactions, where there is alignment between the actions of a given entity and the commonly recognized or presumed shared standards of a specific social group. This implies that the legitimacy of the entity relies on the agreement of a collective audience rather than any particular individual observer. Therefore, legitimacy is not an objective indicator of the "rightness" of the firm but rather a reflection of how society perceives the sufficiency of corporate behavior [53]. Legitimation is considered a relational motivation because it concerns how others perceive an organization's behaviors [54]. Following social norm theory, an individual may comply with a particular social norm for one of three reasons: 1) fear of the repercussions of non-compliance; 2) the desire to please others; and 3) a belief that the social rule is true [55]. Given that individuals typically conform to the customary conduct of their society, it is logical to anticipate that people living in the same nation will exhibit a general awareness and responsiveness to societal norms [56].

In Egypt, religious norms serve as a social control mechanism for beliefs and behaviors. Prior research suggests that the acceptance of accounting manipulation is lower among highly religious individuals [57,58]. A widely accepted explanation is that religious social norms discourage unethical decisions, including earnings management [18]. However, existing research indicates that managers in highly religious regions employ real earnings manipulation more than accruals management [41,59,60]. They suggest that since real earnings management is more difficult to detect, managers view it as a less risky business decision than accrual earnings management. As a result, executives operating in regions with strong religious affiliations are inclined to opt for manipulating real earnings rather than accrual earnings, which they view as a safer method of managing earnings under the inspection of regulators and auditors. According to the risk aversion theory, managers in religious nations are motivated to manipulate real activities while avoiding accrual earnings management.

Moreover, according to the social norm theory, firms should adopt their environmental and social disclosures to match the prevalent norms, values, and beliefs. In recent years, sustainability disclosure (ESG/CSR) has been regarded as the prevalent code of

corporate behavior [21,61–63]. As a result, social norm theory suggests that in religious countries, real earnings management and sustainability disclosure are risk-aversion behaviors that are negatively associated. Following this argument's logic, firms' managers in religious countries are expected to participate in REM practices to avoid risk consequences actively. Therefore, they neglect non-financial disclosure or create indifferent behaviors toward such strategies. The social norm theory's conceptual framework aids in comprehending the managerial objectives and actions that account for the inverse correlation.

3.2. Real earnings management and ESG disclosure

Earnings management, which involves the manipulation of reported accounting results to deceive stakeholders or affect contractual outcomes, has been demonstrated to have an adverse effect on earnings quality and firm value [64,65]. Compared to AEM, REM imposes higher long-term costs on firms' shareholders because it changes actual transactions and occurs all year long, making it harder to detect and less costly than AEM [11,66]. According to Cai et al. [18], managers in religious regions have incentives to engage in REM instead of AEM due to a risk-aversion perspective, rather than an ethical one. Managers employ REM to reduce the risk of job insecurity, enhance the perceived firm value, and improve management credibility. Therefore, managers may use REM as a low-risk option for earnings management.

Research has shown that managers in religious areas have incentives to manipulate real activities instead of accrual earnings management due to a risk aversion perspective rather than an ethical one [18]. Thus, managers may manipulate real earnings as a low-risk option for earnings management. Prior research suggests that ESG sustainability disclosures may serve as a tool to demonstrate compliance with society's religious standards and provide stakeholders with essential information to analyze the firm's risk profile [21]. According to the social norm theory, ESG disclosures enhance societal goals and reduce reputational risk. Thus, ESG disclosures provide firms with a mechanism to satisfy stakeholders' demands and manage risk. Managers can use non-financial disclosure to advance their careers or other personal goals, improve their reputations, and reduce information asymmetry [67–69].

Although the idea that non-financial disclosure is linked to earnings management is not new. Conflicting findings have been found in prior research on the association between non-financial disclosure and earnings management. Two opposing viewpoints have been employed to illustrate the relationship between voluntary disclosure and earnings management: complementary and substitutive relationships [70]. The substitutive relationship argues that firms that use more earnings management are making more voluntary disclosure because there is an information asymmetry between managers and shareholders, which motivates EM practices [71]. On the other hand, according to the complementary relationship, firms implementing CSR practices tend to manipulate their earnings less, supporting the view that CSR activities are driven by managers' desires to be honest and ethical in their decision-making [72–75].

Looking at the REM technique, some studies investigated whether a greater commitment to CSR activities is associated with a lower level of REM. For example, Kim et al. [73] found evidence supporting the ethical perspective that socially responsible companies might be less engaged in REM. However, Liu et al. [76], García-Sánchez et al. [77], and Velte [78] found no significant association between CSR disclosure and REM. Moreover, Kim et al. [79] suggested that firms in institutionally developed regions and those controlled by the state are more likely to engage more in REM while participating in CSR.[1] As a result, it is worth investigating the effect of real earnings manipulation on ESG sustainability disclosure in Egypt. Accordingly, our hypothesis as a test of social norm theory is as follows.

H1. *Firms implementing more real earnings management will disclose less ESG sustainability information.*

3.3. Moderating effect of the managerial ownership

Previous research has shown that managerial ownership significantly impacts managers' behavior and voluntary disclosure [80]. The literature suggests two types of effects that are associated with managerial ownership: alignment and entrenchment. The alignment effect suggests that managerial ownership could reduce agency problems by aligning managers' and stakeholders' interests [81–83]. This alignment effect is predicted to motivate owner-managers to make more voluntary disclosure, enhance long-term corporate performance, and decrease opportunistic managerial behavior.

Conversely, the entrenchment effect suggests that managers with greater ownership would have greater entrenchment, which would mean superior power and greater opportunistic behavior [84]. According to entrenchment, managers with high ownership might disclose less information and engage in opportunistic behavior because they are less likely to be dismissed. Additionally, owner-managers may prioritize their own interests over disclosing ESG-related activities because such activities may be costly for them [85]. Empirical evidence also suggests that entrenched managers may have lower motivation to improve long-term firm environmental performance, prioritizing their immediate private interests [86]. This may lead them to prioritize short-term financial investments over long-term commitment to environmental issues because the advantages associated with environmental commitment are often unclear and accrue only over time. In addition, Oh et al. [87] suggest that owner-managers may be short-term oriented and engage less in CSR. Consistent with these findings, several studies have found that managerial ownership negatively affects non-financial

[1] In an untabulated test, we examine the effect of accrual earnings manipulation on ESG. We found a positive relationship between two variables. This shows that Egyptian companies used the two kinds of earnings management. But in the use of real earnings manipulation as a safer tool, they disclose less ESG information. While using accrual earnings management, they use more ESG disclosure to offset the negative impact of the more risky tool of earnings management.

disclosure [88–90]. These studies found that firms with greater managerial ownership reduce CSR engagement. As managerial ownership increases, managers become more concerned about any reduction in their share, leading them to report less non-financial disclosure (CSR/ESG).

Furthermore, Prior et al. [17] argue that managerial entrenchment could explain the link between earnings management and socially responsible behavior. The authors contend that companies incorporate corporate social responsibility practices as a crucial element of their managers' entrenchment approach to manipulate earnings. Consistent with this view, Gerged et al. [91] found that corporate environmental disclosure has a negative correlation with accrual earnings manipulation. They argue that reforms to corporate governance reduce earnings manipulation.

Based on the literature reviewed above, we expect that managerial ownership will moderate the relationship between real earnings manipulation and ESG disclosure. Thus, our following second hypothesis is postulated.

H2. Managerial ownership moderates the relationship between REM and ESG disclosure.

4. Research design

4.1. Sample

Our study aims to investigate how real activities manipulation (REM) affects ESG disclosure in an Egyptian context. We focused on a main sample consisting of the top 100 active Egyptian firms listed on the Egyptian Exchange, as indicated by the EGX 100 index, for the period of 2013–2018. Consistent with prior research, we exclude financial institutions and banks due to their unique earnings and cash flow characteristics. Out of the total 600 firm-year observations, 180 were associated with financial institutions, and 48 had missing data. Therefore, the final sample comprises 370 firm-year observations. Table 1 shows the details of the sample selection procedure. The study period commenced in 2013 due to the significant impact of the 2011 Egyptian revolution on the economy, leading to financial distress for most companies [35]. Moreover, some data was not available for the years 2011 and 2012. To collect data, we obtained information by using hand collected data from various sources, including Egypt for Information Dissemination database, published annual financial reports on companies' websites, and directors' reports and notes in financial statements (see Table 2). We analyzed the data by using STATA software.

4.2. Variables measurement

4.2.1. Measurement of real earnings manipulation (REM)

To detect real earnings management (REM), we employ equations developed by Cohen and Dey [9], and Roychowdhury [92]. Roychowdhury [92] argues that firms can manage real activities by increasing reported earnings in three ways: overproduction to decrease the cost of goods sold, thus increasing sales; giving a price discount or additional lenient credit terms in order to raise sales revenues; and reducing discretionary expenditures such as research and development (R&D), and selling, general and administrative (SG&A) expenses. Our study employs the same methodology as previous studies [11,92–95]. We begin by estimating abnormal production costs (PROD), then abnormal cash flow from operations (CFO), and finally, abnormal expenses. Second, we use two comprehensive measures of real earnings management (REM 1 and REM 2) to capture the level of real earnings management. We estimate the abnormal level of production costs as the following regression equation:

$$PROD_{it} / TA_{i,t-1} = \beta_0 + \beta_1 (1 / TA_{i,t-1}) + \beta_2 (REV_{it} / TA_{i,t-1}) + \beta_3 (\Delta REV_{it} / TA_{i,t-1}) + \beta_4 (\Delta REV_{i,t-1} / TA_{i,t-1}) + \varepsilon_{it} \quad (1)$$

where $PROD_{it}$ refers to each firm's production costs in year t and is defined as the sum of the cost of goods sold for each year and the change in inventories from year t-1 to year t; $TA_{i,t-1}$ is total assets for firm i at year t-1; REV_{it} represents the sales revenues during year t; $\Delta REV_{i,t-1}$ is the change in sales revenues from year t-1 to year t. The abnormal level of production costs REM_PROD is estimated using the estimated residual from regression equation (1).

We also estimate the Abnormal level of cash flow from operations as the following regression equation:

$$CFO_{it} / TA_{i,t-1} = \beta_0 + \beta_1 (1 / TA_{i,t-1}) + \beta_2 (REV_{it} / TA_{i,t-1}) + \beta_3 (\Delta REV_{it} / TA_{i,t-1}) + \varepsilon_{it} \quad (2)$$

where CFO_{it} is cash flows from operations for the firm i at year t-1. The abnormal level of cash flows from operations REM_CFO is obtained as the estimated residual from regression equation (2). We calculate the level of abnormal discretionary expenditures by using the following regression:

Table 1
Sample selection procedure.

Description	No. Of firms	Firm-year observations
Egyptian firms listed in Egyptian EGX index for six years	100	600
(−) financial sector firms	30	180
(−) missing observations	10	50
Final sample	60	370

Table 2
Variables definition and sources.

Variables	Definition	Sources
ESG	ESG index is based on Egyptian S&P/ESG index data, and collated by Standard & Poor's (S&P) in cooperation with the Egyptian Exchange (EGX), the Egyptian Corporate Social Responsibility Center, and the Credit Rating Information Services (CRISIL)	Egyptian Sustainability Ratings S&P EGX ESG
REM 1	The sum of abnormal discretionary expenses multiplied by a negative 1 and abnormal production costs.	Annual reports
REM 2	The sum of the abnormal cash flows and abnormal discretionary expenses, both multiplied by a negative one.	Annual reports
MGOWNER	The proportion of stock owned by management.	Annual reports
MGOWNER_DUM	A dummy variable coded as one if the proportion of stock owned by management is above the median and zero otherwise.	Annual reports
LEVERAGE	Total debt of a firm scaled by total assets.	Annual reports
SIZE	Natural logarithm of the total assets.	Annual reports
ROA	Operating income of a firm deflated by the total assets.	Annual reports
LOSS	A dummy variable that is coded as one if the firm's earnings are negative and zero otherwise	Annual reports
MB	The ratio of the market value of equity to the book value	Annual reports
AUDITSIZE	A dummy variable coded as one if the firm is audited by a Big 4 auditor and zero otherwise	Annual reports
TENURE	A dummy variable coded as one if the auditor has been with the client for three years or more and zero otherwise	Annual reports
BDIND	The proportion of independent directors on the Board of Directors	Annual reports
DUALITY	A dummy variable coded as one if the chairman is the same as the CEO and zero otherwise	Annual reports
FREEFLOAT	The proportion of stock owned by a big group of small shareholders	Annual reports

Notes. ESG = Environmental, social and governance index; REM 1 = Real earnings management proxy 1; REM 2 = Real earnings management proxy 2; MGOWNER = Managerial ownership; LEVERAGE = Leverage, SIZE = Firm size; ROA = Return on assets; LOSS = Firm loss; MB = Market to Book ratio; AUDITSIZE = Audit firm size; TENURE = Auditor tenure; BDIND = Board independence; DUALITY = CEO Duality; FREEFLOAT = Free float ownership.

$$DISX_{it} / TA_{i,t-1} = \beta_0 + \beta_1 \left(1 / TA_{i,t-1}\right) + \beta_2 \left(REV_{i,t-1} / TA_{i,t-1}\right) + \varepsilon_{it} \quad (3)$$

where $DISX_{it}$ is discretionary expenses and calculated as the sum of (R&D) and (SG&A) expenses. The abnormal discretionary expenses REM_DISX are obtained as the estimated residual from the regression equation (3). We estimate all regression equations by requiring at least 8 observations for each industry-year to estimate all coefficients in equations. We derive two comprehensive measures of real earnings management, REM 1 and REM 2, following Cohen and Zarowin (2010) to estimate the total real earnings management that a firm engages in during a fiscal year. More particularly, REM 1 is the sum of the negative of the abnormal discretionary expenses and the abnormal production costs. REM2 is the sum of the negative of the abnormal CFO and the negative of abnormal discretionary expenses.

4.2.2. Measurement of ESG sustainability disclosure

In our study, we used annual data on ESG ratings from independent sources for the period between 2013 and 2018 to measure the level of ESG sustainability disclosure. These ratings aim to offer investors dependable reference points for managing their ESG investment portfolios and encourage standards of transparency, disclosure, and reporting. The index measures the performance of the Egyptian firms based on their environmental, social, and corporate governance scores. The ESG index was extracted from qualitative, quantitative, and narrative information to extract quantitative, qualitative, and composite scores. The qualitative score is calculated for each firm based on information derived from websites, news stories, and CSR fillings which are used to evaluate the actual performance of the firm in the range from 5 to 1. The quantitative score is derived from three factors: the transparency and disclosure of environmental practices, social practices, and corporate governance. Finally, a composed score is calculated by combining quantitative and quantitative scores.[2] The Egyptian ESG data rates have been successfully utilized in previous CSR research conducted in Egypt [16, 32].

4.3. Regression equation models

The literature suggests that the relationship between earnings management and ESG sustainability disclosure might be endogenously determined [14,17,101]. Previous studies have stressed the importance of controlling for these issues and suggested the use of a linear simultaneous equations system of two cross-sectional models [14,17,96]. Following these studies, we examine the relationship between REM and ESG sustainability disclosure in the Egyptian context using two linear simultaneous equations. Specifically, in the first stage, we regress REM as an endogenous variable on ESG and other exogenous variables whose selection is based on previous studies. Thus, we include in equation (4): ESG, firm size (SIZE), return on assets (ROA), firm loss (LOSS), firm's sales growth, Market to book ratio (MB) and leverage (LEVERAGE). Thus, we construct the first-stage regression equation as follows:

$$REM = \beta_0 + \beta_1 ESG + \beta_2 \mathrm{SIZE} + \beta_3 ROA + \beta_4 \mathrm{LOSS} + \beta_5 GROWTH + \beta_6 MB + \beta_7 \mathrm{LEVERAGE} + Years + Industries + \varepsilon \quad (4)$$

Where REM = real earnings management measures (either REM 1 or REM 2), ESG = Environmental, Social, and Governance ratings,

[2] For more detail on index methodology, please refer to: https://www.egx.com.eg/getdoc/fdd6f085-d88e-4072-a753-fa540d136442/SP%20_ESG_Index_en.aspx.

SIZE = natural logarithm of the total assets, ROA = operating income of a firm deflated by its total assets, LOSS = dummy variable that is coded as one if the firm's earnings are negative and zero otherwise, GROWTH = sales the change in sales from year t−1 to year t, MB = the ratio of the market value of equity to the book value, LEVERAGE = the total debt of a firm scaled by its total assets.

The results of the first regression stage in equation (4) are used as the basis for the second stage's regression, in which ESG is regressed on the fitted values of REM and other exogenous variables. In addition to the control variables included in equation (4), we include several corporate governance and auditing variables in the regression used in previous studies to isolate the effect of real earnings manipulation on ESG sustainability disclosure from the effects of other variables [17,45,76,94,97–100]. These include managerial ownership (MGOWNER), audit firm size (AUDITSIZE), auditor tenure (TENURE), board independence (BDIND), CEO Duality (DUALITY), and free float ownership (FREEFLOAT), As a result, we estimate the following equation of regression:

$$ESG = \beta_0 + \beta_1\ \mathrm{REM} + \beta_2 MGOWNER + \beta_3 \mathrm{SIZE} + \beta_4 ROA + \beta_5 \mathrm{LOSS} + \beta_6 GROWTH + \beta_7 MB + \beta_8 \mathrm{AUDITSIZE} + \beta_9 TENURE + \beta_{10} BDIND + \beta_{11} DUALITY + \beta_{12} \mathrm{LEVERAGE} + \beta_{13} \mathrm{FREEFLOAT} + Years + Industries + \varepsilon \quad (5)$$

Where MGOWNER = the proportion of stock owned by management, AUDITSIZE = dummy variable coded as one if the firm is audited by a Big 4 auditor and zero otherwise, TENURE = dummy variable coded as one if the auditor has been with the client for three years or more and zero otherwise, BDIND = the proportion of independent directors on the Board of Directors, DUALITY = dummy variable coded as one if the chairman is the same as the CEO and zero otherwise, FREEFLOAT = the proportion of stock owned by a large group of small shareholders.

This study employs equations (4) and (5) to test hypothesis 1 (H1), which pertains to investigating the association between REM and ESG disclosure. Hypothesis 2 (H2), which relates to investigating the moderating effect of managerial ownership on the association between REM and ESG disclosure, is tested by introducing the interaction term REM × MGOWNER_DUM to equation (5), while equation (4) remains unchanged. As a result, we estimate the following regression equation to replace equation (5) when testing H2:

$$ESG = \beta_0 + \beta_1\ REM + \beta_2 MGOWNER\_DUM + \beta_3 REM\ x\ MGOWNER\_DUM + \beta_4 SIZE + \beta_5 ROA + \beta_6 LOSS + \beta_7 GROWTH + \beta_8 MB + \beta_9 AUDITSIZE + \beta_{10} TENURE + \beta_{11} BDIND + \beta_{12} DUALITY + \beta_{13} LEVERAGE + \beta_{14} FREEFLOAT + Years + Industries + \varepsilon \quad (6)$$

Finally, all the study equations account for industry and year fixed effects, using firm-level clustered standard errors. Table 2 provides detailed definitions for the variables that are used in the equations as well as the data sources.

5. Empirical results

This section investigates the association between real earnings management (REM) and ESG disclosure. We continue to investigate how managerial ownership moderates this association.

5.1. Main analysis

Table 3 shows the descriptive statistics for the test equations' dependent, independent, and control variables. There is a significant amount of variation among the sample companies, as indicated by the ESG scores, which range from a low of 11.05 to a high of 46.86 and have a standard deviation of 7.63. The mean value of ESG ratings is 21.52, which is relatively low, indicating that Egyptian firms have a low level of ESG performance. The mean values for the real earnings manipulation measures (REM1 and REM2) are.00 and

Table 3
Descriptive statistics.

Variables	N	Mean	SD	Min	p25	Median	p75	Max
ESG	370	21.52	7.63	11.05	15.19	19.17	26.64	46.86
REM 1	370	0.00	0.15	−1.04	−0.07	0.01	0.07	1.09
REM 2	370	−0.00	0.13	−0.84	−0.06	0.01	0.06	0.43
MGOWNER	370	0.47	0.29	0.00	0.25	0.48	0.71	1.00
LEVERAGE	370	0.51	0.38	0.00	0.27	0.45	0.64	2.38
SIZE	370	9.08	0.75	7.41	8.60	9.05	9.55	10.98
ROA	370	0.08	0.15	−0.30	0.01	0.05	0.12	0.70
LOSS	370	0.18	0.38	0.00	0.00	0.00	0.00	1.00
GROWTH	370	0.38	1.29	−0.97	−0.04	0.15	0.41	9.62
MB	370	1.47	2.73	−5.95	0.49	0.84	1.48	18.68
AUDITSIZE	370	0.40	0.49	0.00	0.00	0.00	1.00	1.00
TENURE	370	0.89	0.32	0.00	1.00	1.00	1.00	1.00
BDIND	370	0.70	0.19	0.00	0.60	0.75	0.86	1.00
DUALITY	370	0.32	0.47	0.00	0.00	0.00	1.00	1.00
FREEFLOAT	370	0.44	0.23	0.02	0.28	0.42	0.59	1.00

Notes. ESG = Environmental, social and governance index; REM 1 = Real earnings management proxy 1; REM 2 = Real earnings management proxy 2; MGOWNER = Managerial ownership; LEVERAGE = Leverage, SIZE = Firm size; ROA = Return on assets; LOSS = Firm loss; MB = Market to Book ratio; AUDITSIZE = Audit firm size; TENURE = Auditor tenure; BDIND = Board independence; DUALITY = CEO Duality; FREEFLOAT = Free float ownership. See Table 2 for variable definitions.

Table 4
Correlations matrix.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1) ESG	1.00														
(2) REM_1	−0.18***	1.00													
(3) REM_2	−0.23***	0.64***	1.00												
(4) MGOWNER	0.02	−0.09	−0.03	1.00											
(5) SIZE	0.44***	−0.09	−0.11*	0.04	1.00										
(6) ROA	0.08	−0.41***	−0.51***	−0.01	0.18***	1.00									
(7) LOSS	−0.03	0.20***	0.19***	0.06	−0.16**	−0.52***	1.00								
(8) GROWTH	−0.04	0.02	−0.00	−0.03	0.04	0.03	−0.07	1.00							
(9) MB	0.04	−0.07	−0.10	−0.02***	0.01	0.23***	−0.13*	−0.04	1.00						
(10) AUDITSIZE	0.29***	−0.18***	−0.02	0.07	0.37***	0.02	−0.05	0.03	−0.05	1.00					
(11) TENURE	0.14**	0.03	0.01	0.07	0.20***	0.06	−0.12*	−0.03	0.08	0.06	1.00				
(12) BDIND	0.11*	−0.03	0.03	0.04	0.01	0.01	−0.01	0.01	0.09	0.20***	−0.00	1.00			
(13) DUALITY	0.09	−0.06	−0.00	0.03	−0.02	0.02	−0.12*	0.05	−0.06	0.13*	0.03	0.24***	1.00		
(14) LEVERAGE	0.17**	0.15**	0.11*	0.07	0.17**	−0.27***	0.26***	−0.03	−0.08	0.16**	0.10*	−0.09	−0.07	1.00	
(15) FREEFLOAT	−0.15**	−0.03	0.09	−0.25***	−0.34***	−0.12*	0.01	0.05	−0.10	−0.05	−0.15**	0.11*	0.13*	−0.05	1.00

Notes. ESG = Environmental, social and governance index; REM 1 = Real earnings management proxy 1; REM 2 = Real earnings management proxy 2; MGOWNER = Managerial ownership; LEVERAGE = Leverage, SIZE = Firm size; ROA = Return on assets; LOSS = Firm loss; MB = Market to Book ratio; AUDITSIZE = Audit firm size; TENURE = Auditor tenure; BDIND = Board independence; DUALITY = CEO Duality; FREEFLOAT = free float ownership.
*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$. See Table 2 for variable definitions.

−0.00, respectively, which is consistent with the findings of Cohen and Zarowin (2010), indicating that firms manipulate real activities such as overproduction or sales manipulation. The following is the mean of the control variables: LEVERAGE (0.51), SIZE (9.08), ROA (0.08), GROWTH (0.38), and MB (1.47). According to the presented data, it can be observed that 18 % of the firms included in the sample have reported losses, while 40 % of the firms included in the sample are subjected to auditing by a Big 4 audit firm.

The Pearson correlation matrix for the variables used in our study is shown in Table 4 to help check for the possibility of multicollinearity problems. The findings indicate a statistically significant negative association between real earnings manipulation and ESG disclosure, thereby supporting our hypothesis that firms that resort to real earnings management disclose less sustainability information. The table also shows that LEVERAGE, SIZE, AUDITSIZE, TENURE, and BDIND are positively and significantly associated with ESG disclosure, whereas There exists a negative and statistically significant correlation between the variables of GROWTH and FREEFLOAT and the extent of ESG disclosure. The correlation coefficients of the independent variables are all below 0.65, suggesting that there is no issue of multicollinearity.

According to prior studies, earnings management and non-financial sustainability disclosure are endogenous variables [70,72,101,102]. Therefore, the estimates of equations (4) and (5) using the Ordinary Least Squares (OLS) may yield parameter estimates that are both inconsistent and biased due to the presence of independent variables that are correlated with the error terms of the equations [103]. So, two linear simultaneous equations regression technique is utilized to address potential endogeneity problems, and there are several studies that have employed this method [14,104,105]. We report the 2-Stages regression analysis results in Table 5.

The regression equation findings (4) indicate that the coefficient related to the correlation between REM and ESG disclosure is statistically significant and exhibits a negative for both REM1 and REM2. This indicates that firms with lower ESG disclosure are more likely to use real activities manipulation. Firm size is one of the control variables that has a positive and significant impact on REM, whereas ROA has a negative and significant impact. Other control variables do not significantly affect REM measurements.

According to the regression equation (5) findings, there is a statistically significant negative correlation between REM and ESG

Table 5
Main results – 2-stage regression analysis.

	REM 1 (DISX + PROD)		REM 2 (DISX + CFO)	
Dependent variable	Stage (1) REM	Stage (2) ESG	Stage (1) REM	Stage (2) ESG
ESG	−0.004***		−0.004***	
	(-2.86)		(-4.03)	
REM		−3.786***		−2.350***
		(-7.52)		(-5.30)
MGOWNER		−0.038***		−0.026*
		(-3.19)		(-1.96)
SIZE	0.017	3.023***	0.017*	3.005***
	(1.34)	(5.12)	(1.68)	(4.47)
ROA	−0.434***	−5.785***	−0.502***	−6.475***
	(-3.86)	(-10.28)	(-5.44)	(-9.67)
LOSS	−0.004	−0.907	−0.027	−5.694***
	(-0.13)	(-1.31)	(-1.14)	(-5.30)
GROWTH	0.003	0.559***	0.000	−0.011
	(0.66)	(5.12)	(0.03)	(-0.10)
MB	0.002	0.417***	0.002	0.364***
	(0.51)	(4.23)	(0.50)	(3.80)
LEVERAGE	0.025	6.851***	−0.003	1.286
	(0.68)	(6.05)	(-0.16)	(1.11)
AUDITSIZE		1.573**		2.099**
		(2.00)		(2.48)
TENURE		0.407		0.594
		(0.52)		(0.61)
BDIND		−0.593		−0.441
		(-0.28)		(-0.19)
DUALITY		0.016		0.134
		(0.02)		(0.19)
FREEFLOAT		−1.197		−1.490
		(-0.75)		(-0.87)
CONSTANT	−0.005	−9.903*	−0.004	−7.967
	(-0.04)	(-1.87)	(-0.04)	(-1.32)
Year Fixed Effect	Included	Included	Included	Included
Industry Fixed Effect	Included	Included	Included	Included
N	370	370	370	370
Adj. R^2	0.18	0.81	0.30	0.76

Notes. ESG = Environmental, social and governance index; REM 1 = Real earnings management proxy 1; REM 2 = Real earnings management proxy 2; MGOWNER = Managerial ownership; LEVERAGE = Leverage, SIZE = Firm size; ROA = Return on assets; LOSS = Firm loss; MB = Market to Book ratio; AUDITSIZE = Audit firm size; TENURE = Auditor tenure; BDIND = Board independence; DUALITY = CEO Duality; FREEFLOAT = free float ownership.
*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$. See Table 2 for variable definitions.

disclosure for both REM measures. This suggests that companies that manage real earnings have lower ESG ratings. In terms of the economic implication of our findings, we multiply the coefficient on REM by its standard deviation in Table 3 and our results suggest that one standard deviation increase in REM 1 (REM 2) decreases the ESG sustainability score by 57 points (31 points). This finding supports the "penalty" perspective, which suggests that managers use real activities management because it makes it more difficult for investors to sue and litigate managers for the benefit of their corporations [10,43]. Moreover, the previously mentioned results correspond to the social norm theory, suggesting that managers who engage in REM practices are not integrating the norms linked with ESG sustainability disclosure. This result is consistent with those indicating that earnings management (EM) negatively affects non-financial disclosure. It suggests that opportunistic behavior by managers does not give rise to non-financial disclosure [106]. ESG disclosure has a positive relationship with LEVERAGE, SIZE, GROWTH, MB, and AUDITSIZE among the control variables, while having a negative relationship with ROA, LOSS, and FREEFLOAT.

5.2. The moderating effect of managerial ownership

This section investigates the moderating influence of managerial ownership on the correlation between real earnings management and ESG disclosure (H2). In order to examine the proposed hypothesis, we run 2-stage regression equations. Equation (4) is employed to estimate the fitted value for REM in Stage 1 and Equation (6) is employed to regress the fitted value and the interaction variable for real earnings manipulation and managerial ownership (REM × MGOWNER_DUM) against the firm's ESG score (dependent variable) in Stage 2. According to the findings in Table 6, there is a significant positive correlation between ESG disclosure and real earnings management at the 1 % level, which suggests that managerial ownership moderates this relationship. According to the results,

Table 6
The moderating effect of managerial ownership on REM-ESG nexus.

	REM 1 (DISX + PROD)		REM 2 (DISX + CFO)	
	Stage (1) REM	Stage (2) ESG	Stage (1) REM	Stage (2) ESG
ESG	−0.004***		−0.004***	
	(-2.86)		(-4.03)	
REM		−61.996***		−54.054***
		(-11.37)		(-10.59)
MGOWNER_DUM		−0.414		−0.400
		(-1.03)		(-0.96)
REM x MGOWNER_DUM		16.000***		13.379**
		(2.64)		(2.23)
SIZE	0.017	3.190***	0.017*	3.143***
	(1.34)	(11.03)	(1.68)	(10.55)
ROA	−0.434***		−0.502***	
	(-3.86)		(-5.44)	
LOSS	−0.004	−0.909	−0.027	−2.143***
	(-0.13)	(-1.64)	(-1.14)	(-3.82)
GROWTH	0.003	0.559***	0.000	0.423***
	(0.66)	(4.33)	(0.03)	(3.10)
MB	0.002	0.411***	0.002	0.403***
	(0.51)	(6.27)	(0.50)	(6.17)
LEVERAGE	0.025	6.567***	−0.003	5.358***
	(0.68)	(9.56)	(-0.16)	(7.72)
ROA		−5.757***		−6.024***
		(-20.75)		(-21.02)
AUDITSIZE		1.553***		1.663***
		(4.09)		(4.34)
TENURE		0.252		0.357
		(0.45)		(0.62)
BDIND		−0.300		−0.287
		(-0.27)		(-0.25)
DUALITY		−0.115		−0.086
		(-0.29)		(-0.21)
FREEFLOAT		−1.306		−1.488
		(-1.41)		(-1.59)
CONSTANT	−0.005	−10.952***	−0.004	−10.366***
	(-0.04)	(-3.95)	(-0.04)	(-3.65)
Year Fixed Effect	Included	Included	Included	Included
Industry Fixed Effect	Included	Included	Included	Included
N	370	370	370	370
Adj. R^2	0.18	0.81	0.30	0.80

Note. ESG = Environmental, social and governance index; REM 1 = Real earnings management proxy 1; REM 2 = Real earnings management proxy 2; MGOWNER_DUM = Managerial ownership; LEVERAGE = Leverage, SIZE = Firm size; ROA = Return on assets; LOSS = Firm loss; MB = Market to Book ratio; AUDITSIZE = Audit firm size; TENURE = Auditor tenure; BDIND = Board independence; DUALITY = CEO Duality; FREEFLOAT = free float ownership; *T* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. See Table 2 for variable definitions.

Table 7
Robustness analysis.

Panel A: Bootstrapping (1000 Replications)

	REM 1 (DISX + PROD)		REM 2 (DISX + CFO)	
Dependent variable	Stage (1)	Stage (2)	Stage (1)	Stage (2)
	REM	ESG	REM	ESG
ESG	−0.004***		−0.004***	
	(-3.86)		(-4.75)	
REM		−3.786***		−3.406***
		(-14.80)		(-13.42)
MGOWNER		−0.038***		−0.035***
		(-3.71)		(-3.57)
SIZE	0.017	3.023***	0.017*	3.026***
	(1.54)	(10.13)	(1.92)	(9.61)
ROA	−0.434***	−5.785***	−0.502***	−6.065***
	(-4.48)	(-19.72)	(-6.34)	(-21.81)
LOSS	−0.004	−0.907	−0.027	−2.162***
	(-0.15)	(-1.64)	(-1.29)	(-3.86)
GROWTH	0.003	0.559***	0.000	0.432***
	(0.51)	(3.98)	(0.03)	(3.08)
MB	0.002	0.417***	0.002	0.415***
	(0.60)	(5.90)	(0.53)	(6.07)
LEVERAGE	0.025	6.851***	−0.003	5.538***
	(0.93)	(9.34)	(-0.17)	(7.98)
AUDITSIZE		1.573***		1.701***
		(4.31)		(4.52)
TENURE		0.407		0.416
		(0.74)		(0.79)
BDIND		−0.593		−0.596
		(-0.55)		(-0.56)
DUALITY		0.016		0.025
		(0.04)		(0.06)
FREEFLOAT		−1.197		−1.318
		(-1.48)		(-1.56)
CONSTANT	−0.005	−9.903***	−0.004	−9.436***
	(-0.06)	(-3.59)	(-0.05)	(-3.18)
Year Fixed Effect	Included	Included	Included	Included
Industry Fixed Effect	Included	Included	Included	Included
N	370	370	370	370
Adj. R^2	0.18	0.81	0.30	0.80

Panel B: Firm Fixed Effect

	(1)	(2)
	REM 1 (DISX + PROD)	**REM 2 (DISX + CFO)**
REM	−2.513**	−4.700***
	(-2.16)	(-3.97)
MGOWNER	0.108	−0.082
	(0.24)	(-0.20)
SIZE	4.021***	3.922***
	(5.74)	(5.91)
ROA	−7.534***	−7.528***
	(-20.20)	(-22.53)
LOSS	−6.691***	−6.627***
	(-18.07)	(-18.99)
GROWTH	0.076	0.066
	(1.05)	(0.88)
MB	0.389***	0.399***
	(7.21)	(7.47)
LEVERAGE	−0.911**	−1.012**
	(-2.09)	(-2.46)
AUDITSIZE	0.399	0.526
	(0.67)	(0.89)
TENURE	0.264	0.157
	(0.76)	(0.46)
BDIND	0.852	0.507
	(0.91)	(0.57)
DUALITY	0.352	0.429
	(1.01)	(1.25)
FREEFLOAT	−0.592	−0.977

(*continued on next page*)

Table 7 (*continued*)

Panel B: Firm Fixed Effect		
	(1)	(2)
	REM 1 (DISX + PROD)	**REM 2 (DISX + CFO)**
	(-0.67)	(-1.12)
CONSTANT	−15.614**	−13.916**
	(-2.44)	(-2.33)
Year Fixed Effect	Included	Included
Firm Fixed Effect	Included	Included
N	370	370
Adj. R^2	0.97	0.97

Notes. ESG = Environmental, social and governance index; REM 1 = Real earnings management proxy 1; REM 2 = Real earnings management proxy 2; MGOWNER = Managerial ownership; LEVERAGE = Leverage, SIZE = Firm size; ROA = Return on assets; LOSS = Firm loss; MB = Market to Book ratio; AUDITSIZE = Audit firm size; TENURE = Auditor tenure; BDIND = Board independence; DUALITY = CEO Duality; FREEFLOAT = free float ownership.
*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$. See Table 2 for variable definitions.

managerial ownership weakens the impact of real earnings management on ESG disclosure, in contrast to the results from previous studies [17,91].

5.3. Robustness tests

We conducted several robustness checks in our study to confirm the reliability of our findings. While the sample size is inherently constrained by the number of firms reporting ESG during the study period, our findings might suffer from small sample bias as well potential heterogeneity. Therefore, Table 7 – Panel A presents the main findings using bootstrapping estimation (1000 replications), while Table 7 – Panel B show the results of both firm and year fixed effect. The results of this robustness analysis confirm the main findings reported in Table 4 and show that they are less likely to suffer from the sample size bias and heterogeneity concerns.

5.4. Endogeneity tests

To ensure that our results do not suffer from potential endogeneity problems, we employ different ways to alleviate such problems, such as 2SLS instrumental variable regression analysis, lagged independent variable as well as a change model. Firstly, to alleviate potential endogeneity concern arising from simultaneity, we estimate an instrumental variable that is very likely to be exogenous to the contemporaneous REM. We follow prior studies [107,108] in using the firm-level initial value of the REM measure as an instrument. Table 8 – Panel A presents the results of the 2SLS regression analysis. Columns 1 and 3 shows the results of the first stage, while Columns 2 and 4 reports the results of the second one. The findings are consistent with our main prediction that real earnings management is negatively and significantly associated with the ESG sustainability reporting (significant at 1 %), suggesting that endogeneity does not drive our main findings. Secondly, to address potential reverse causality, we employ Equation (5) where the ESG sustainability reporting is the dependent variable and REM is the lagged independent variable and report the results in Table 8 – Panel B. Thirdly, we explore the relationship between ESG sustainability reporting and changes in REM measures by employing a change equation (Equation (5)) to address potential endogeneity issues arising from unobservable variables. Overall, the results in Table 8 show that the negative association between the two measures of real activities manipulation and ESG disclosure persists even after considering the potential endogeneity issues, suggesting that companies that manage real earnings have lower ESG sustainability disclosure.

5.5. Additional analysis

To gain a better understanding of the relationship between firms' engaging with real earnings management and their ESG sustainability disclosure, we employ Equation (5) and introduce the interaction term between real earnings management proxies and a few control variables. Table 9 shows the results of this additional analysis. The interaction terms' coefficients are noticeably positive, as would be expected. This implies that the negative relationship between real earnings management proxies and ESG disclosure commitment is weaker in loss-making firms (LOSS), firms with more leverage, and firms audited by a Big 4 audit firm. These results provide additional support for the moderating effect of these control variables in the association between real earnings management and ESG sustainability disclosure.

6. Conclusion

Our study aims to examine the relationship between real activities manipulation (REM) and ESG (Environmental, Social, and Governance) disclosure within the Egyptian context. Specifically, the study examined whether firms that used REM practices were less likely to disclose information regarding their ESG activities. Additionally, the study explored whether managerial ownership

Table 8
Endogeneity tests.

Panel A: 2SLS Regression Analysis

	(1)	(2)	(3)	(4)
	REM_1	ESG	REM_2	ESG
INSTRUMENT	0.460***		0.628***	
	(5.06)		(8.09)	
REM		−37.820***		−46.110***
		(-5.24)		(-5.41)
MGOWNER	−0.001	−0.055	−0.000	−0.020
	(-1.04)	(-1.08)	(-0.36)	(-0.54)
SIZE	0.009	4.392***	0.005	4.365***
	(0.83)	(7.36)	(0.58)	(7.42)
ROA	−0.300***	−14.925***	−0.267***	−21.496***
	(-3.33)	(-3.31)	(-3.54)	(-3.80)
LOSS	0.008	0.822	−0.004	−0.222
	(0.29)	(0.62)	(-0.23)	(-0.18)
GROWTH	0.005	0.028	0.001	−0.215
	(0.82)	(0.11)	(0.21)	(-0.80)
MB	−0.001	0.193	0.003	0.178
	(-0.22)	(1.43)	(0.75)	(1.10)
LEVERAGE	0.009	2.157	−0.021	0.953
	(0.36)	(1.64)	(-1.03)	(0.81)
AUDITSIZE	−0.054***	−2.030**	−0.027*	0.559
	(-3.03)	(-2.20)	(-1.83)	(0.64)
TENURE	0.009	2.634**	−0.009	1.856
	(0.40)	(2.33)	(-0.58)	(1.60)
BDIND	0.051	4.538***	0.070***	4.691**
	(1.55)	(2.60)	(2.83)	(2.54)
DUALITY	−0.011	0.035	−0.003	1.325*
	(-0.78)	(0.05)	(-0.31)	(1.71)
FREEFLOAT	−0.020	1.288	0.020	2.549
	(-0.55)	(0.70)	(0.76)	(1.44)
CONSTANT	−0.061	−18.400***	−0.052	−18.760***
	(-0.63)	(-3.35)	(-0.60)	(-3.37)
Year Fixed Effect	Included	Included	Included	Included
Industry Fixed Effect	Included	Included	Included	Included
N	351	351	366	366

Panel B: Lagged Independent Variable

	(1)	(2)
	REM 1	REM 2
L.REM	−7.602**	−10.039**
	(-2.31)	(-2.37)
MGOWNER	−0.014	−0.015
	(-0.25)	(-0.28)
SIZE	4.404***	4.311***
	(5.20)	(5.03)
ROA	−2.566	−3.323
	(-0.77)	(-0.94)
LOSS	1.004	1.153
	(0.87)	(0.99)
GROWTH	−0.371**	−0.364**
	(-2.10)	(-2.04)
MB	0.183	0.276
	(1.22)	(1.65)
LEVERAGE	1.528	1.732
	(1.05)	(1.20)
AUDITSIZE	0.834	1.572
	(0.54)	(1.09)
TENURE	1.591	1.872
	(1.17)	(1.42)
BDIND	2.718	2.549
	(0.93)	(0.86)
DUALITY	1.860	1.796
	(1.42)	(1.37)
FREEFLOAT	1.786	2.824
	(0.65)	(1.02)
CONSTANT	−19.382**	−19.641**
	(-2.50)	(-2.50)
N	309	310
Adj. R^2	0.33	0.33

Panel C: Change Model		
	(1)	(2)
	REM 1	REM 2
ΔREM	−38.746***	−21.695***
	(-14.70)	(-9.37)
ΔMGOWNER	−1.301*	−0.753
	(-1.94)	(-0.91)
ΔSIZE	2.267***	1.823**
	(2.88)	(1.98)
ΔROA	−4.842***	−5.048***
	(-14.46)	(-11.63)
ΔLOSS	−0.493	−3.692***
	(-1.31)	(-6.98)
ΔGROWTH	0.397***	−0.071
	(5.90)	(-1.08)
ΔMB	0.476***	0.390***
	(8.57)	(6.04)
ΔLEVERAGE	3.557***	−1.064**
	(7.46)	(-2.09)
ΔAUDITSIZE	−0.286	−0.372
	(-0.38)	(-0.43)
ΔTENURE	−0.263	−0.144
	(-0.48)	(-0.25)
ΔBDIND	−0.521	−0.721
	(-0.52)	(-0.64)
ΔDUALITY	0.244	0.122
	(0.48)	(0.21)
ΔFREEFLOAT	4.873***	5.628***
	(4.05)	(3.98)
CONSTANT	0.011	0.506***
	(0.08)	(3.02)
N	295	295
Adj. R^2	0.67	0.58

Notes. ESG = Environmental, social and governance index; REM 1 = Real earnings management proxy 1; REM 2 = Real earnings management proxy 2; MGOWNER = Managerial ownership; LEVERAGE = Leverage, SIZE = Firm size; ROA = Return on assets; LOSS = Firm loss; MB = Market to Book ratio; AUDITSIZE = Audit firm size; TENURE = Auditor tenure; BDIND = Board independence; DUALITY = CEO Duality; FREEFLOAT = free float ownership.
*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$. See Table 2 for variable definitions.

moderated this relationship, as prior research has suggested that strong corporate governance measures have the potential to reduce the adverse impact of REM on the quality of financial reporting. REM and ESG disclosure relationship is investigated using a sample of 370 Egyptian firm-year observations from 2013 to 2018. This is the first study to examine whether ESG practices result from manipulating real activities in the MENA region and Egypt in particular. This study contributes to the empirical literature on the relationship between EM and ESG in developing countries. The study's main findings show that there is a negative relationship between REM and ESG disclosure, meaning that firms using REM practices were likely to disclose less information about their ESG practices. This finding supports the "penalty" perspective, which posits that managers engage in REM because it is less detectable than other forms of earnings management. Our study also finds that managerial ownership moderates this relationship, as the negative effect of REM on ESG disclosure is weaker in firms with high levels of managerial ownership. In summary, the findings of our study indicate that managers may exhibit a preference for immediate financial benefits at the expense of long-term sustainability. However, implementing strong corporate governance measures may serve as a potential solution to mitigate this tendency.

The study provides several contributions to the existing literature by examining the relationship between real activities manipulation and ESG disclosure in the specific context of Egyptian listed firms, which contributes to the limited literature on this topic in the Middle East. Secondly, the study contributes to the corporate governance literature by providing insights into how managerial ownership moderates the relationship between REM and ESG disclosure. Finally, the study provides important insights into the challenges faced by firms in developing countries in balancing financial performance with sustainability. The findings of the study have a number of implications for regulators and policymakers. The study first emphasizes the significance of raising public awareness of REM and its negative impact on sustainability reporting. Policymakers and regulators should prioritize efforts to increase transparency and disclosure of sustainability practices to help mitigate the negative effects of REM. Second, the study indicates effective corporate governance practices, such as high levels of managerial ownership, may assist in mitigating the negative effect of REM on sustainability reporting. Policymakers and regulators should encourage firms to adopt strong corporate governance practices to help promote sustainability reporting.

The study's findings suggest several avenues for future research. Firstly, due to data availability, the sample size of our study was relatively small, limiting the findings' generalizability. In future studies, the study might be repeated with a larger sample size to enhance the generalizability of the findings. Secondly, future research could investigate which specific components of ESG disclosure drive the relationship between REM and ESG in Egyptian listed firms. Our research was constrained by data availability, resulting in a sample size that is relatively modest. This limitation restricts the breadth of our findings, potentially making them less generalizable to

Table 9
Additional analysis.

Panel (A): REM 1 (DISX + PROD)			
	(1)	(2)	(3)
	ESG	ESG	ESG
REM	−55.952***	−68.487***	−59.968***
	(-14.24)	(-15.31)	(-14.00)
LOSS	−2.442***		
	(-3.50)		
REM x LOSS	29.085***		
	(3.14)		
LEVERAGE	6.226***	4.487***	7.093***
	(9.07)	(5.81)	(9.05)
REM x LEVERAGE		34.514***	
		(5.65)	
AUDITSIZE			1.627***
			(4.47)
REM x AUDITSIZE			20.687***
			(3.30)
CONTROLS	Included	Included	Included
Year Fixed Effect	Included	Included	Included
Industry Fixed Effect	Included	Included	Included
N	370	370	370
Adj. R^2	0.81	0.83	0.82
Panel (B): REM 2 (DISX + CFO)			
	(1)	(2)	(3)
	ESG	ESG	ESG
REM	−49.163***	−62.394***	−53.650***
	(-13.78)	(-13.41)	(-13.44)
LOSS	−3.216***		
	(-5.02)		
REM x LOSS	28.582***		
	(2.89)		
LEVERAGE		4.295***	
		(6.10)	
REM x LEVERAGE		34.570***	
		(4.45)	
AUDITSIZE			1.851***
			(4.98)
REM x AUDITSIZE			20.690***
			(3.31)
CONTROLS	Included	Included	Included
Year Fixed Effect	Included	Included	Included
Industry Fixed Effect	Included	Included	Included
N	370	370	370
Adj. R^2	0.80	0.82	0.81

Notes. ESG = Environmental, social and governance index; REM 1 = Real earnings management proxy 1; REM 2 = Real earnings management proxy 2; MGOWNER = Managerial ownership; LEVERAGE = Leverage, SIZE = Firm size; ROA = Return on assets; LOSS = Firm loss; MB = Market to Book ratio; AUDITSIZE = Audit firm size; TENURE = Auditor tenure; BDIND = Board independence; DUALITY = CEO Duality; FREEFLOAT = free float ownership.
*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$. See Table 2 for variable definitions.

a broader population of firms. While our study provides an initial insight into the dynamics of REM, ESG disclosures, and the Egyptian context, future research could enrich this knowledge by analyzing a more extensive data set. Access to larger and more diverse samples, potentially across multiple emerging markets, would offer a more holistic understanding of the intricate relationship between REM and ESG disclosures. In connection with the above limitation is the issue of endogeneity. While we have employed different techniques to mitigate endogeneity concerns, such as the use of firm-fixed effect, 2SLS instrumental variable approach, lagged independent variables, and change model, these measures are not foolproof and we acknowledge that endogeneity in accounting research is a notoriously difficult challenge to address comprehensively.

Additionally, while our study broadly addressed ESG disclosures, there are multiple individual components under the ESG umbrella, each of which might have a distinct relationship with REM. Future research could delve into a granular exploration to discern whether certain aspects of ESG (like environmental initiatives or social responsibility programs) are more susceptible to earnings management practices than others. Finally, future research could explore the trade-off between accruals and REM and how this trade-off affects ESG disclosure in the MENA region.

Data availability statement

Data will be made available on request.

CRediT authorship contribution statement

Tingli Liu: Conceptualization, Project administration, Supervision, Funding acquisition, Methodology. **Aya Abdelbaky:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Resources, Software, Validation, Visualization, Writing – original draft. **Ahmed A. Elamer:** Project administration, Supervision, Validation, Visualization, Writing – review & editing. **Mohamed Elmahgoub:** Conceptualization, Formal analysis, Investigation, Software, Validation, Visualization, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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