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The impact of board gender diversity on the accrual/real earnings management practice: evidence from an emerging market

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Abstract

This paper examines the impact of gender diversity on financial reporting quality (accrual and real earnings management). We use a sample of 78 Egyptian listed companies over the period 2009–2021. The quality of financial reporting is measured using different models of earnings management (accrual and real earnings management). Accrual earnings management (AEM) is detected through four different models developed by modified Jones model, the Kasznik model, Kothari model, Raman and Shahrur model, while real earnings management (REM) is measured using six different model which are abnormal cash flows from operations (ABCFO), abnormal production costs (ABPROD), abnormal discretionary expenditures (ABDISEXP) and three aggregate proxies (RM1, RM2, RM3). Using the system generalized method of moments, companies with more gender diversity are more effective in reducing accrual earnings manipulation (AEM). The exception is the modified Jones model. Moreover, we find that gender diversity is positively and significantly correlated with financial reporting quality based on proxies of real earnings-based activity, except for RM2. The study found a non-significant and negative relationship between board diversity and RM2 as a proxy for REM. Overall, the empirical results based on accrual and real earnings management models (AEM and REM) support the notion that enterprises with more gender diversity on the board are more effective in controlling earnings manipulation practices. The predictions of corporate governance theories are confirmed. Policy makers should continue to promote and support gender diversity in leadership positions within organizations. This can be achieved through initiatives such as diversity quotas, mentoring programs, and leadership development opportunities for women.

Keywords Gender diversity, Real and accrual earnings management, System GMM, Egyptian context

Introduction

According to experts, one of the most important corporate governance (CG) systems is the board of directors. In order to protect the interests of shareholders, it is responsible for the direction and management of the organisation's affairs, as well as the monitoring, supervision and advice of senior management [4, 9]. More specifically, the board has delegated numerous roles and responsibilities such as developing and selecting the best strategy for the organisation and monitoring its implementation [8], guiding and monitoring the performance of the management; hiring and firing underperforming managers; linking the organisation to the internal

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and external environmental conditions; accountable for whether managers follow formal procedures and policies; hiring and compensating senior managers; designing and overseeing internal controls, communicating critical information to managers, and enhancing corporate legitimacy and fairness [17, 57].

For example, in the Sarbanes–Oxley Act and the most recent stock exchange regulations on CG, it was expected that boards with a higher proportion of female members would be less prone to accounting fraud and misconduct by senior managers [8]. As a result of ineffective decision making and monitoring, lack of accountability to societal stakeholders, ineffective direction and control functions, increased information asymmetry, and a general decline in public trust in the firm, other literature has instead suggested that the board may be responsible for corporate failures and scandals around the world [11, 14, 16, 17]. The board of directors plays a crucial role in CG, especially in addressing the agency problems of shareholders and managers, according to the seminal work of Jensesn and Meckling (1976). This role encompasses policies, rules, regulations, processes, and people to satisfy stakeholder needs and to help guide and control management activities with ethical business practices, integrity, transparency, and objectivity. Gender diversity is one of the most important CG mechanisms that can improve the alignment between the interests of shareholders and managers and mitigate the inherent agency problems [27, 78]. The structure of CG is made up of many internal and external mechanisms (e.g. [27, 24, 65, 75]).

Earnings management (EM), also known as income smoothing, window dressing, accounting magic, general EM, true EM, and accrual EM, has been defined and discussed in various ways. Until the beginning of the 1980s, the most used term was "*income smoothing*". Since then, the term earnings management has replaced income smoothing [89]. There is no precise or unambiguous definition of EM. Schipper [89] was one of the first to identify the practice of EM as deliberately interfering with the external financial reporting process to achieve a particular private benefit. Healy and Wahlen [59, p. 6] defined EM more broadly as: "*the setting in which management judgmentally adjust the financial reports and the structure of the transactions. This could be done with the purpose of misleading stakeholders about the organization performance or influencing contractual outcomes that are based on the reported accounting values.*"

Because of the nature of accrual accounting, managers have a great deal of latitude in calculating the actual income generated by the organization in any given period. As a result, they have a great deal of control over when actual expenses (such as those for advertising, maintenance, or R&D) are incurred. In addition, it may allow firms to change the timing of revenue and expense recognition through credit sales or to delay the recognition of losses by delaying the establishment of loss reserves [95]. According to Dechow and Dichev [40], EM is the link between cash flows and accruals. Therefore, management has the power to recognize the right to restrict information or use it to control profitability. According to Boakye et al. [32], EM occurs when managers take advantage of opportunities to make accounting decisions that change reported earnings based on estimates and judgements.

Despite this, for many decades women faced professional and social challenges that prevented them from advancing to top management positions. In recent years, board diversity has been seen as one of the most important and integral components of CG practices. Previous research by Adams and Ferreira [6], Gul, Hutchinson, and Lai [54], and Gull et al. [56] demonstrated the importance of promoting women to higher oversight and regulatory positions. They found that gender-diverse boards promote greater monitoring efforts and managerial accountability to eliminate agency and control problems. Compared to male directors, female directors are more interested in attending board meetings and focusing on ethical standards and risk-averse projects.

They are motivated more by moral issues than by self-achievement. Women make more efforts to complement male directors rather than replace them, to be able to promote open discussions, bring new dynamics to board deliberations, and create a good and healthy environment for the organisation to support monitoring and oversight functions and promote financial reporting quality [92]. As a result, it is predicted that women are less likely to engage in earnings management, especially when opportunistic manipulation involves the risk of losing reputation, litigation risk, current and new investors, and jobs. As a result, female directors are less willing to engage in unethical activities than their male counterparts [56]. As a result, many countries require quotas for female directors on boards, suggesting that a certain number of women are represented on boards to break the glass ceiling [44]. Norway was the first country to require companies to have a defined quota of female directors on the board, set at 40% in 2003. Following Norway's example, several developed and developing countries introduced quotas for female directors on company boards. However, not all countries have been successful in requiring companies to implement a predetermined quota of female directors. As a result, the importance of gender equality has become central to Egypt's economic and political agenda. Egypt's legislative and institutional systems have increased their interest in strengthening the

role of women's rights and representation on corporate boards.

The study focuses on Egypt for several reasons. First, Egypt can be seen as representative of the Middle East and Arab countries. As an emerging market, Egypt is important to the global economy due to its favourable investment climate and expected economic growth [27, 86, 87]. Second, the Egyptian CG code was first implemented by the Ministry of Investment and International Cooperation in 2005, based on CG principles endorsed by the Organisation for Economic Cooperation and Development (OECD). However, the Egyptian financial market continues to suffer from poor financial reporting and transparency. Nevertheless, the use of CG in Egypt as a model for emerging markets differs greatly from its use in rich countries.

In Egypt, CG enforcement is neither mandatory nor legally binding; rather, it aims to inspire and motivate companies to manage and control their systems in line with international best practices, demonstrating that sound management can run companies in the best interests of stakeholders [27, 25, 43]. Third, as an emerging stock exchange, Egypt lacks alternative sources of information other than public financial statements, such as earnings forecasts, media releases, industry financial studies, and management conference calls. As a result, financial statements are the main source of information available to both internal and external users [10]. As a result, the quality of financial reporting in developing countries, especially in the Middle East and North Africa (MENA) region, is more important than in developed countries in terms of reducing information asymmetry and improving decision making [7, 88].

Particularly, women in Egypt face numerous institutional, legal, and social barriers to leadership. The International Finance Corporation (IFC) ranked Egypt 134th out of 153 countries in its global gender gap index. Egypt's constitution does not provide equal opportunities for men and women [44]. As a result, regulatory bodies have implemented several changes and regulations, including the issuance of laws, CG codes, and regulations to improve the integrity of financial reporting [43]. As a result, in 2016, the Egyptian Code of Governance recommended non-discrimination against women. The Financial Regulatory Authority (FRA) issued Decree 123/2019 in 2019, requiring the appointment of at least one female board member. After two years, FRA issued revised Decree 109/2021 amending Decree 123/2019 mandating the appointment of at least one female board member. After two years, the FRA published new Decree 109/2021 to amend Decree 123/2019, which mandate the appointment of at least 25% or at least two women on the board with one year.

Our paper adds to the current literature in several ways. First, there is a dearth of empirical information on the impact of female roles on the quality of financial reporting, particularly in emerging market contexts. As a result, this study provides further information on the impact of gender diversity on the practice of pay manipulation in Egypt. Second, by using advanced research design and data, this paper extends previous research on the impact of CG characteristics on accrual and real-based EM. There has been little research on the impact of gender diversity on accrual EM. As a result, this study proposes more data on the extent to which internal CG mechanisms in Egypt moderate real-based EM practices. The study aims to support the policy agendas of many key organizations, including the World Bank, the IMF, and the Capital Market Authority (CMA), to convince the government to promote CG standards as part of a broader CG reform. Third, we examine real EM efforts to see if EM techniques are influenced by CG mechanisms, an area where research is limited, especially for Egyptian organizations. Recently, several studies have focused exclusively on the practice of discretionary accruals [38]. Nevertheless, there is extensive evidence of real-based earnings management (REM) practices in most organizations. However, most of the academic research has focused on accrual-based earnings management (AEM). Several research has shown that the switching of organizations between AEM and REM is overlooked by investors, prompting authorities to pay close attention to certain EM practices [45, 47]. As a result, this study focuses on how gender diversity reduces both types of manipulation. Fourth, the relationship between gender diversity and EM practices has long been a topic that few studies have addressed. Indeed, previous research on this topic cannot be generalized and may not be internationally applicable due to differences in legal and economic systems, cultural norms, capital market size, and the efficiency of CG mechanisms. This study is one of the few to examine the relationship between the presence of women on boards and EM practices. Fifth, to the best of my knowledge, this study is the first to identify earnings manipulation practices in the Egyptian context using several real-world based EM models: six models developed by Roychowdhury [84] to be confirmed by the validity, reliability, and robustness of the study findings. Sixth, the analysis applied more advanced techniques to efficiently correct for various econometric difficulties found in previous empirical literature (endogeneity, individual and time-invariant heterogeneity, and autocorrelation, etc.). In this case, the study employs a system GMM to address these issues, allowing it to provide a consistent and robust result. Most previous experiments in CG and EM have used pooled regression analysis and static panel

data analysis (e.g. [60, 64]). These techniques are considered inappropriate due to the dynamic endogeneity and unobserved firm heterogeneity that emerges in the relationship between CG and EM [26].

The paper is structured as follows. The first section deals with the context of our research (introduction), followed by a presentation of the literature review. The third section is devoted to the methodology of our research. The fourth section deals with the analysis and discussion of the results. The conclusion, the different stages and the results of our research are presented in the fifth and final section.

Gender Diversity and Earnings Management : Theoretical Framework

The relationship between board gender diversity and earnings management can be apprehended since several theories, namely agency, resource dependency, stakeholder, and institutional theories. Under agency theory, the importance of fiduciary duty is to address the problem of misalignment of interests between principals and agents due to conflicts between managers' and shareholders' interests [49, 61]. As a result, this perspective argues that gender diversity among directors in the boardroom is crucial to enhance the board's independence and support its function of monitoring and controlling management, thereby limiting conflicts of interest [69]. According to agency theory, diversity provides the organisation with fresh ideas, qualifications, knowledge, expertise, and information, which increases the organisation's ability to deal with the complexities and difficulties that arise in the external market environment. These diverse qualifications, histories, and perspectives allow women to contribute unique and valuable ideas and methods during board meetings, which increases the effectiveness of the decision-making process [52].

According to resource dependency theory, greater gender diversity can lead to greater access to links, channels of communication, and networks of different resources. This protects vital resources for companies such as information, skills, experience, prestige, diverse cultural backgrounds, legitimacy, gender diversity, and business contacts. Most organisations like to assign tasks to female directors to increase the legitimacy of the company by showing that the company promotes gender equality in the external environment [81]. Gender diversity supports board members to adhere and respond quickly to issues of uncertainty and to control issues of limited resources for their firms [69]. Diversity enhances the recruitment process of highly qualified candidates from inside or outside the organisation to create a healthy competitive atmosphere in internal labour markets [92]. Therefore, board diversity helps organisations to maintain their independence and sustainability of relevant resources and increase their competitive advantage [6, 56, 72].

Stakeholder theory holds that organisations are a part of the social system. It is assumed that gender diversity can facilitate interdependence among stakeholders like as consumers, employees, the local community, and suppliers. Gender diversity enhances board members' ability to examine and comprehend societal concerns, hence enhancing their sense of social responsibility towards the society [51]. This reflects a positive image of the firm and strengthens social capital and cohesion, which promotes stakeholder wealth and maximises the effectiveness of representation for various stakeholders [69]. Organisations become more capable of building their reputation and commercial potential because of their extensive network of stakeholders [52, 69, 92]. Furthermore, the firm can raise its capability to increase its market share and to penetrate the market more easily and give the opportunity for their board to sponsor their functional ability, engage in complex problem-solving situations, and take strategic decisions in favour of their stakeholders [2, 6].

However, institutional theory shows that gender diversity on boards is not always and, in all circumstances, beneficial for firms. The importance of gender diversity varies depending on the quality of corporate governance, applicable accounting standards, level of investor protection, quality of government, legal system, and culture. For example, in companies with robust governance structures, gender diversity on the board is seen as detrimental due to excessive oversight. On the other hand, gender diversity can be beneficial and urgent for firm success, especially in poorly controlled firms [56]. They emphasised that gender diversity provides the organisation with skills, knowledge, information, education, and expertise that help its members cope with changing environmental, social, and institutional demands. As a result, complexity, uncertainty, corruption, and ambiguity are reduced, ultimately improving business performance. According to UK studies, the results of the relationship between diversity, independence, and earnings quality cannot be generalised across countries due to changing economic environments, governance quality, capital market size, cultural differences, investor protection, and different regulatory regimes [79].

In summary, although agency, resource dependence, and stakeholder theories support board diversity, there are arguments against board diversity because it may have a negative impact on earnings quality. For example, more internal diversity may lead to more perspectives, debates, conversations, and critical assessments within the organisation. Several studies have shown that gender diversity in the boardroom may lead to less cooperation and more disagreements, which may reduce the quality

of decision making (e.g. [2, 94]). In addition, the effectiveness of the board may be compromised if board members do not act as an effective operational team, which may slow down decision making and limit business success. Gender diversity can have a negative impact on group cohesion and boardroom cooperation, making decision-making slow and ineffective, particularly in highly competitive markets. This limits the board's ability to respond quickly to market shocks, reactions, and demands [6, 56, 57, 69, 74].

Empirical Literature Review and Hypothesis Development

Despite the proliferation of studies, there are still much debate and inconclusive results on the relationship between gender diversity and EM practices, which are arguably the most important components of CG. One stream of researchers found that board characteristics have positive and negative effects on financial reporting quality [9]. On the contrary, another stream of researchers found that BOD characteristics and financial reporting quality are not related [29, 93]. To reconcile these inconsistencies, this study aims to analyse the relationship between gender diversity and financial reporting quality from theoretical and empirical perspectives.

Thus, there is a strong motivation to include female directors in the boardroom to communicate with female workers and female customers in the society due to their expertise and professionalism [55]. For example, Nguyen and Faff [74], using 832 observations of listed Australian companies, found that diversity enables better understanding of the market, more effective problem solving, support for creativity and innovation practices, development of more effective global relationships, and corporate leadership. In the USA, Adams and Ferreira [6] found a positive association between female directors and performance in the presence of weak shareholder rights. However, board diversity may have a negative impact on firm value due to excessive monitoring because of strong shareholder rights.

Al-Shaer and Zaman [13] in the UK FTSE35 in 2012 found that independent women directors have a greater impact on the quality of sustainability reporting than female directors and are effective in reducing agency costs. In a similar context, Lara et al. [71] in the UK found a positive and significant relationship between the percentage of female directors and accounting quality in the case of discrimination. However, the presence of a female director would not affect monitoring functions and EM if women and men behave similarly in high-profile positions in the absence of discrimination.

Recently, Gull et al. [56] investigated the association between female directors and earnings manipulation and whether this relationship is moderated by the role of statutory and demographic attributes using 394 French listed firms. Initial results revealed a negative association between female directors and EMs. However, the results showed a positive association when the statutory and demographic attributes were considered in the regression models. Therefore, the researchers concluded that specific (statutory and demographic) attributes such as (AC membership and business expertise) are important characteristics that should be considered when appointing female directors. This may enhance their effectiveness in monitoring and supervising functions, thereby mitigating opportunistic management behaviour. In line with these findings, Zalata et al. [97] (Zalata et al. 2022) suggested that female directors should be appointed and involved in monitoring functions rather than only in an advisory role on the board to develop the integrity and reliability of the financial reporting process. Their study recommended the importance and necessity of including women in the board structure to make good contributions to shareholders and to play an effective role in curbing managerial opportunism.

On the other hand, in the UK, Arun et al. [21] found that firms with more female and independent female directors are more likely to apply conservative financial reporting rules and standards. In other words, women are more likely to engage in revenue decreasing rather than revenue increasing EMs. These findings are consistent with the study of Gavious et al. [52], who found that female and independent directors on the board are less likely to engage in income increasing EM manipulations due to their conservatism. However, in France, Lakhal et al. [70] found that the presence of at least three women on the board plays an important role in monitoring and supervising management behaviour and effectively eliminating opportunistic EMs. Political bodies try to equalize the number of women and men on the board, hopefully to eliminate the practice of EM. However, the woman on the board should have the qualifications, experience, background, and expertise to effectively eliminate EMs. Imposing rules and regulations regarding the quota of women on the board may be detrimental to the organization if they consider the qualifications and financial literacy of the women selected. For example, some countries such as Norway, Iceland, and Spain, which have imposed a quota of 40% female directors on the board, have reduced the value of their companies by enforcing the law to hire younger and less experienced women as directors.

Chen and Gavious [37] in Israel, while investigating the relationship between diversity and EMs, determined the need to consider the impact of the female director's financial literacy. The results are inconclusive, in the first stage there is a negative relationship between the female

director and EM in the pre-IFRS period, while the opposite result is found for the post-IFRS period. Specifically, both measures of EM are significantly larger when female representation is higher. In the second stage, when the financial literacy of the woman is considered in the investigation, the results show that the presence of female directors is beneficial in other aspects related to the characteristics of the woman in the company. Explicitly, it is necessary for female directors to be financially literate in order to contribute effectively to monitoring the opportunistic behaviour of EM either before or after IFRS periods.

Previous literature in developing countries has found conflicting results on the relationship between board diversity and firm performance. This may be due to different time frames, lack of control variables, non-harmonized performance measures, the endogeneity problem between gender diversity and performance, and different institutional contexts such as regulatory and legislative [35, 83].

Several works in the literature are consistent with RDT, which suggests that board diversity brings important and critical information to the manager to help them make better decisions. The female brings more opinions and viewpoints to the discussions due to her different socialization and exposure to different experiences. The woman is well prepared for the board meeting and attends it more than men. Furthermore, studies linking gender and ethics have revealed that women are more ethical in their judgements and decisions than men, and they put in place active monitoring rules to detect fraud in financial reports [94]. Therefore, women are interested in being appointed to the audit, nomination, and CG committees rather than the remuneration committee. For example, in China, Luo et al. [72] found that female directors play an important role in reducing REM. This negative association between female directors and REM is particularly stronger when the percentage of their shareholding is high. Female directors, due to their shareholding, are more willing to supervise and monitor earnings manipulation. Similarly, Orazalin [77] found that the presence of female directors and independent female directors on the board can reduce the practice of earnings manipulation in Kazakhstan. Similarly, Chee and Tham [36] found a negative relationship between female directors and the level of earnings manipulation in Singapore.

Alves [15] also revealed a negative relationship between female director and AEM in European Union countries. The tendency and propensity to conduct earnings manipulations is lowered with the presence of woman on the board. The impact of female representation is more manifested when there are at least three members on the board.

On the other hand, other literature found that gender diversity did not prevent earnings manipulation or improve firm performance. For example, Hassan and Ibrahim [58] in Nigeria reported a positive association between REM and the presence of women on the board. The female directors are not effective in hindering the bad practices of the management. In the same view, Akpan and Amran [9] in the Nigerian context presented a significant negative relationship between gender diversity and performance. The feasible cause of the negative results could be attributed to different performance measures. Bala and Gugong [28] found a positive relationship between female directors and opportunistic EMs. This may be the result of the widespread belief that women are weaker in questioning and validating the activities of managers. Later, Waweru and Prot [94] investigated whether the fulfilment of the CG structure mitigates the manipulation of EMs in Kenya and Tanzania. The cross-country analysis revealed a positive relationship between board diversity and DAs. The rationale for this finding is that women are more conservative and risk-averse when making investment decisions. This has a negative impact on monitoring functions. Furthermore, the application of CG is not mandatory for all listed companies in East Africa. Similarly, Anh and Khuong [18] in Vietnam context found positive correlation between woman on the board and REM, while negative relationship between Female on board and AEM. This result may be due the vital role of female on the board to keep the degree of EM at suitable level through the trade-off selection between AEM and REM to inhibit risky impact on the firm value on the long-term basis.

Interestingly, Sun et al. [91] found a non-significant relationship between the percentage of female directors in ACs and the level of EMs. The possible justifications for these findings are that many female directors did not view all EMs as unethical and bad, especially when used to create a stable financial environment. In addition, female directors may be more ethical than their male counterparts but are unable to influence the rest of the board. There is also no consistency in the decisions of women on ACs.

In the Egyptian context, to the best of our knowledge, there is a lack of studies investigating the relationship between gender diversity and the quality of reporting. Abdou et al. [3]examined the relationship between female directors and the quality of financial reporting using the 50 most active companies. They found that companies with a low number of women tend to have a low level of EM. Noting that this study focused on a small sample size and the data on which the study is based were collected along enough before the issuance of the EGX recommendation regarding the issuance of rules

of non-discrimination against women on the board. El-Dyasty and ElAmer [44] examined the impact of female leadership on the quality of financial reporting using abnormal accruals. They found that increasing the number of female directors, female executives, and women on the audit committee improves the quality of financial reporting. Salem et al. [85] found that gender diversity is positively and significantly related to firm value in both Egyptian and American context. They recommended CG authorities to increase the proportion of women on the board, as they are interested in increasing the economic value of the firm and allocating more resources to investment projects rather than building economic empires. It seems that there is relatively little focus of evidence on the relationship between gender diversity and earnings management in developing countries in general and even less focus on the Middle East such as the Egyptian context. Specifically, REM practice has remained a largely unexplored area. Egyptian laws and corporate governance are silent on the role of gender diversity in the boardroom. This is evidenced by the statistics reflected in the Egyptian Country Report (2017), which shows that the average representation of women on the boards of the top ten listed companies is 6.13%, which represents a weakness in the strategies of the Egyptian Stock Exchange. This result is relatively like Salem et al. [85] who also revealed that the average of gender diversity in Egyptian listed companies is 5.6%, which is relatively lower than the average of gender diversity in the USA with an average of 19.8% (minimum of 6% and maximum of 50%). Recently, laws and codes are working to pay more attention to gender diversity and to include this issue in the broader context of sustainability and stock exchange strategies.

In summary, and in line with the mixed nature of the existing theoretical literature on board diversity, the empirical studies have produced conflicting results. These studies include those reporting (1) significant positive results such as Bala and Gugong [28], Waweru and Prot [94], (2) significant negative results [6, 5, 13, 56, 69, 70, 71, 72, 74], and (3) insignificant relationship between board diversity and EMs such as Habbash [57], Hassan and Ibrahim [58]. The conflicting international evidence may be explained by the fact that previous studies use different board diversity, EM techniques, performance proxies, sample periods, estimation techniques, and country and context differences. Accordingly, more research is needed to investigate the relationship between female directors and earnings manipulation using a larger sample and different proxies to measure financial reporting quality. In addition, it is more critical to understand and even explore the motives behind the recent decree issued by the Financial Regulatory Authority (FRA) regarding the appointment of female directors on the board. This study proposes the following hypotheses based on the above empirical findings:

Hypothesis 1 The gender diversity of the board is negatively associated with the level of EM practices.

Hypothesis 1.a The number of female directors on the board constrains accrual EM practices.

Hypothesis 1.b The number of female directors on the board constrains real EM practices.

Research methods

Data and Sample

We used companies listed on the Egyptian Exchange (EGX) to build our database. The EGX has been growing again because of an economic reform program and privatization. In this study, we examined a sample of 78 listed non-financial companies from 2009 to 2021. Firms without information for at least three years and firms with significant missing corporate governance data were excluded from our study. Table 1 describes the structure of our panel database (sample summary). The primary manual data sources are the EGX, the Capital Market Authority (CMA), and the Egypt for Information Dissemination (EGID). Data for the set of control variables and EM proxies are computed using DataStream data.

The study focused on companies listed on the Egyptian stock exchange, initially comprising a total of 226 companies. To ensure the relevance and reliability of the sample, certain exclusions were made. First, financial, insurance, and investment companies were excluded, reducing the number of companies by 47. In addition, companies with at least three years of missing financial information were excluded, resulting in the removal of 30 companies. To further refine the sample, industries that lacked homogeneity were excluded, resulting in the removal of five companies. Sectors that did not consist of at least seven companies were also excluded, resulting in the removal of 18 companies. To maintain data consistency, companies with missing DataStream information and companies with missing corporate governance data were excluded, resulting in the removal of 23 and 25 companies, respectively. After these exclusions, the total number of firms included in the sample was 78, representing 36% of the original 226 firms listed on the Egyptian Stock Exchange. This rigorous selection process aimed to ensure a more focused and representative dataset for the study's analysis, thereby increasing the robustness of the findings.

Table 1 Summary of variables and their measurement

	Label	Measure	Source
Dependent variable			
Earnings Management			
Accrual Earnings Management	AEM	Modified Jones model (1995) (Eq. 1)	DataStream and financial statements
		Kothari et al. [67] (Eq. 2)	
		Kasznik [63] model (Eq. 3)	
		Raman and Shahrur [80] Model (Eq. 4)	
Real Earnings Management	REM	ABCFO: Abnormal levels of cash flow from operations (Eq. 5)	DataStream and financial statements
		ABDISCX: Abnormal level from the sum of Selling and Marketing Expenses and General and Administrative Expenses (Eq. 6)	
		ABPROD: Abnormal level from the sum of cost of goods sold and change in inventory (Eq. 7) RM1 = – Abnormal cash flows from operations + Abnormal production costs (Eq. 8)	
		RM2 = – Abnormal cash flows from operations – Abnormal discretionary expenditures (Eq. 9)	
		RM3 = – Abnormal cash flows from operations + Abnormal production costs – Abnormal discretionary expenditures (Eq. 10)	
Independent variable			
Board diversity	BRDDIV	The number of female directors scaled by total size of board directors	Annual Disclosure Books By EGX, Ownership structure reports and BOD reports
Control variables			
Firm size	SIZE	Natural log of the book value of a firm's total assets at the end of its financial year	DataStream and financial statements
Liquidity	LIQ	Ratio of current assets to current liabilities	DataStream and financial statements
Performance	ROA	Ratio of net income to total assets at the beginning of the year	DataStream and financial statements
Performance	ROE	Net income is scaled by the total equity at the beginning of the year	DataStream and financial statements
Capital structure (Gearings)	GEAR	Total debt is scaled by total equity at the end of fiscal year	DataStream and financial statements
Leverage	LEV	The book value of total debt scaled by total assets at the end of its financial year	DataStream and financial statements
Assets Tangibility	ASSTAN	Ratio of net property plant and equipment scaled by total assets	DataStream and financial statements
Operating Cycle	OC	The logarithm of the sum of the inventory and the receivables period	DataStream and financial statements
Earnings Management Flexibility	EMFLEX	Total inventories and receivables scaled by total assets	DataStream and financial statements

Variables measurement

Dependent variables

The study measures EM practice using AEM and REM; first, discretionary accruals (DAs) are used as a proxy for AEM using different models. They are the modified Jones model [41], the Kasznik model [63], the performance adjusted discretionary accruals (DAs) model [67], and the Raman and Shahrur model [80]. Second, REM can be implemented by manipulating operating cash flow, overproducing inventory to reduce cost of goods sold, reducing discretionary spending such as advertising and research and development (R&D), and reducing general selling and administrative expenses [25, 24, 38, 68, 84].

- Accrual earnings management model

DAs are used as a proxy for accruals EM using different models. Total accruals (TAC) are calculated as the difference between net cash flow from operating activities and net profit for company i in year t. To measure EM, DAs are estimated which are the residuals of modified Jones model (Eq. 1), the Kasznik model [63] (Eq. 2), the performance adjusted DAs model [67] (Eq. 3), and the Raman and Shahrur model [80] (Eq. 4). In these models, non-discretionary provisions are estimated as follows:

$$\frac{\mathrm{TAC}_{it}}{\mathrm{TA}_{it-1}} = \alpha_1\left(\frac{1}{\mathrm{TA}_{it-1}}\right) + \beta_1\left(\Delta\mathrm{REV}_{it} - \frac{\Delta\mathrm{REC}_{it}}{\mathrm{TA}_{it-1}}\right) + \beta_1\left(\Delta\mathrm{REV}_{it} - \frac{\mathrm{PPE}_{it}}{\mathrm{TA}_{it-1}}\right) + \varepsilon_{it} \quad (1)$$

$$\frac{\mathrm{TAC}_{it}}{\mathrm{TA}_{it-1}} = \alpha_1\left(\frac{1}{\mathrm{TA}_{it-1}}\right) + \beta_1\left(\Delta\mathrm{REV}_{it} - \frac{\Delta\mathrm{REC}_{it}}{\mathrm{TA}_{it-1}}\right) + \beta_1\left(\Delta\mathrm{REV}_{it} - \frac{\mathrm{PPE}_{it}}{\mathrm{TA}_{it-1}}\right) + \beta_3\mathrm{CFO}_{it-1} + \varepsilon_{it} \quad (2)$$

$$\frac{\mathrm{TAC}_{it}}{\mathrm{TA}_{it-1}} = \alpha_1\left(\frac{1}{\mathrm{TA}_{it-1}}\right) + \beta_1\left(\Delta\mathrm{REV}_{it} - \frac{\Delta\mathrm{REC}_{it}}{\mathrm{TA}_{it-1}}\right) + \beta_1\left(\Delta\mathrm{REV}_{it} - \frac{\mathrm{PPE}_{it}}{\mathrm{TA}_{it-1}}\right) + \beta_3\mathrm{ROA}_{it} + \varepsilon_{it} \quad (3)$$

$$\frac{\mathrm{TAC}_{it}}{\mathrm{TA}_{it-1}} = \alpha_1\left(\frac{1}{\mathrm{TA}_{it-1}}\right) + \beta_1\left(\Delta\mathrm{REV}_{it} - \frac{\Delta\mathrm{REC}_{it}}{\mathrm{TA}_{it-1}}\right) + \beta_1\left(\Delta\mathrm{REV}_{it} - \frac{\mathrm{PPE}_{it}}{\mathrm{TA}_{it-1}}\right) + \beta_3\mathrm{ROA}_{it} + \beta_4\mathrm{GO}_{it-1} + \varepsilon_{it} \quad (4)$$

where TAC_{it} is total accruals for firm i at time t, TA_{it-1} is total assets for firm i at year $t-1$, $\Delta\mathrm{REV}_{it}$ is Change in revenues scaled by total assets, $\Delta\mathrm{REC}_{it}$ is change in account receivable scaled by total assets, PPE_{it} is gross property plant and equipment for firm i at time t, CFO_{it-1} is cash flow from operating activities for firm i for year $t-1$; ROA_{it} is return on assets for firm i at time t, GO_{it-1} growth opportunities for firm i at year $t-1$, and ε_{it} is error term.

- Real earning management model

REM can be conducted by manipulating operating cash flow, or overproducing inventory to reduce cost of goods sold, or reducing discretionary spending such as advertising, R&D, and general selling and administrative expenses [38, 68, 84]. The following models are used to measure REM, developed by Roychowdhury [84].

$$\frac{\mathrm{CFO}_{it}}{\mathrm{TA}_{it-1}} = \beta_1\left(\frac{1}{\mathrm{TA}_{it-1}}\right) + \beta_2\left(\frac{\mathrm{Sales}_{it}}{\mathrm{TA}_{it-1}}\right) + \beta_3\left(\frac{\Delta\mathrm{Sales}_{it}}{\mathrm{TA}_{it-1}}\right) + \varepsilon_{it} \quad (5)$$

$$\frac{\mathrm{PROD}_{it}}{\mathrm{TA}_{it-1}} = \beta_1\left(\frac{1}{\mathrm{TA}_{it-1}}\right) + \beta_2\left(\frac{\mathrm{Sales}_{it}}{\mathrm{TA}_{it-1}}\right) + \beta_3\left(\frac{\Delta\mathrm{Sales}_{it}}{\mathrm{TA}_{it-1}}\right) + \beta_4\left(\frac{\Delta\mathrm{Sales}_{it-1}}{\mathrm{TA}_{it-1}}\right) + \varepsilon_{it} \quad (6)$$

$$\frac{\mathrm{DISEXP}_{it}}{\mathrm{TA}_{it-1}} = \beta_1\left(\frac{1}{\mathrm{TA}_{it-1}}\right) + \beta_2\left(\frac{\mathrm{Sales}_{it}}{\mathrm{TA}_{it-1}}\right) + \varepsilon_{it} \quad (7)$$

where CFO_{it} is cash flow from the operation for firm i at time t, PROD_{it} is the sum of the cost of goods sold and change in inventory for firm i at time t, DISEXP_{it} the sum of selling and marketing expenses, general and administrative expenses, advertising expenses, and research and development expenses for firm i at time t; TA_{it-1} total assets for firm i at time $t-1$, $Sales_{it}$ is sales for firm i at time t, $\Delta\mathrm{Sales}_{it}$ is the change of sales for firm i at time t, $\Delta\mathrm{Sales}_{it-1}$ is the change of sales for firm i at time $t-1$, and ε_{it} is error term.

Note that the predicted variables from Eqs. (5), (6), and (7) are named as follows: abnormal levels of cash flow from operations (ABCFO), abnormal level from the sum of cost of goods sold and change in inventory (ABPROD), and abnormal level from the sum of advertising, R&D, and general selling and administrative expenses (ABDISCX). In addition, the study measures REM using three aggregate proxies (RM_1, RM_2, RM_3) in line with several studies (e.g. [38, 84, 99], Braam et al. 2015). These different proxies are summarized as follows:

$$\mathrm{RM}_1 = -\mathrm{ABCFO} + \mathrm{ABPROD} \quad (8)$$

$$\mathrm{RM}_2 = -\mathrm{ABCFO} + \mathrm{ABDISEXP} \quad (9)$$

$$\mathrm{RM}_3 = -\mathrm{ABCFO} + \mathrm{ABDISEXP} - \mathrm{ABPROD} \quad (10)$$

where ABCFO is abnormal cash flows from operations, ABPROD is abnormal production costs, and ABDISEXP is abnormal discretionary expenditures. The higher the value of each of the three aggregate proxies (RM1, RM2, RM3), the more likely it is that the company is engaged in real-based activity management.

Main independent variables and control variables

Gender diversity is measured as the number of female directors divided by the total number of directors on the board [1, 27, 25, 42, 50, 57, 62, 93, 95, 96].

In addition, we include several control variables to balance the firm and firm-specific variances in the sample, which have the propensity to influence the dependent variable (EM). Different control variables are included to organize the causal relationships in the model, to obtain a more complete empirical model and to eliminate the predicament of endogeneity.

According to Al-Najjar and Clark [12], Attia [27], Attia et al. [25], Attia et al. [24], Attia and Mehafdi [26], Emile et al. [46], we include these control variables such as leverage (LEV), operating cycle (OC), firm size (Size), profitability (ROA and ROE), gearing (Gear), liquidity (LIQ), asset tangibility (TANG), and EM Flexibility (EMFLEX). Table 1 summarizes the variables studied and how they are measured.

Table 2 Descriptive statistics

Variables	N	Minimum	Maximum	Mean	Std. Dev	Skewness	Kurtosis
BRDDIV	1014	0.0000	0.5000	0.0672	0.1005	1.4302	4.5546
ROA	1014	−0.0398	0.2163	0.0512	0.0647	0.9881	3.5379
ROE	1014	−0.0688	0.3740	0.0995	0.1180	0.8363	2.9363
LIQ	1014	0.5147	5.0461	1.8261	1.1874	1.3917	4.1883
LEV	1014	0.0182	0.6098	0.2311	0.1717	0.6207	2.3693
GEAR	1014	0.0195	2.0804	0.5162	0.5518	1.5568	4.7051
ASSTAN	1014	0.0089	0.7800	0.3590	0.2443	0.1139	1.8376
OC	1014	4.0974	6.8154	5.3578	0.7604	0.2025	2.2082
EMFLEX	1014	0.0799	0.8734	0.3990	0.2247	0.5545	2.3791
FIRMSIZE	1014	4.6774	6.9666	5.7008	0.6981	0.3451	1.9378
ABCFO	1014	−0.9652	0.7284	0.0631	0.1507	0.0098	10.9074
ABPROD	1014	−0.9754	1.6671	0.1577	0.3871	1.0463	3.8840
ABDISEXP	1014	−0.0390	1.0006	0.0502	0.0555	6.4254	93.6025
RM1	1014	−1.3208	1.4266	0.0850	0.4256	0.4219	3.7818
RM2	1014	−1.4484	0.9594	−0.1133	0.1593	−0.7689	13.3548
RM3	1014	−1.3851	1.8984	0.0445	0.4499	0.4412	3.8968
MODIFCFO	1014	−0.2862	0.2387	−0.0039	0.1285	−0.2399	2.9486
KOTHARIE	1014	−0.1782	0.2050	0.0008	0.0958	0.1761	2.7682
KAZANK	1014	−0.2042	0.1817	−0.0081	0.0913	−0.0610	3.0546
RAMAN & SHURER	1014	−0.1940	0.1925	−0.0121	0.0976	0.1708	2.6385

This table presents the descriptive statistics for AEM and REM Models variables. The mean, median, standard deviation, minimum, and maximum values are presented in the columns for the CG characteristics, and firm-level characteristics on accrual and real-based EM for firms in the Egyptian context from 2009 to 2021

Table 3 Correlation matrix results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) BRDDIV	1									
(2) ROA	0.065	1								
(3) ROE	0.04	0.864**	1							
(4) LIQ	0.007	0.228**	0.046	1						
(5) LEV	0.024	−0.142**	−0.062	−0.371**	1					
(6) GEAR	−0.063	−0.166**	−0.042	−0.364**	0.800**	1				
(7) ASSTTANG	0.038	−0.109**	−0.178**	−0.338**	0.115**	0.095**	1			
(8) OC	−0.073*	.081*	0.255**	−0.288**	0.185**	0.336**	0.01	1		
(9) EMFLEX	−0.074*	−0.049	0.111**	−0.041	0.049	0.091*	−0.452**	0.254**	1	
(10) FIRM Size	0.017	0.001	0.031	0.032	−0.046	−0.041	−0.028	−0.044	0.061	1

This table shows the correlation coefficients between independent variables over the period 2009–2021. *, ** denote the significant at 5 and 10% level, respectively

Econometric models

In this study, we investigate the impact of gender diversity on the real/accrual EMs (REM/AEM). To do so, we employed system generalized method of moments (GMM) developed by Blundell and Bond (1998). The proposed regression model is defined by the following equation:

$$\mathrm{EM}_{it} = \beta_0 + \beta_1 \mathrm{EM}_{it-1} + \beta_2 \mathrm{BRDIV}_{it} + \beta_j \sum_{j=4}^{13} X_{it} + \varepsilon_{it} \quad (11)$$

where EM_{it} is the real/accrual EMs for firm i at time t, EM_{it-1} is one year lag of Islamic real/accrual EMs, BRDIV_{it} is the board diversity for firm i at time t, X_{it} is the vector of control variables (ROA refers to return on assets; ROE refers to return on equity; LIQ refers to liquidity; Lev refers to leverage; Gear refers to gearing; Size refers to firm size; AT refers to asset tangibility; OC

Table 4 Test results for VIF and tolerance values

Variable	VIF	1/VIF
ROE	5.5	0.180
ROA	5.4	0.182
Gear	3.50	0.284
LEV	3.12	0.321
OC	1.76	0.566
LIQ	1.67	0.600
ASSTAN	1.64	0.610
EMFLEX	1.58	0.634
BRDDIV	1.13	0.884
FIRMSIZE	1.03	0.964
Mean VIF	2.09	

refers to the operating cycle; EMFLEX refers to EM-flexibility.), and ε_{it} is the error term.

The system GMM has been used in several studies (e.g. [22, 23, 27, 26, 31, 39, 48, 66, 73]). This technique has several advantages. First, it can deal with the problems of omitted variables, measurement errors, differences between dynamic panels, and possible endogeneity due to any independent variables related to the error term. Second, it works well when a panel has a shorter time dimension (where T is 14) than its cross-sectional dimension (where N is 27). However, AR (2) model did not show significant results for the test of second-order autocorrelation, implying that there is no autocorrelation [19] (Blundell and Bond 1998). This means that the model has an appropriate lag structure and only one lag for the NFRD variable is sufficient. To ensure the accuracy of the system GMM technique, we used appropriate instruments, such as the values of $t-1$ and $t-2$ for the difference equation and a single lag for the level equation.

We run the "*xtabond2*" command to perform the system GMM estimation using Stata software, following Roodman (2009). In this study, we perform post-estimation specification checks. Specifically, we use the Hansen J-test for over-identifying restrictions and the Arellano and Bond (1991) AR (2) test for no autocorrelation in the second-differenced errors. In addition, we use *collapse* sub-option for the *xtabond2* command to reduce the number of instruments (Roodman 2009).

Empirical results and discussion

Descriptive statistics and correlation matrix

Table 2 shows the descriptive statistics for the variables in the model. The results show that the mean of board diversity is relatively very low (0.067), which can be considered as slightly unsatisfactory. This ratio is relatively like the findings of [85] who found that the ratio of gender diversity in the Egyptian context is 5.6%. The findings of Brammer et al. (2007) were strongly supported by the relatively low proportion of female directors as found in the current study.

The Pearson correlation between the independent variables and the control variables within the REM/AEM models indicates no significant correlation between the variables. Therefore, collinearity could not compromise the interpretation of the regression coefficients of the independent variables in these six models. None of these correlations were significant, as the correlations are lower than 0.80 (Table 3).

In addition to the correlation analysis, the variance inflation factor (VIF) test was carried out to check for any multicollinearity between the independent variables. As stated in the previous studies, a VIF value of more than 10 indicates the problem of serious multicollinearity in the regression analysis. Table 4 presents the results of the VIF and tolerance values for the variables of the study. The estimated VIF values for all independent variables are lower than the threshold value of 10, indicating the absence of multicollinearity in these models (Table 4).

Board gender diversity and accrual earnings management

Regarding board diversity, Table 5 presents the system GMM estimation results between board gender diversity, control variables, and different models of AEM. The results show that board diversity is significantly and negatively correlated with AEM (Kasznik model, Kothari et al. model, and the Raman and Shahrur model) at 1% and 5% significance levels. These results are in line with Adams and Ferreira [6], Abbott et al. [2], and Ntim [76] who found that women are more risk averse and conservative in making financial decisions and more vigilant in monitoring and control functions. Therefore, female directors are more interested in reducing agency costs and improving the quality of financial reporting. Moreover, in France, Lakhal et al. [70] found that women are effective in monitoring and controlling functions and are then considered as an important CG device. As a result, women may be inherently more likely to detect earnings manipulation to avoid litigation risk and loss of reputation as they are not easily accessible to such positions. This finding supports the critical mass theory, which reinforces the need to increase the number of women on boards through regulation and legislation.

A possible explanation for such findings is that there is a tendency in Egyptian firms to increase the proportion of women on boards and to give them enough power to make effective decisions and improve the quality of financial reporting. These results support hypothesis (H1b) that increased gender diversity leads to higher earnings

Table 5 Board gender diversity and accrual earnings management

Variables	(1) Modified Jones	(2) Kothari model	(3) Kasznik model	(4) Raman and Shahrur model
L.AEM	0.061***	0.027***	0.067***	0.032***
	(0.002)	(0.001)	(0.002)	(0.002)
BRDDIV	0.064***	−0.037***	−0.033***	−0.020*
	(0.014)	(0.010)	(0.008)	(0.010)
ROA	−0.005	0.116***	−0.143***	0.056
	(0.043)	(0.037)	(0.038)	(0.057)
ROE	−0.017	−0.034	0.075***	−0.054
	(0.024)	(0.022)	(0.014)	(0.034)
LIQ	0.001*	−0.002	0.000	−0.003***
	(0.001)	(0.001)	(0.001)	(0.001)
LEV	−0.062***	−0.025***	−0.035***	−0.042***
	(0.015)	(0.009)	(0.013)	(0.011)
GEAR	0.019***	0.012***	0.009*	0.008*
	(0.003)	(0.004)	(0.005)	(0.004)
FIRMSIZER	0.015***	0.020***	−0.015***	0.020***
	(0.005)	(0.004)	(0.004)	(0.005)
ASSTAN	0.054***	0.003	0.017***	0.003
	(0.009)	(0.006)	(0.006)	(0.007)
OC	−0.013***	−0.022***	0.015***	−0.019***
	(0.004)	(0.004)	(0.003)	(0.005)
EMFLEX	0.070***	0.006	−0.007	−0.002
	(0.007)	(0.008)	(0.007)	(0.013)
Constant	−0.069***	0.007	0.002	−0.007
	(0.017)	(0.014)	(0.008)	(0.018)
Observations	936	936	936	936
Number of firms	78	78	78	78
Number of instruments	78	77	78	76
AR (1) test (*p* value)	0.000	0.000	0.000	0.000
AR (2) test (*p* value)	0.402	0.971	0.248	0.470
Hansen test (*p* value)	0.323	0.416	0.401	0.357

This table presents the results from System-GMM estimations for dynamic panel-data models. The dependent variable is the AEM proxies. Sample consists of 1014 observations during period 2009–2021. Two-step results and Hansen J tests never reject the validity of the over-identifying restrictions. Second-order autocorrelation AR (2) of residuals is always rejected. Standard errors are reported in parentheses. *, **, *** significance levels at the 10, 5, and 1% levels, respectively

quality. On the other hand, the empirical results show that board diversity is positively and significantly related to EM using the modified Jones model. This result is consistent with the findings of Bala and Gugong [28] in Nigeria and Waweru and Prot [94] in Africa, which showed a significant and positive relationship between diversity and DAs due to the voluntary application of CG guidelines (comply explain principle) in developing countries. Developing countries may need to shift CG culture from mere compliance and box-ticking to one that reflects the essence of good governance.

Board gender diversity and real earnings management

Regarding board diversity, Table 6 presents the results of the system GMM estimation between board gender diversity, control variables, and various proxies for real earnings management (REM). The results show that board diversity has a significant and negative impact on the ABCFO, ABPROD, ABDISX, RM1, RM3 models of REM. The negative coefficient of gender diversity supports hypothesis (H1a), implying that female directors enhance superior earnings quality. These results are in line with Nguyen and Faff [74], Kılıç and Kuzey [69], Adamu et al. [5], Gull et al. [56] who found that board diversity is more likely to reduce earnings manipulation

Table 6 Board gender diversity and real earnings management

Dependent variable: REM	(1)	(2)	(3)	(4)	(5)	(6)
Variables	ABCFO	ABPROD	ABDIX	RM1	RM2	RM3
L.REM	−0.338***	−0.083***	−0.139***	−0.274***	0.162***	−0.172***
	(0.025)	(0.019)	(0.015)	(0.026)	(0.005)	(0.018)
BRDDIV	−0.072**	−0.090**	−0.010	−0.202***	−0.090***	−0.234***
	(0.035)	(0.042)	(0.008)	(0.063)	(0.008)	(0.060)
ROA	1.326**	−1.301	−0.315**	−1.984*	−0.393***	−1.337
	(0.560)	(0.848)	(0.145)	(1.110)	(0.075)	(1.114)
ROE	0.763**	0.432	0.317***	−0.898	−0.138***	−0.799
	(0.341)	(0.442)	(0.083)	(0.740)	(0.032)	(0.711)
LIQ	−0.020	0.155***	−0.012***	0.113***	−0.010***	0.112***
	(0.017)	(0.028)	(0.003)	(0.039)	(0.002)	(0.033)
LEV	−1.186***	−1.216***	0.079	−0.101	−0.102***	−0.785***
	(0.185)	(0.206)	(0.051)	(0.291)	(0.009)	(0.249)
GEAR	0.142***	0.227**	−0.117***	0.284***	0.043***	0.444***
	(0.047)	(0.088)	(0.014)	(0.083)	(0.005)	(0.071)
FIRMSIZER	−0.096**	−0.403***	−0.032*	−0.280***	−0.030***	−0.258***
	(0.048)	(0.087)	(0.018)	(0.085)	(0.004)	(0.085)
ASSTAN	0.334**	0.185	0.057	−0.431**	−0.062***	−0.179
	(0.162)	(0.219)	(0.036)	(0.201)	(0.007)	(0.252)
OC	0.109**	0.224**	0.079***	0.108	0.022***	0.085
	(0.047)	(0.098)	(0.018)	(0.096)	(0.003)	(0.098)
EMFLEX	0.085	1.328***	0.031	1.246***	0.031***	0.930***
	(0.123)	(0.174)	(0.031)	(0.213)	(0.008)	(0.185)
Constant	−0.030	0.640	−0.172*	0.601	0.028	0.612
	(0.287)	(0.719)	(0.095)	(0.512)	(0.023)	(0.488)
Observations	936	936	936	936	936	936
Number of firms	78	78	78	78	78	78
Number of instruments	61	61	61	61	76	61
AR (1) test (*p* value)	0.000	0.000	0.000	0.000	0.000	0.000
AR (2) test (*p* value)	0.374	0.515	0.244	0.701	0.666	0.411
Hansen test (*p* value)	0.477	0.576	0.797	0.414	0.305	0.312

This table presents the results from System-GMM estimations for dynamic panel-data models. The dependent variable is the REM proxies. Sample consists of 1014 observations during period 2009–2021. Two-step results and Hansen J tests never reject the validity of the over-identifying restrictions. Second-order autocorrelation AR (2) of residuals is always rejected. Standard errors are reported in parentheses. *, **, *** significance levels at the 10, 5, and 1% levels, respectively

and thus increase firm value. Gender diversity can improve communication with female customers, increase the effectiveness of decision-making, improve the firm's image, introduce different and non-traditional views to the board, and ensure a better understanding of the market. In contrast, the study found a non-significant and negative relationship between board diversity and RM2 as a proxy for REM. The comparatively low number of female directors on the board (as shown in the descriptive analysis) may be one explanation for these findings; they lack the capacity to monitor and control the functions of managers. These findings may be consistent with the views of Adams and Ferreira [6], Habbash [57], Hassan and Ibrahim [58], Lakhal et al. [70], Lara et al. [18].

Robustness check: feasible generalized least square (FGLS)

Several further tests are carried out to establish the credibility of the main results. The first set of tests, which includes the main findings, is reported from the main model with alternative proxies for REM. In addition, FGLS analysis, pooled OLS with robust standard error, and fixed/random effects panel data analysis are conducted as robustness checks of the findings.

Regarding board diversity and REM, the FGLS test as shown in (Table 7) indicates that board diversity has a significant and negative impact on the ABDISX, RM1, RM2, RM3 models of real-based EM. In contrast, there is a significant and positive relationship between board diversity and ABCFO as a proxy for EM at 5% and an

Table 7 Robustness check: FGLS results

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(10)	(10)
	AEM						REM			
	Modified Jones	Kothari model	Kasznik model	Raman and Shahrur model	ABCFO	ABPROD	ABDIX	RM1	RM2	RM3
BRDDIV	0.0184	−0.038	−0.055**	−0.025	0.057**	0.011	−0.0146***	−0.088*	−0.051*	−0.096**
	(0.037)	(0.035)	(0.025)	(0.028)	(0.026)	(0.033)	(0.005)	(0.045)	(0.029)	(0.047)
ROA	−0.115	−0.136	−0.228**	−0.117	0.266**	−0.523***	0.009	−0.769***	−0.303**	−0.720***
	(0.167)	(0.143)	(0.110)	(0.118)	(0.126)	(0.147)	(0.026)	(0.193)	(0.134)	(0.205)
ROE	0.129	0.088	0.124**	0.074	0.089	0.109	0.005	−0.040	−0.084	−0.022
	(0.089)	(0.076)	(0.057)	(0.064)	(0.068)	(0.086)	(0.015)	(0.112)	(0.071)	(0.118)
LIQ	0.0003	0.003	−0.005*	−0.0004	−0.001	0.007*	0.0004	0.007	0.004	0.009
	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)	(0.004)	(0.0008)	(0.006)	(0.004)	(0.006)
LEV	−0.017	−0.009	−0.054*	−0.019	−0.031	−0.057	0.0213**	−0.026	0.0341	−0.042
	(0.051)	(0.043)	(0.032)	(0.0323)	(0.035)	(0.052)	(0.009)	(0.062)	(0.041)	(0.062)
GEAR	0.011	0.004	0.019**	0.004	−0.002	0.0069	−0.008***	−0.003	0.0049	0.0102
	(0.015)	(0.013)	(0.009)	(0.010)	(0.011	(0.017)	(0.003)	(0.020)	(0.013)	(0.020)
FIRMSIZER	0.008	0.045**	−0.007	0.044***	−0.001	0.005	0.001	0.004	0.0004	0.004
	(0.019)	(0.018)	(0.013)	(0.014)	(0.013)	(0.017)	(0.003)	(0.022)	(0.014)	(0.023)
ASSTAN	0.043	0.016	0.027	−0.034	−0.069**	0.0001	−0.0096	0.0507	0.111***	0.119*
	(0.041)	(0.037)	(0.028)	(0.031)	(0.028)	(0.037)	(0.008)	(0.055)	(0.032)	(0.062)
OC	0.009	−0.019	−0.014	−0.018	−0.062***	0.066***	0.0131***	0.107***	0.037**	0.087***
	(0.025)	(0.023)	(0.016)	(0.019)	(0.019)	(0.020)	(0.005)	(0.032)	(0.019)	(0.032)
EMFLEX	−0.022	0.024	−0.018	−0.0002	0.012	0.044	−0.005	0.062	−0.004	0.040
	(0.034)	(0.033)	(0.023)	(0.028)	(0.022)	(0.034)	(0.008)	(0.047)	(0.025)	(0.047)
Constant	−0.104	−0.151	0.125	−0.114	0.317***	0.818***	−0.080***	−0.089	−0.204*	0.687***
	(0.145)	(0.132)	(0.099)	(0.107)	(0.107)	(0.148)	(0.026)	(0.230)	(0.111)	(0.208)
Observations	1014	1014	1014	1014	1014	1014	1014	1014	1014	1014
Number of firms	78	78	78	78	78	78	78	78	78	78
Heteroscedasticity test (*p* value)	0.003	0.138	0.040	0.4094	0.000	0.000	0.000	0.000	0.005	0.030
Autocorrelation test (*p* value)	0.000	0.117	0.003	0.1586	0.000	0.000	0.000	0.000	0.000	0.000
Wald test (*p* value)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firms fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

insignificant relationship with ABPROD. Consistent with the results of the main test for real-based EM, the direction and significance level between board diversity and REM are almost the same as in the main test, except for ABPROD. However, the significance level drops from 1 to 5%. Regarding the relationship between board diversity and DAs, the FGLS results are consistent with the main findings. Both tests confirm that gender diversity (women) has a negative and significant relationship with DAs using different models at 1% in the main test and 5% in the sensitivity test. This result recommends policy makers in the Egyptian stock market to consider age, gender, and nationality diversity in the selection of directors. This supports that increased gender diversity leads to better earnings quality.

Conclusion

This study examines the extent to which women on the board can deter REM/AEM in Egypt. In this paper, we use the system GMM in addition to standard regression models on a sample of 1014 firm-year observations from the Egyptian context from 2008 to 2021. The results of the study are mainly mixed, consistent with the multi-theoretical framework's reliance on insights from agency, stewardship, resource dependence, and institutional theories. These results are obtained after controlling for several factors, including firm size, liquidity, ROE, ROA, capital structure, leverage, asset tangibility, operating cycle, and earnings flexibility.

Our results show that companies with a high proportion of female directors have lower levels of REM and AEM. This conclusion clearly supports the notion that female board members, as a fundamental mechanism of corporate governance, play an important role in eliminating agency problems and improving financial reporting quality. This study contributes to the existing literature in three ways. First, the use of a unique (hand-collected) dataset that mimics different corporate governance structures and circumstances allows us to shed more light on the role of institutional factors in developing countries in defining the relationship between BODs and EMs. The analysis in this study also sheds more light on the usefulness of monitoring and the importance of BOD processes. Second, the data obtained are based on the use of several proxies for earnings management, which provide a solid basis for the study's conclusions. Third, the study provides substantial support for the FRA's recommendation on the importance of including women on the boards of companies listed on the Egyptian stock exchange. As a result, the study provides insights and recommendations to regulators and policy makers on how to improve reforms and policies on the importance of increasing the number of female board members and the proportion of independent female board members in the emerging market. Finally, the findings may be useful for other emerging markets seeking to break through the glass ceiling and promote women into leadership positions.

Based on our findings, Egyptian policymakers can explore certain policy implications in the Egyptian stock market. When designing or updating the provisions of the CG Code, they should carefully evaluate the role of gender diversity. The Egyptian Stock Exchange should specify the percentage of women that companies should have, require companies to follow such a policy, and evaluate whether women are making valuable contributions on the board. Policy makers should encourage the corporation to consider the importance of incorporating female on BODs, as their participation and cooperation will be monitoring mechanism to reduce earnings manipulations. In addition, training programs should be provided to the female to improve their technical expertise and leadership qualities which may in turn benefit the effectiveness of the board.

Although our study yielded interesting results, it had several limitations. Firstly, the study is only applicable to one country. The report recommends that the study is expanded to include more years of data and countries in the MENA region to provide more insight into the different market responses to CG, external audit, and EMs. Future research can include age, education, experience, and culture as aspects of gender diversity. The study may also consider the financial and banking industries due to their distinct ownership, governance structure, and various regulations that govern these industries. Thirdly, despite the use of numerous alternative DAs models and other variables related to measurement error in the study, the results are not completely free of measurement error. Finally, there is an ongoing debate about the inefficiency of current accrual models for classifying DAs and non-DAs components.

Abbreviations

System GMM	System generalized method of moment
REM	Real earnings management
AEM	Accrual earnings management
ABDIX	Abnormal discretionary expenditures
CG	Corporate governance
EM	Earnings management
OECD	Organization for Economic Cooperation and Development
MENA	Middle East and North Africa region
IFC	International Finance Corporation
FRA	Financial regulatory authority
CMA	Capital Market Authority
DAs	Discretionary accruals
IFRS	International Financial Reporting Standards
EGX	Egyptian exchange
EGID	Egypt for information dissemination
CFO	Cash flow from the operation of firm *i* in period *t*
ABProd	The sum of the cost of goods sold and change in inventory of

	firm *i* in year *t*
TAC	Total accruals
FGLS	Feasible generalized least square

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Author contributions
EA and SY helped in developing the conceptualization, validating, writing and developing the original draft, design of work, collecting the data, analysing the results, using new advanced statistical techniques, conclude the draft, and were the major contributor in writing the work. EA, AC, and AS edited and reviewed the draft and made constructive changes to the draft. AC and AS add substantial contributions to the conception of the work and gave his valuable comments to develop the quality of research. All authors have read and approved the manuscript.

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Availability of data and materials
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Declarations

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References

1. Abata M, Migiro S (2016) Corporate governance and management of earnings: empirical evidence from selected Nigerian-listed companies. Invest Manag Financ Innov 13:189–205
2. Abbott L, Parker S, Presley J (2012) Female board presence and the likelihood of financial restatement. Account Horiz 26(4):607–629
3. Abdou H, Ellelly N, Elamer A, Hussainey K, Yazdifar H (2020) Corporate governance and earnings management nexus: evidence from the UK and Egypt using neural networks. Int J Finance Econ 26(4):1–31. https://doi.org/10.1002/ijfe.2120
4. Abdul-Rahman R, Ali M (2006) Board, audit committee, culture and earnings management: Malaysian evidence. Manag Audit J 21(7):783–804
5. Abubakar IA, Ishak RB, Chandren SA (2017) The effect of board attributes on real earnings management in Nigerian financial institutions. J Account Bus Finance Res 1:76–83
6. Adams R, Ferreira D (2009) Women in the boardroom and their impact on governance and performance. J Financ Econ 94:291–309
7. Afify H (2009) Determinants of audit report lag: does implementing corporate governance have any impact? Empirical evidence from Egypt. J Appl Acc Res 10(1):56–86
8. Agrawal A, Chadha S (2005) Corporate governance and accounting scandals. J Law Econ 48(2):371–406
9. Akpan E, Amran N (2014) Board characteristics and company performance: evidence from Nigeria. J Finance Account 2(3):81–89
10. Al-Ajmi J (2009) Audit firm, corporate governance, and audit quality: evidence from Bahrain. Adv Account 25(1):64–74
11. Al-Ghamdi S (2012) Investigation into earnings management practices and the role of corporate governance and external audit in emerging markets: empirical evidence from Saudi listed companies. Durham thesis, Durham University. Available from: http://www.etheses.dur.ac.uk/3438/.
12. Al-Najjar B, Clark E (2017) Corporate governance and cash holdings in MENA: evidence from internal and external governance practices. Res Int Bus Finance 39:1–12
13. Al-Shaer H, Zaman M (2016) Board gender diversity and sustainability reporting quality. J Contemp Account Econ 12(3):210–222
14. Alessandro M (2013) Corporate Governance: the relationship between Board of Directors and Firm Performance: empirical evidence of Italian listed companies. PhD thesis, Università degli Studi diFerrara
15. Alves S (2023) Gender diversity on corporate boards and earnings management: evidence for European Union listed firms. Cogent Bus Manag 10:2193138. https://doi.org/10.1080/23311975.2023.2193138
16. Amador C (2012) Ownership concentration and Earnings Quality: evidence from The Netherlands. Master thesis, Amsterdam University, Faculty of Economics and Business. www.dare.uva.nl/document/447280
17. Amer M (2016) Measuring the effect of the board of directors and audit committee characteristics on firm financial performance in Egypt. PhD Thesis. Cardiff Metropolitan University, Cardiff School of Management
18. Anh LHT, Khuong NV (2022) Gender diversity and earnings management behaviours in an emerging market: a comparison between regression analysis and FSQCA. Cogent Bus Manag 9(1):2101243. https://doi.org/10.1080/23311975.2022.2101243
19. Arellano M, Bover O (1995) Another look at the instrumental variable estimation of error-components models. J Econom 68(1):29–51
20. Arellano M, Bond S (1991) Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. Rev Econ Stud 58(2):277–297
21. Arun T, Almahrog Y, Aribi Z (2015) Female directors and earnings management: evidence from UK companies. Int Rev Financ Anal 39:137–146
22. Assefa TA, Esqueda OA, Mollick AV (2017) Stock returns and interest rates around the World: a panel data approach. J Econ Bus 89:20–35. https://doi.org/10.1016/j.jeconbus.2016.10.001
23. Attia E, Awad I (2022) The influence of board leadership structure on the creditability of financial reporting: triangulation approach. J Manag Res. https://doi.org/10.21608/JSO.2022.153446.1024
24. Attia F, Ismail T, Mehfadi M (2022) Impact of board of directors attributes on real-based earnings management: Further evidence from Egypt. Future Bus J. https://doi.org/10.1186/s43093-022-00169-x
25. Attia E, Khémiri W, Mehafdi M (2023) Does ownership structure reduce earnings manipulation practice of Egyptian listed firms? Evidence from a dynamic panel threshold model. Future Bus J 9:34. https://doi.org/10.1186/s43093-023-00213-4
26. Attia E, Mehafdi M (2023) The dynamic endogeneity issue between corporate ownership structure and real-based earnings manipulation in an emerging market: advanced dynamic panel model. Risks 11(11):189. https://doi.org/10.3390/risks11110189
27. Attia E (2020) Evaluating the effectiveness of corporate governance mechanisms and external audit on earnings management: empirical study of companies listed in the Egyptian Stock Market. Doctoral thesis, University of Huddersfield.
28. Bala H, Gugong B (2015) Board characteristics and earnings management of listed food and beverages firms in Nigeria. Eur J Account Audit Finance Res 3(8):25–41
29. Basiruddin R (2011) The relationship between governance practices, audit quality and earnings management: UK evidence. Durham theses, Durham University. Available at Durham E-Theses Online: http://etheses.dur.ac.uk/1382/
30. Blundell R, Bond S (1998) Initial conditions and moment restrictions in dynamic panel data models. J Econometr 87(1):115–143
31. Boachie C, Mensah E (2022) The effect of earnings management on firm performance: the moderating role of corporate governance quality. Int Rev Financ Anal 83:102270
32. Boakye BY, Atiso F, Koranteng E (2019) The relationship between real earnings management and cost behavior. SEISENSE J Manag. https://doi.org/10.33215/sjom.v2i6.244
33. Braam G, Nandy M, Weitzel U, Lodh S (2015) Accrual-based and real earnings management and political connections. Int J Acc 50(2):111–141
34. Brammer S, Millington A, Rayton B (2007) The contribution of corporate social responsibility to organizational commitment. Int J Hum Res Manag 18(10):1701–1719

35. Carter DA, D'Souza F, Simkins BJ, Simpson WG (2010) The gender and ethnic diversity of US boards and board committees and firm financial performance. Corp Gov Int Rev 18(5):396–414
36. Chee K, Tham Y (2021) The role of directors with multiple board seats and earnings quality: a Singapore context. J Corp Account Finance 32:31–47. https://doi.org/10.1002/jcaf.22474
37. Chen E, Gavious I (2016) Complementary relationship between female directors and financial literacy in deterring earnings management: the case of high-technology firms. Adv Account 35:114–124
38. Cohen D, Zarowin P (2010) Accrual-based and real earnings management activities around seasoned equity offerings. J Account Econ 50(1):2–19
39. Dayanandan A, Donker H, Ivanof M, Karahan G (2016) IFRS and accounting quality: legal origin, regional, and disclosure impacts. Int J Account Inf Manag 24(3):296–316. https://doi.org/10.1108/IJAIM-11-2015-0075
40. Dechow P, Dichev I (2002) The quality of accruals and earnings: the role of accrual estimation errors. Account Rev 77:35–59
41. Dechow P, Sloan R, Sweeney A (1996) Causes and consequences of earnings manipulation. Contemp Account Res 13(1):1–36
42. Dharmadasa P, Gamage P, Herath S (2014) Corporate governance, board characteristics and firm performance: evidence from Sri Lanka. South Asian J Manag 21(1):7
43. Ebaid I (2013) Corporate governance and investors' perceptions of earnings quality: Egyptian perspective, corporate governance. Int J Bus Soc 13:261–273
44. El-Dyasty M, Elamer A (2022) Female leadership and financial reporting quality in Egypt. J Appl Account Res. https://doi.org/10.1108/JAAR-11-2021-0315
45. ElKalla T (2017) An empirical investigation of earnings management in the MENA region, PhD thesis, University of West England
46. Emile R, Ragab A, Kyaw S (2014) The effect of corporate governance on firm performance, evidence from Egypt. Asian Econ Financ Rev 4(12):1865–1877
47. Enomoto M, Yamaguchi T (2017) Discontinuities in earnings and earnings change distributions after J-SOX implementation: empirical evidence from Japan. J Account Public Policy 36(1):82–98
48. Esqueda OA, Assefa TA, Mollick AV (2012) Financial globalization and stock market risk. J Int Finan Mark Inst Money 22(1):87–102. https://doi.org/10.1016/j.intfin.2011.07.006
49. Fama EF, Jensen MC (1985) Organizational forms and investment decisions. J Financ Econ 14:101–119. https://doi.org/10.1016/0304-405X(85)90045-5
50. Fauzi F, Locke S (2012) Board structure, ownership structure and firm performance: a study of New Zealand listed-firms. Asian Acad Manag J Account Finance 8(2):43–67
51. Freeman RE (1984) Strategic management: a stakeholder approach. Cambridge University Press, Cambridge
52. Gavious I, Segev E, Yosef R (2012) Female directors and earnings management in high-technology firms. Pac Account Rev 24(1):4–32
53. Gujarati DN, Porter DC (2003) Basic econometrics. McGraw-Hill, New York
54. Gul F, Hutchinson M, Lai K (2013) Gender-diverse boards and properties of analyst earnings forecasts. Account Horiz 27(3):511–538
55. Gul F, Srinidhi B, Ng A (2011) Does board gender diversity improve the informativeness of stock prices? J Account Econ 51(3):314–338
56. Gull A, Nekhili M, Nagati H, Chtioui T (2018) Beyond gender diversity: how specific attributes of female directors affect earnings management. Br Account Rev 50(3):255–274
57. Habbash M (2010) The effectiveness of corporate governance and external audit on constraining earnings management practices in the UK. PhD, Durham University
58. Hassan S, Ibrahim G (2014) Governance attributes and real activities manipulation of listed manufacturing firms in Nigeria. Int J Account Tax 2(1):37–62
59. Healy P, Wahlen J (1999) A review of the earnings management literature and its implications for standard setting. Account Horiz 13(4):365–383
60. Issarawornrawanich P (2015) The association between board of directors' characteristics and firm performance: empirical evidence from emerging market of Thailand. J Appl Bus Econ 17(1):54–65
61. Jensen M, Meckling W (1976) Theory of the firm: managerial behavior, agency costs and ownership structure. J Financ Econ 3:305–360
62. Kao M, Hodgkinson L, Jaafar A (2019) Ownership structure, board of directors and firm performance: evidence from Taiwan. Corp Gov Int J Bus Soc 19(1):189–216
63. Kasznik R (1999) On the association between voluntary disclosure and earnings management. J Account Res 37(1):57–82
64. Khalil M, Ozkan A (2016) Board independence, audit quality and earnings management: evidence from Egypt. J Emerg Mark Finance 15(1):84–118
65. Khémiri W, Alsulami F (2023) Corporate social responsibility disclosure and Islamic bank stability in GCC countries: do governance practices matter? Cogent Bus Manag 10:2260559. https://doi.org/10.1080/23311975.2023.2260559
66. Khémiri W, Noubbigh H (2021) Joint analysis of the non-linear debt-growth nexus and capital account liberalization: new evidence from sub-Saharan region. Q Rev Econ Finance 80:614–626. https://doi.org/10.1016/j.qref.2021.04.009
67. Kothari S, Leone A, Wasley C (2005) Performance matched discretionary accrual measures. J Account Econ 39(1):163–197
68. Kuo J, Ning L, Song X (2014) The real and accrual-based earnings management behaviors: evidence from the split share structure reform in China. Int J Account 49(1):101–136
69. Kılıç M, Kuzey C (2016) The effect of board gender diversity on firm performance: evidence from Turkey. Gend Manag Int J 31(7):434–455
70. Lakhal F, Aguir A, Lakhal N, Malek A (2015) Do women on boards and in top management reduce earnings management? Evidence in France. J Appl Bus Res 31(3):1107
71. Lara J, Osma B, Mora A, Scapin M (2017) The monitoring role of female directors over accounting quality. J Corp Finance 45:651–668
72. Luo JH, Xiang Y, Huang Z (2017) Female directors and real activities manipulation: evidence from China. China J Account Res 10(2):141–166
73. Muhammad N, Islam ARM, Marashdeh HA (2016) Financial development and economic growth: an empirical evidence from the GCC countries using static and dynamic panel data. J Econ Finance 40(4):773–791. https://doi.org/10.1007/s12197-015-9331-9
74. Nguyen H, Faff R (2007) Impact of board size and board diversity on firm value: Australian evidence. Corp Ownersh Control 4(2):24–32
75. Nguyen MH, Nguyen KQT, Le HMD, Le VT, Nguyen TKC (2023) Corporate social responsibility, board of directors' affect financial performance: evidence in Vietnam. Int J Prof Bus Rev 8(8):e02388. https://doi.org/10.26668/businessreview/2023.v8i8.2388
76. Ntim CG (2015) Board diversity and organisational valuation: unravelling the effects of ethnicity and gender. J Manag Gov 19(1):167–195
77. Orazalin N (2020) Board gender diversity, corporate governance, and earnings management evidence from an emerging market. Gend Manag Int J 35(1):37–60
78. Park Y, Shin H (2004) Board composition and earnings management in Canada. J Corp Finance 10(3):431–457
79. Pucheta-Martínez M, Bel-Oms I, Olcina-Sempere G (2018) The association between board gender diversity and financial reporting quality, corporate performance and corporate social responsibility disclosure: a literature review. Acad Rev Latinoam Adm 31(1):177–194
80. Raman K, Shahrur H (2008) Relationship-specific investments and earnings management: evidence on corporate suppliers and customers. Account Rev 83(4):1041–1081
81. Reguera-Alvarado N, de Fuentes P, Laffarga J (2017) Does board gender diversity influence financial performance? Evidence from Spain. J Bus Ethics 141(2):337–350
82. Roodman D (2009) How to do xtabond2: an introduction to difference and system GMM in Stata. Stata J 9(1):86–136
83. Rose C (2007) Does female board representation influence firm performance? The Danish evidence. Corp Gov Int Rev 15(2):404–413
84. Roychowdhury S (2006) Earnings management through real activities manipulation. J Account Econ 42:335–370
85. Salem W, Metawe S, Youssef A, Mohamed M (2019) Boards of directors' characteristics and firm value: a comparative study between Egypt and USA. Open Access Libr J 6(04):1
86. Samaha K, Dahawy K (2010) Factors influencing corporate disclosure transparency in the active share trading firms: an explanatory study. Res Account Emerg Econ 10:87–118

87. Samaha K, Dahawy K, Hussainey K, Stapleton P (2012) The extent of corporate governance disclosure and its determinants in a developing market: the case of Egypt. Adv Account 28:168–178
88. Sarhan A, Ntim C, Al-Najjar B (2019) Antecedents of audit quality in MENA countries: the effect of firm- and country-level governance quality. J Int Account Audit Tax 35:85–107
89. Schipper K (1989) Commentary on earnings management. Account Horiz 3(4):91–102
90. Shehata N, Dahawy K, Ismail T (2014) The relationship between firm characteristics and mandatory disclosure level: when Egyptian accounting standards were first adopted. Mustang J Account Finance 5:85–103
91. Sun J, Liu G, Lan G (2011) Does female directorship on independent audit committees constrain earnings management? J Bus Ethics 99(3):369–382
92. Taljaard C, Ward M, Muller C (2015) Board diversity and financial performance: a graphical time-series approach. S Afr J Econ Manag Sci 18(3):425–447
93. Uwuigbe U, Peter D, Oyeniyi A (2014) The effects of corporate governance mechanisms on earnings management of listed firms in Nigeria. Account Manag Inf Syst 13(1):159–174
94. Waweru N, Prot N (2018) Corporate governance compliance and accrual earnings management in eastern Africa: evidence from Kenya and Tanzania. Manag Audit J 33(2):171–191
95. Xie B, Davidson W, DaDalt P (2003) Earnings management and corporate governance: the role of the board and the audit committee. J Corp Finance 9:295–316
96. Yasser Q, Entebang H, Abu Mansor S (2011) Corporate governance and firm performance in Pakistan: the case of Karachi Stock Exchange (KSE)-30. J Econ Int Finance 3(8):482–491
97. Zalata A, Ntima C, Choudhrya T, Hassaneinb A, Elzahard H (2019) Female directors and managerial opportunism: monitoring versus advisory female directors. Leadersh Q 30:1–16
98. Zalata AM, Ntim CG, Alsohagy MH, Malagila J (2022) Gender diversity and earnings management: the case of female directors with financial background. Rev Quant Financ Acc 58(1):101–136
99. Zang A (2012) Evidence of the trade-off between real activities manipulation and accrual-based earnings management. Account Rev 87(2):675–703

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