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# Corporate environmental disclosure and earnings management—The moderating role of corporate governance structures

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## Abstract

Our study examines whether internal corporate governance (CG) mechanisms moderate the relationship between a firm's engagement in corporate environmental disclosure (CED) and earnings management (EM) practices in an emerging economy. Using a sample of 100 Jordanian listed firms from 2010 to 2014 (i.e., 500 firm-year observations), our findings reveal that while the relationship between CED and earnings manipulations is negative, the links between CG arrangements and EM are heterogeneous in that they might have either reduced or increased earnings manipulations in Jordan. Furthermore, some CG structures, such as board size, managerial, and institutional ownership structures have moderating effects on the CED-EM nexus. Our research highlights the significance of considering internal CG mechanisms to explain the link between CED and EM in the context of emerging economies. Our results help to explain and place into setting the earlier mixed results on the association between CED and earnings manipulations and most importantly add to the debate about whether CG structures detrimental to the CED-EM nexus. This study allows for a richer understanding of how managers respond to CED initiatives and CG reforms in relation to reducing earnings manipulations, which offers policymakers, board directors and managers, a set of context-specific recommendations related to the crucial need for more concerted efforts to ensure corporate sustainability in emerging economies.

## KEYWORDS

corporate environmental disclosure, corporate governance, developing economies, earnings management, Jordan, listed companies

## 1 | INTRODUCTION

In an era of climate change, constraints of natural resource and other socio-environmental pressures, Corporate Environmental Disclosure (CED) has been

increasingly pushed to the forefront of corporate decision-making and communication (Albitar, Hussainey, Kolade, & Gerged, 2020; Cho & Patten, 2007; Gerged, 2020; Gerged, Beddewela, & Cowton, 2020; Gerged, Matthews, & Elheddad, 2020; Lu & Abeysekera, 2017). We define CED

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as the provision of information to external parties about a corporation's environmental policies, activities and performance (Deegan, 2002). CED can involve critical environmental issues and their effects on firms' future financial performance, material items of expense or income, environmental policies, and other uncertainties and risks (Birkey, Michelon, Patten, & Sankara, 2016). Such issues are expected to be of interest to a large group of users involving, investors, lenders, and shareholders that are concerned about environmental sustainability due to its economic, social, and political implications (Gray, Javad, Power, & Sinclair, 2001; Lehman & Kuruppu, 2017). CED can also be advantageous in improving corporate reputation, reducing the cost of capital and strengthening firms' negotiation power and market competitiveness (Bae, Chang, & Yi, 2018; Sarumpaet, Nelwan, & Dewi, 2017). Theoretically, a firm engages in CED either as a legitimizing tool (Chen, Cho, & Patten, 2014; Lu & Abeysekera, 2017) or it can be driven by managers attempt to "opportunistically" use CED as a green washing tool to cover up their unethical behaviors such as earnings management (EM) (Gerged, Al-Haddad, & Al-Hajri, 2020; McWilliams, Siegel, & Wright, 2006). Although the first theoretical stance suggests a significant and negative relationship between CED and earnings manipulations, the second one hypothesizes the opposite relationship (Kim, Park, & Wier, 2012).

According to Healy and Wahlen (1999), EM occurs when "managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers," p. 386. Prior studies have concluded many motivations for corporate engagement in EM such as avoidance of possible regulatory interference (Adiel, 1996; Collins, Shackelford, & Wahlen, 1995), meeting analysts' forecasts (Kasznik, 1999; Payne & Robb, 2000), equity offerings (Teoh, Welch, & Wong, 1998), and achieving specific contract-related objectives (Abarbanell & Lehavy, 2003). Dechow and Sloan (1991) indicates that managers do engage in EM to maximise the plans of their overall executive compensation. Others, nevertheless, argue that a corporation's management seemed to participate in managing the reported earnings to avoid debt covenants violation (DeAngelo, DeAngelo, & Skinner, 1994; DeFond & Jiambalvo, 1994; Sweeney, 1994).

Managers perceive the reported earnings as a critical metric for stakeholders to assess not only firms' financial performance, albeit also executive compensation and firms' survival prospects in the future (Graham, Harvey, & Rajgopal, 2005). Managers, therefore, might have a strong incentive to manipulate earnings figures in order to

maximize their compensations (Xu, Taylor, & Dugan, 2007). Even though earnings manipulation might not be violating the generally accepted accounting standards in a given context, yet it can present a misleading picture of a firm's financial performance to outsiders (Rahman & Ali, 2006).

The existing CED-to-EM literature seems to have several weaknesses. First, a few researchers have investigated the relationship between environmental disclosures and EM worldwide (e.g., Kim et al., 2012; Liu, Shi, Wilson, & Wu, 2017; Pyo & Lee, 2013; Sun, Salama, Hu'ssainey, & Habbash, 2010). Fewer studies, nevertheless, have examined the CED-EM nexus in the context of developing countries (Gerged, Al-Haddad, & Al-Hajri, 2020). Our research, therefore, extends the existing body of literature by offering new evidence about the relationship between CED and EM in an emerging economy has recently undergone substantial governance and regulatory transformations, namely Jordan. The first critical question we pose for this study addresses this empirical gap; is CED associated with EM?

Yip, Van Staden, and Cahan (2011) indicate that the association between CED and EM is a context-specific, mainly related to the governance and regulatory environment. Given that, the findings of examining the CED-EM nexus are primarily attributable to differences in the governance systems across countries. Compliance with corporate governance (CG) practices can improve the integrity of financial reports and act as a deterrent to earnings manipulation (Uadiale, 2012). Drawing on previous studies (e.g., Fama & Jensen, 1983; González & García-Meca, 2014; Jensen & Meckling, 1976), our research focuses secondly on the monitoring role of CG mechanisms in reducing corporate engagements in EM activities. Consequently, we pose the second critical question; is corporate compliance with good CG practices attributed to EM in the context of developing countries?

Third, meanwhile, few prior studies have assessed the impact of CED on EM (Gerged, Al-Haddad, & Al-Hajri, 2020; Kim et al., 2012; Liu et al., 2017; Pyo & Lee, 2013). Others have investigated the connections among traditional CG arrangements and EM (Al-Haddad & Whittington, 2019; Beasley, 1996; Chen & Zhang, 2014; Dechow, Sloan, & Sweeney, 1996; Klein, 2002; Peasnell, Pope, & Young, 2005; Roodposhti & Chashmi, 2011; Talbi, Omri, Guesmi, & Ftiti, 2015; Uadiale, 2012). In contrast, prior research examining how can a company's internal CG structure moderates the association between CED and EM is scarce (Sun et al., 2010). Thus, this study distinctively examines the crucial policy questions of why and how CG might moderate the link between CED and EM in developing economies?

Arguably, these weaknesses within the extant accounting literature limit our understanding of why and how a corporation's CED engagement might enhance or hinder the quality of its reported earnings, and whether internal CG arrangements can moderate the CED-EM nexus. Thus, our study contributes to the existing literature as follows. First, we provide a piece of new evidence on the CED-EM nexus from an under-researched developing context, namely Jordan. Second, we examine the potential effects of CG mechanisms on reducing earnings manipulations in Jordan. Third, our research investigates the expected moderating role of CG arrangements on the CED-EM nexus in Jordan.

Our objectives in this article are three-fold. First, we aim to examine the CED-EM nexus in an emerging economy. In stating our aim, we purport that companies, which are deemed to be environmentally responsible, in this case, by engaging in substantive CED practices, maybe engaging in corporate irresponsibility behaviors if they also perform EM simultaneously. Furthermore, by collecting our data from the Jordanian context, we also shift the focus of CED-to-EM studies to emerging economies, which have been much neglected in previous studies of a similar nature (Patten & Trompeter, 2003; Sun et al., 2010). Second, we aim to investigate the potential effects of CG structures in Jordan on CED-EM nexus from 2010 to 2014. In doing so, our findings can assist policymakers in assessing the effectiveness of CG mechanisms in reducing earnings manipulations after the 2009 CG reforms in Jordan. Finally, our study aims at extending the body of existing literature by examining the moderating role of CG on the link between CED and EM in developing economies that apply the UK voluntary style of CG on a "Comply-or-Explain" basis.

Our findings are three-fold. First, using a comprehensive CG, CED, and EM manually collected dataset, our results suggest that high-CED firms seemed to be less engaged in earnings manipulations. Second, we indicate that corporate compliance with good CG arrangement reduces, to an extent, firms' engagement in EM. Third, our study demonstrates that the negative impact of CED on EM when combined with CG is stronger than CED on its own, meaning that some CG structures have a moderating effect on the CED-EM nexus. Overall, our econometric models are robust to various types of endogeneities, in addition to alternative CG and CED proxies.

The remainder of this paper is designed as follows. Section 2 reviews the previous CG, CED and EM literature; Section 3 describes research design; Section 4 presents empirical results and robustness checks;

Section 5 concludes the main findings, limitation and recommendations.

## 2 | BACKGROUND, THEORY, EMPIRICAL LITERATURE REVIEW, AND HYPOTHESIS DEVELOPMENT

### 2.1 | Environmental regulations, reporting, and CG developments in Jordan

Jordan is located in the Middle East region and inhabited by about 9.53 million (Department of Statistics-Jordan, 2016). The Jordanian economy is characterized with inadequate supplies of natural resources (Al-Akra, Ali, & Marashdeh, 2009). Amman stock exchange (ASE) dated back to 1930 and considered an enormous stock exchange in the Middle East with 241 listed companies (Gerged, 2018).

The role of government in propagating mandatory corporate engagement in environmental responsibilities has changed in Jordan. For example, the Environmental Protection Law No.12 of 1995 has been amended by the Government in 2003 and accepted by both Houses of Parliament and King of Jordan in 2006 to enforce corporate adherence to various environmental responsibilities (Gerged, Cowton, & Beddewela, 2018). Likewise, in 2003, the Ministry of the Environment has introduced a new regulatory framework to contribute to sustainable development and to preserve the natural resources of Jordan (Bani Khalid, Kouhy, & Hassan, 2017). Similarly, the Jordan Environment Society (JES) was established in 1988 to protect the environment, and to collaborate with other parties to determine and tackle the environmental challenges (Al-Sharari, 2014). Corporate involvement in environmentally responsible behaviors has, nevertheless, remained as a part of a voluntary framework to achieve sustainable development in the country (Omar & Simon, 2011).

In 2009, new CG reforms were introduced in Jordan by ASE for listed companies to comply with (Al-Haddad & Whittington, 2019). The 2009 CG reforms in Jordan aims at (a) developing a regulatory framework to regulate the relationship between ASE and its listees; (b) defining rights, duties and responsibilities; and (c) safeguarding stakeholders' rights (JCGC, 2009). Though, as the CG code in Jordan is applied on a comply-or-explain basis, managers might still be tempted to manipulate the reported earnings (Al-Haddad & Whittington, 2019). Consequently, we believe that Jordan, as a developing country, offers an interesting setting in which to examine the expected moderating role of

CG on the CED-EM nexus after the introduction of the 2009 CG reforms.

We intriguingly shed light on Jordan as a part of the MENA region in which the structure of ownership is largely concentrated in large shareholders hands, and the investor protection degree is poorly rated (Al-Haddad & Whittington, 2019; Gerged, Matthews, & Elhaddad, 2020). For instance, as opposed to the traditional agency conflict in developed economies (i.e., the conflict of interests between shareholders and managers), in Jordan, it appears to be between minority and controlling shareholders (e.g., large block holders or companies) (Al-Haddad, Gerged, & Saidat, 2019). Given all what has been mentioned above, Jordan provides us with a unique context to investigate the extent to which EM activities can be influenced by CED and CG in emerging economies.

## 2.2 | Theoretical framework

Three theories can be effectively used as a rationale for the CG, CED, and EM links, namely the stakeholders' theory, agency theory, and legitimacy theory. Agency theory suggests that the information asymmetry issues that are related to the agent-principle association can offer opportunities for managers (the agents) to opportunistically serve their own interests rather than the interests of their shareholders (the principals) (Koch & Schmidt, 2010). Earnings manipulations, however, may trigger some negative consequences to management that can be imposed by powerful stakeholders (Desai, Hogan, & Wilkins, 2006; Zahra, Priem, & Rasheed, 2005). In an attempt, thus, to mitigate such possible penalties, managers have a tendency to compensate those stakeholders by publishing environmental information along with their compliance with CG provisions (Gargouri, Shabou, & Francoeur, 2010; Prior, Surroca, & Tribó, 2008). This means that companies with high levels of CED and adherence to CG provisions are unlikely to manipulate their reported earnings.

Stakeholders theory, on the other hand, proposes that managers consider stakeholders' goals in the decision-making process (Jensen, 1993; Lu & Abeysekera, 2017); thus, they might attempt to refrain from any ethically undesirable behaviours, such as EM, in consort with signifying an environmentally responsible image, in this case using CED, in order to avoid probable conflicts with key stakeholders (Kim et al., 2012). This implies that corporate engagement in CED is associated with compliance with good CG practices that are collectively expected to enhance the quality of reported earnings in order to manage the impression of influential stakeholders (Al-Haddad & Whittington, 2019).

Furthermore, legitimacy theory assumes that companies ought to carry out their economic activities in alignment with the expected societal norms and prospects (Shocker & Sethi, 1973). One of the basic tenets of the conventional legitimacy theory according to Archel, Husillos, Larrinaga, and Spence (2009) is that there exists between the business and the society, a social contract, whereby adherence endorses organizations to act with the "legitimacy" and authenticity required for the retention of its license to operate, likewise for the inexorable use of social resources (Deegan, 2002; Shocker & Sethi, 1973). Crucially, corporations engage in several environmental actions and use a number of strategies such as adherence to CG structures to obtain and maintain their legitimacy (Cho & Patten, 2007; Cohen, Dey, & Lys, 2008). From a legitimacy theory perspective, a company's engagement in CED can be attributed to better-reported earnings figures as a tool by which it can impact and manage a society's perception of a favorable image (Sun et al., 2010).

Following Sun et al. (2010), we use a multi-theoretical framework, which consists of agency theory, stakeholder's theory, and legitimacy theory, to formulate our hypotheses and interpret the emerging results.

## 2.3 | Empirical literature review and hypotheses development

Table 1 summarizes the efforts of prior researchers, most of which are examining various aspects related to CG, social and environmental disclosures and EM links. Previous studies seemed to have a number of shortages. First, a few studies focused on exploring the CSR/CED-EM nexus in the context of developed economies such as the US (Hong & Andersen, 2011; Kim et al., 2012; Liu et al., 2017; Patten & Trompeter, 2003; Yip et al., 2011), the UK (Sun et al., 2010), South Korea (Pyo & Lee, 2013), although fewer papers have recently investigated this association in developing economies, for example, Muttakin et al. (2015) in Bangladesh, Jordaan et al. (2018) in South Africa, Gerged, Al-Haddad, and Al-Hajri (2020) in Kuwait. Second, the majority of those studies have focused on examining the relationship between corporate social responsibility (CSR) and EM (Hong & Andersen, 2011; Jordaan et al., 2018; Kim et al., 2012; Muttakin et al., 2015; Prior et al., 2008; Pyo & Lee, 2013; Yip et al., 2011). For example, Yip et al. (2011) examined the association between CSR disclosure and EM among a sample of oil and food industries in the United States. This study suggests that SCR disclosure is negatively attributed to EM in the Oil and Gas industry, although a positive association has been documented in

**TABLE 1** Systematic review of previous studies

Authors	Objectives	Context	Results
<b>Panel A: CED-to-EM studies</b>			
Patten and Trompeter (2003)	Were among the first to examine the CED-EM relationship.	US	They found evidence that firms with higher levels of CED took less negative discretionary accruals, suggesting that managers believe that CED can be used as a tool for reducing a firm's exposure to political and social pressures.
Gerged, Al-Haddad, and Al-Hajri (2020)	This study investigates the association between corporate environmental disclosure (CED) and earnings management (EM).	Kuwait	The results are suggestive of a significant and negative relationship between CED and EM in Kuwait.
<b>Panel B: CSR/CSRD-to-EM studies</b>			
Prior et al. (2008)	It investigates whether CSR activities are used strategically by managers to hide their EM practices.	26 countries	The results revealed a positive relationship between social and environmental operations and EM practices.
Hong and Andersen (2011)	It used a sample of US non-financial firms to examine the relationship between CSR and EM.	US	Their results showed a negative relationship between a firm's CSR activities and EM.
Yip et al. (2011)	This research investigates the CSR-EM nexus using a sample of US-listed companies from both the food industry and the oil and gas industry.	US	Although they found a positive relationship between CSR and EM in the food industry, it was significantly negative in the oil and gas industry.
Kim et al. (2012)	This study investigates the CSR-EM nexus.	US	The study found that firms that appeared to be engaged in EM practices have exhibited lower levels of CSR, including CED practices.
Pyo and Lee (2013)	This paper examines the relationship between the level of CSR disclosure and earnings quality.	South Korea	The results show that firms with higher CSR activities have less discretionary accruals and more accounting conservatism.
Muttakin, Khan, and Azim (2015)	This paper aims to explore the relationship between CSR disclosures and earnings quality.	Bangladesh	Opportunistic motives drive earnings management by Bangladeshi companies.
Jordaan, De Klerk, and de Villiers (2018)	This article examines the relationship between CSR and EM nexus in South Africa.	South Africa	The findings suggest that companies with better CSR performance are highly likely to be engaged in EM.
<b>Panel C: CED, CG, and EM studies</b>			
Sun et al. (2010)	This paper examines the association between CED and EM and the impact of corporate governance (CG) mechanisms on that association.	UK	The paper finds no significant statistical association between various measures of discretionary accruals (DA) and environmental disclosure. The article also finds that some CG attributes affect the relationship between CER and EM.
<b>Panel D: CSR/CSRD, CG, and EM studies</b>			
Liu et al. (2017)	This study examines the impact of family involvement in corporate ownership, management, and/or governance upon the association between the disclosure of CSR activities and EM.	US	The results indicate an insignificant relationship between CSR disclosure and EM when family involvement is accounted for.

the food industries. Similarly, Kim et al. (2012) indicate that socially responsible companies are unlikely to engage in earnings manipulation through discretionary accruals in the United States. Likewise, Jordaan et al. (2018) point out that firms with more CSR disclosures are less engaged in earnings manipulations in South Africa.

In contrast, there is a little attention has been paid to assessing the CED-EM nexus (Gerged, Al-Haddad, & Al-Hajri, 2020; Patten & Trompeter, 2003). To the best of our knowledge, only Patten and Trompeter (2003) and most recently Gerged, Al-Haddad, and Al-Hajri (2020) provided empirical evidence on the association between CED and EM in the settings of the US and Kuwait, respectively. Third, only one study attempted to examine the moderating effect of CG on the CED-EM nexus in the context of the United Kingdom (Sun et al., 2010). Sun et al. (2010) indicated that some CG structures could affect the relationship between CED and EM.

Subsequently, our paper aims to address several weaknesses in the prior body of knowledge and extends the existing literature as follows. First, we empirically investigate how CED can affect EM in an under-researched developing setting that has recently experienced substantial regulatory changes and CG reforms, namely Jordan. Second, we distinctively assess the effectiveness of CG reforms of 2009 in Jordan in reducing corporate engagements in earnings manipulation from 2010 to 2014. Finally, we uniquely examine the moderating effect of CG internal mechanism on the association between CED and EM in Jordan. In other words, we explore the impact of CED on minimizing EM engagements at different levels of corporate compliance with CG internal mechanism in Jordan post the 2009 CG reforms. By doing so, we add to the extant debate about whether CG can moderate the CED-EM nexus. To the best of our knowledge, we offer the first empirical evidence on the potential moderating role of CG in the association between CED and EM in the settings of emerging economies.

In the next subsections, the research hypotheses will be developed based on the adopted theory, prior studies, and the institutional setting of Jordan.

## 2.4 | CED and the quality of reported earnings

Panel A of Table 1 presents the studies that have primarily focused on reviewing the CED-EM link (Patten & Trompeter, 2003; Gerged, Al-Haddad, & Al-Hajri, 2020). It summarizes that studies examining how CED impacts EM are very rare. For example, using data related to a sample of 40 US chemical firms, Patten and Trompeter (2003) found that CED is negatively associated

with discretionary accruals, where managers believe that CED can be used as a tool for reducing company's exposure to political and societal pressures. Likewise, Gerged, Al-Haddad, and Al-Hajri (2020) indicate a negative relationship between CED and EM in Kuwait, which implies that the managers of environmentally responsible companies, in this case through CED, are less likely to engage in EM practices in Kuwait. Theoretically, Gerged, Al-Haddad, and Al-Hajri (2020) state that companies with good CED engagement seemed to be more conservative in accounting decisions, providing more accurate earnings information to their stakeholders. This means that CED is driven by managers' motivations to be ethical, honest, and trustworthy in order to legitimize their activities and to enhance their survivability prospects.

Panel B of Table 1 shows previous CSR-to-EM studies (Hong & Andersen, 2011; Jordaan et al., 2018; Kim et al., 2012; Muttakin et al., 2015; Prior et al., 2008; Yip et al., 2011). For example, Prior et al. (2008) indicate a positive relationship between CSR and EM practices. However, Yip et al. (2011) report mixed results using a sample of US-listed firms from both the food industry and the oil and gas industry. On the other hand, Kim et al. (2012); Pyo and Lee (2013) and Jordaan et al. (2018) suggest that corporations with higher levels of CSR disclosure are unlikely to engage in earnings manipulations; thus, less likely to be a subject of scrutiny by influential stakeholders such as the Securities and Exchange Commission (SEC). Likewise, Shafai, Amran, and Ganesan (2018) conclude that corporations in Malaysia have employed CSR as an administrative entrenchment strategy against the managerial discretions cost, that is EM.

Theoretically, earnings manipulation might trigger negative consequences for corporate managers that might be imposed by influential stakeholders (Prior et al., 2008); so, managers may attempt to mitigate any potential penalties and try to compensate stakeholders by publishing information related to their environmental responsibility performance accompanied by reliable earnings figures as a policy to be perceived as ethically responsible (Gargouri et al., 2010). Accordingly, the first hypothesis to examine is:

**H1.** *Ceteris paribus, there is a statistically significant negative relationship between CED and EM.*

## 2.5 | The CG-EM nexus: The moderating impact of CG on the CED-EM connexion

Previous studies, specifically those conducted on developed economies suggest that compliance with good CG arrangements can positively contribute to minimizing

earnings manipulations and protecting the rights of shareholders (Habbash, 2010; Klein, 2002; Peasnell et al., 2005). Specific board attributes are related to a more active role of CG mechanisms in monitoring managers behavior when reporting earnings figures (El Diri, Lambrinouidakis, & Alhadab, 2020). In the current study, we attempt to investigate the effects of two types of CG arrangements (i.e., board and ownership structures) on (a) limiting EM engagement, and (b) on the relationship between CED and EM. For example, a large-sized board might lead to less corporate participation in earnings manipulations (Peasnell et al., 2005; Vafeas, 2000), as it is likely to comprise of more independent and experienced directors who can scrutinize managers activities.

Similarly, independent directors seem to have a strong motivation to act as experienced monitors effectively, and not to “collude” with managers to expropriate shareholders’ wealth for the reason that their value in the market is dependent on their performance as independent directors (Fama, 1980; Fama & Jensen, 1983). From a theoretical perspective, agency theory states that board independence can be seen as an effective CG mechanism in restricting “managerial opportunism” that is resulting from the separation of ownership and control (Al-Haddad & Whittington, 2019). The 2009 Jordanian CG Code (JCGC) recommends that at least one-third of members of the board of directors should be independent. Our study is, therefore, motivated to investigate the impact of having a third of independent directors on boards on minimizing the engagement in EM activities in Jordan after 2009, and how can independent directors affect the CED-EM nexus.

Likewise, prior studies document that firms whose CEO acts as the chairman of the board are likely to be a subject to enforcement actions by influential stakeholders for allegedly engaging in earnings manipulations (El Diri et al., 2020). For example, Klein (2002), Sarkar, Sarkar, and Sen (2008), Gulzar (2011), Roodposhti and Chashmi (2011), Soliman and Ragab (2014), Uwuigbe, Peter, and Oyeniyi (2014), Latif and Abdullah (2015); Iqbal, Khan, and Ahmed (2015); Al-Haddad and Whittington (2019) suggest that CEO-duality appeared to be positively associated with discretionary accruals manipulations. This implies that CEO-duality improves the CEO’s power and increases managerial discretion opportunities (Fama & Jensen’s, 1983; Jensen’s, 1993). In line with the 2009 JCGC, we assume that CEO-duality can weaken board independence, and lead to ineffective monitoring process in restraining managerial opportunism.

Morck, Shleifer, and Vishny (1988) believe that high levels of managerial ownership can provide managers with greater entrenchment, which means superior power and further opportunities to exercise their opportunistic

behavior. Consistent with the “Entrenchment Hypothesis,” managerial ownership can hypothetically lead to increasing earnings manipulations.

Additionally, foreign ownership can play a more significant role within CG structures because foreign investors have a higher power to monitor managers behavior than local investors (Young, Peng, Ahlstrom, Bruton, & Jiang, 2008). Prominent previous research argues that foreign investors require high-quality earnings information to avoid the expropriation risk of corporate resources (Al-Haddad & Whittington, 2019; Ben-Nasr, Boubakri, & Cosset, 2015; Guo, Huang, Zhang, & Zhou, 2015). In Jordan, there are no restrictions on foreign ownership percentage further to complete freedom of capital movement, and no taxes on capital gains (ILO, 2013). Notably, foreign investments are representative of 49% of the total market capitalization of the ASE (ASE Annual Report, 2015). This means that any CG failures in Jordan might have serious consequences far beyond emerging markets and the Middle East region. Given the fact that emerging markets become more integrated into the global economic system, foreign investors seem to be a major mechanism to monitor managerial opportunism in order to protect shareholders rights (Khanna & Palepu, 2000). Collectively, our second objective is to contribute to the existing literature by distinctively examining the CG-EM nexus, and thus the second central hypothesis to be tested is:

**H2.** *Ceteris paribus, there is a statistically significant negative relationship between the quality of internal CG mechanisms, as proxied by broad and ownership structures, and EM.*

Concerning the expected moderation effect of CG mechanisms on the CED-EM nexus, there is limited evidence on such an investigation (Gerged, Matthews, & Elheddad, 2020). For example, Liu et al. (2017) examined the impact of family involvement in corporate ownership, management, and/or governance upon the association between the disclosure of CSR activities and EM. The findings indicate an insignificant relationship between CSR and EM when family involvement is accounted for. More relatedly, Sun et al. (2010) investigated the association between CED and EM and the impact of CG on that association in the United Kingdom. This study concluded no significant statistical association between EM and CED, while some CG attributes found to be moderating the relationship between CED and EM. Our final objective is, therefore, to expand the existing body of studies by remarkably investigating how can corporate compliance with good CG arrangements affect the CED-



Description	2010	2011	2012	2013	2014	Pooled
Initial sample	251	251	251	251	251	1,255
Excluded						
Financial sector companies	(108)	(108)	(108)	(108)	(108)	(540)
Missing annual reports	(35)	(35)	(35)	(35)	(35)	(175)
Final sample	108	108	108	108	108	540

**TABLE 2** Sample selection procedure

EM nexus in the context of emerging economies, and thus the final hypothesis to be tested is:

**H3.** *Ceteris paribus, the higher (lower) the CG quality, the more (less) negative is the relationship between CED and EM.*

### 3 | RESEARCH DESIGN

#### 3.1 | Data and sample considerations

The population of our study is based on all non-financial firms listed on the ASE, with complete data for the years from 2010 to 2014. Mainly, the financial institutions were excluded from our sample for several reasons. First, financial firms are predominantly expected to have an indirect association with the environment (Thompson & Cowton, 2004). Second, the financial sector is heavily regulated as compared with non-financial sectors, which may differently influence its performance and reporting practices (Huang & Wang, 2015). Finally, excluding financial institutions is in line with prior studies, which similarly adopted such a strategy (Haniffa & Hudaib, 2006). We, therefore, focus on industrial and services corporations. The exclusion of the financial institutions resulted in a final sample of 100 firms (500 firm-year observations); 50 services companies and 50 industrial companies. Table 2 presents the sampling criteria of the current study.

We have combined various databases in order to examine our research questions. The predictor variable, outcome variable, moderator variables, and control variables have been primarily collected from companies' annual reports that published on the official website of the ASE, accompanied with Perfect Information Database, and Trade Mubasher Database.

#### 3.2 | Measures

Table 3 explains how the research variables have been operationally defined. In testing the research hypotheses, we divided our research into four stages. First, we measure CED in annual reports among a sample of Jordanian

listed firms from 2010 to 2014 using both unweighted and weighted disclosure indices. Second, we use the discretionary accruals as a proxy for the possible incidence of EM following Kothari et al. (2005). Third, we investigate (a) the association between CED and EM, and (b) the relationship between CG arrangements and EM using a set of panel data techniques. Fourth, we examine how CG mechanisms can affect the CED-EM nexus.

We use the environmental disclosure index (EDI) that has been recently developed by Gerged et al. (2018). The EDI includes a total of 55 environmental items, which are divided into five main sub-indices. These sub-indices are differently weighted as follows: environmental policy (5 items), pollution by product and process (22), energy (10), financial (7), and other environmental items (11).

The vast majority of previous EM literature (e.g., Bona-Sánchez, Pérez-Alemán, & Santana-Martín, 2011; Cohen & Zarowin, 2010; Gerged, Al-Haddad, & Al-Hajri, 2020; Guthrie & Sokolowsky, 2010; Hazarika, Karpoff, & Nahata, 2012; Lakhal, Aguir, Lakhal, & Malek, 2015; Lee & Masulis, 2011; Pelucio-Grecco, Geron, Grecco, & Lima, 2014; Rodríguez-Pérez & Van Hemmen, 2010; Sun, Liu, & Lan, 2011; Wilson & Wang, 2010) seems to employ discretionary accruals as a proxy for EM. Therefore, we detect earnings manipulations in Jordan by discretionary accruals estimated employing the model of Kothari et al. (2005). Kothari model applies similar drivers to the Modified (Jones, 1991) model (i.e., revenues and gross property, plant and equipment's) in order to estimate non-discretionary accruals and consequent residuals. Kothari model, nevertheless, highlights that the modified Jones seemed to exhibit a rise in discretionary accruals when a corporation is growing. For this reason, Kothari accounts for the return on assets (ROA) as a tactic to control for any extreme operating performances. The Kothari model is estimated cross-sectionally each year. Accordingly, the calculation of EM in line with the Kothari model is specified as follows:

$$\frac{TACC_{it}}{TA_{it-1}} = a_0 + \beta_1 \frac{1}{TA_{it-1}} + \beta_2 \frac{\Delta REV_{it} - \Delta REC_{it}}{TA_{it-1}} + \beta_3 \frac{PPE_{it}}{TA_{it-1}} + \beta_4 ROA_{(it \text{ or } it-1)} + \varepsilon_{it}$$

**TABLE 3** The operational definitions of research variables

Variable	Operational definition
<b>Dependent variable</b>	
EM	Earnings management measured by the absolute values of the residuals from the Kothari, Leone, and Wasley (2005) model.
<b>Independent variables</b>	
EDI	The total environmental disclosure score measured by the un-weighted environmental disclosure index.
WEDI	The applied EDI consists of 55 items cover five sub-indices. These indices have not equally weighted. Therefore, to check the robustness of the primary results to the weighting of the five categories of the EDI, we follow previous literature in constructing a weighted index. An alternative environmental disclosure index called WEDI was constructed, where equal weights of 20% have been awarded to each category.
EDI1	Environmental policy sub-index, which includes five environmental items out of 55 items included in the developed EDI.
EDI2	Environmental pollution sub-index, which includes 22 items out of 55 items included in the developed EDI.
EDI3	Environmental energy sub-index, which includes 10 out of 55 environmental items included in the developed EDI.
EDI4	Environmental, financial sub-index, which includes 7 out of 55 items included in the developed EDI.
EDI5	Environmental other sub-index, which includes 11 out of 55 items included in the developed EDI.
<b>Moderator variables</b>	
BIND	Board independence, equal to the proportion of independent directors on the board to the total number of directors on the board.
BSIZE	Board size, equal to a total number of directors on the board.
CEODUAL	CEO-duality is a dummy variable equals 1 if the same person holds CEO and the chairman positions, 0 otherwise.
MANGOW	Managerial ownership, equal to the proportion of shares owned by board members and their relatives to the total number of shares outstanding.
INSTITOW	Institutional ownership, equal to the proportion of common shares held by the institutions.
FOREOW	Foreign ownership, equal to the proportion of common shares held by the foreign investors (non-Jordanian).
LARGEST	The largest shareholder, equal to the proportion of common shares held by the largest shareholder who does not serve as an executive officer or director.
<b>Control variables</b>	
FSIZE	Firm size, equal to the natural log of total assets.
LEV	Leverage, measured as total liabilities scaled by total assets.
ROA	Return on assets, measured as net income divided by total assets.
MKTB	Market to book ratio.
BIG4	Dummy variable set one if the firm is audited by the big 4-audit firm, zero otherwise.

where,  $TACC_{it}$  is the total accruals computed as the company's net income before extraordinary items for the year less cash flows from operations, deflated by company's end of the year total assets,  $TA_{it-1}$  is the book value of total assets of firm  $i$  at the end of year  $t-1$ ,  $\Delta REV_{it}$  is sales revenues of firm  $i$  in year  $t$  fewer revenues in year  $t-1$ ,  $\Delta REC_{it}$  is the change in accounts receivables.  $PPE_{it}/TA_{it-1}$  is gross property, plant and equipment of firm  $i$  at the end of year  $t$  scaled by  $TA_{it-1}$ ,  $ROA_{it}$  is the return on assets, which is earnings before extraordinary items scaled by lagged total assets,  $\alpha \beta_1 \beta_2 \beta_3 \beta_4$  are estimated parameters, and  $\varepsilon_{it}$  is the residual that represents this study proxy for discretionary accruals. The absolute values of the residuals from applying Kothari model are used for multivariate regression analysis.

Following Bland and Altman (1997), we used Cronbach  $\alpha$  technique to evaluate the inter consistency and reliability of our EDI (Bland & Altman, 1997). The result is indicative of the  $\alpha$  value of .80, which is considered an acceptable level of reliability for the EDI (Bland & Altman, 1997).

Additionally, to address any possible endogeneities linking to omitted variables, we employ a set of firm-specific determinants to control for the investigated relationships (Gujarati, 2003; Wooldridge, 2010). The carefully chosen controls are the firm size (SIZE), leverage (LEV), market to book ratio (MKTB), profitability (ROA), and audit type (big4). We have chosen these control variables in agreement with prior studies (see Albitar et al., 2020; Al-Haddad & Whittington, 2019; Al-Haddad et al.,

2019; Crifo & Forget, 2015; Fifka, 2013; Gerged, Al-Haddad, & Al-Hajri, 2020; Gerged, Beddewela, & Cowton, 2020; Gerged, Matthews, & Elhaddad, 2020; Ntim, 2016).

### 3.3 | Analysis

Multivariate regression analyses the relationships between CED, CG, and EM, and if at all, an association exists, it describes the degree of significance. In line with prior CED, CG, and EM research (e.g., Gerged, Al-Haddad, & Al-Hajri, 2020; Harjoto, 2017; Kiesewetter & Manthey, 2017; Kim et al., 2012; Salem, Ezeani, Gerged, Usman, & Alqatamin, 2020), we employ an ordinary least squares (OLS) model as an estimation method, assuming that all associations are linear, and the data is normally distributed (Gujarati, 2003; Born & Breitung, 2016). According to Wagner (2005), OLS estimation is an effective method if (a) the errors unit was assumed to be identically and independently distributed, (b) the errors were homoscedastic hypothetically, and (c) the traditional linear regression assumptions were accomplished. This analysis is supplemented with conducting a random-effects model and a generalized method of moments (GMMs) model to address any concerns regarding the potential existence of firm-level heterogeneities and endogenities, respectively. The primary model can be stated as follows.

$$\begin{aligned}
 EM_{it} = & \beta_0 + \beta_1 EDI_{it} + \beta_2 BIND_{it} + \beta_3 BSIZE_{it} \\
 & + \beta_4 CEODUAL_{it} + \beta_5 MANGOW_{it} \\
 & + \beta_6 INSTITOW_{it} + \beta_7 FOREOW_{it} \\
 & + \beta_8 LARGEST_{it} + \beta_9 CONTROL_{it} \\
 & + \beta_{10} \text{Years Fixed Effects}_t + \varepsilon_{it}
 \end{aligned} \quad (1)$$

where EM is earnings management, EDI is an environmental disclosure index; BIND is board independence, BSIZE is board size, CEODUAL is CEO duality, MANGOW is managerial ownership, INSTITOW is institutional ownership, FOREOW is foreign ownership, LARGEST is the largest shareholder. CONTROLS are firm size (FSIZE), leverage (LEV), profitability (ROA), Market to book ration (MKTB), and finally, audit type (BIG4).

## 4 | EMPIRICAL ANALYSIS AND DISCUSSION

### 4.1 | Univariate analysis

Table 4 represents the descriptive statistics of the variables included in this study. The first row of Table 4

**TABLE 4** Descriptive statistics

Variable	Obs	<i>M</i>	<i>SD</i>	Min	Max
EM	540	0.197	0.096	0	0.492
BIND	540	0.383	0.232	0	1
BSIZE	540	8.09	2.18	5	13
CEODUAL	540	0.17	0.376	0	1
MANGOW	540	0.507	0.266	0	0.958
INSTITOW	540	0.445	0.262	0	0.95
FOREOW	540	0.163	0.202	0	0.905
LARGEST	540	0.356	0.213	0.087	0.95
EDI	540	0.094	0.062	0	0.309
WEDI	540	0.006	0.006	0	0.03
FSIZE	540	16.92	1.339	14.416	20.303
LEV	540	0.338	0.228	0.016	0.918
ROA	540	0.018	0.079	-0.236	0.167
MKTB	540	1.316	0.92	0.24	4.14
BIG4	540	0.378	0.485	0	1

Note: The variables are operationally defined in Table 3.

shows that the mean value of EM (0.197), which varies from a minimum of 0 to a maximum of 0.492 and its standard deviation is 0.096. Consistent with prior studies, such as Hayes (2009) Zang (2012) Kang and Kim (2012), Goh, Lee, and Lee (2013), Kuo, Ning, and Song (2014) Al-Haddad and Whittington (2019) Gerged, Al-Haddad, and Al-Hajri (2020) the mean value of EM proxy in this study is just about zero, suggesting that the model fit the data reasonably well. The EDI is also positive with a mean value of 0.094, which is very low, which means that CED is still at an early stage in Jordan. The standard deviation of EDI is 0.062. Further, the mean value of the weighted EDI (WEDI), an alternative measure of CED, is 0.006, with 0.006 standard deviations. The results of the univariate analysis are aligned with previous CSR/CED-to-EM studies (see Gerged, Al-Haddad, & Al-Hajri, 2020; Jordaan et al., 2018; Patten & Trompeter, 2003; Shafai et al., 2018; Sun et al., 2010).

For CG structures, Table 4 shows that the mean value of board independence (BIND) is 0.34, signifying that less than half of the sampled Jordanian listed companies are broadly in agreement with the recommendations of the ASE, which emphasize that at least one-third of the board members are independent directors. The mean value of board size (BSIZE) is 8.09, while the mean value of CEO duality (CEODUAL) is 0.17. This means that about 83% of our sampled firms comply with the JCGC requirements. Regarding ownership structures, Table 4 presents that the mean value of managerial ownership (MANGOW) is 0.507 (50.7%), which is very high

**TABLE 5** Matrix of correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1) EM	1.000														
(2) BIND	0.119	1.000													
(3) BSIZE	-0.116	-0.096	1.000												
(4) CEODUAL	-0.073	0.083	0.017	1.000											
(5) MANGOW	-0.095	-0.087	-0.016	-0.036	1.000										
(6) INSTITOW	-0.013	0.268	-0.064	-0.187	0.198	1.000									
(7) FOREOW	-0.074	0.112	-0.015	-0.039	0.124	0.272	1.000								
(8) LARGEST	0.107	0.054	-0.159	-0.152	0.167	0.334	0.096	1.000							
(9) EDI	-0.076	0.006	0.059	0.129	-0.211	-0.079	0.044	0.037	1.000						
(10) WEDI	0.349	0.033	-0.006	0.150	-0.203	-0.101	-0.089	0.028	0.630	1.000					
(11) FSIZE	-0.069	0.042	0.298	-0.076	0.033	0.193	0.199	0.131	-0.098	-0.053	1.000				
(12) LEV	0.115	0.041	-0.022	-0.103	-0.099	0.055	0.042	0.123	0.043	0.052	0.368	1.000			
(13) ROA	-0.087	-0.036	0.088	0.103	0.132	0.138	-0.035	0.067	-0.073	0.000	0.232	-0.254	1.000		
(14) MKTB	0.009	0.018	0.100	0.054	0.026	0.095	-0.114	0.159	0.140	0.181	0.046	0.181	0.040	1.000	
(15) BIG4	-0.014	0.186	0.202	-0.180	0.160	0.358	0.279	-0.015	-0.097	-0.092	0.340	0.115	-0.002	0.097	1.000

compared with other emerging economies. For example, Ali, Salleh, and Hassan (2008) reported a mean value of 9.9% for MANGOW in Malaysia, and of 10.7% in Saudi Arabia, as presented by Alghamdi (2012). Table 4, furthermore, shows that the institutional ownership (INSTITOW) is associated with a mean value of 37%, although foreign ownership (FOREOW) is of 17% (0.07) mean value. The average value of 17% for FOREOW is lower than the whole market proportion as a result of a high FOREOW in the finance sector that is excluded for comparability reasons. Additionally, the largest shareholder (LARGEST) has a mean value of (0.356) 36%, confirming a high level of concentration among the sampled Jordanian companies.

In addition, Table 4 shows a higher level of leverage (LEV) measured by total debt to total assets ratio in Jordan than other developed economies (Zalata & Roberts, 2016). Even though our sampled firms are characterized with a low-level of profitability measured by the ROA ratio compared with Korean firms, for instance (Kang & Kim, 2012), yet the market to book (MKTB) ratio is higher than the one reported by Goh et al. (2013) in the Korean context. Additionally, big four auditing companies (BIG4) have audited only 37% of the sampled Jordanian companies.

## 4.2 | Bivariate analysis

Table 5 shows the correlations matrix for the dependent and independent variables in order to test the assumption of multi-collinearity. It reports the coefficients of Pearson (parametric) correlation. The nature of Pearson coefficients suggests that any residual non-normal distribution in our research variables might be mild, and are also comparable to those stated by previous studies (e.g., Al-Haddad & Whittington, 2019; Gerged, Al-Haddad, & Al-Hajri, 2020; Goh et al., 2013; Hayes, 2009; Kang & Kim, 2012; Kuo et al., 2014; Zang, 2012). VIF has been tested separately, and the results show that multicollinearity does not appear to be a concern in explaining the regression results.

## 4.3 | Multivariate analysis

### 4.3.1 | CED and earnings management

Table 6 presents different sets of tests to examine the relationship between CED, CG arrangements, and earnings manipulations. The findings of conducting a multivariate regression analysis using an OLS estimation method, and supplemented by doing a random-effects model and a

GMM model are presented in  $p$  values on the basis of Newey and West standard errors, correcting for the impact of autocorrelation and heteroscedasticity issues. Multicollinearity should not be a severe statistical problem as the highest variance inflation factor (VIF) is 2.59. All four models of Table 6, whose adjusted  $R^2$  differ between .57 and .59, display a significant negative relationship between CED and EM, consistent with both our hypotheses and vigorous to the form of EDI used (either EDI or WEDI).

We run the first model to examine the impact of CED and CG structures on EM using OLS regression models. This type of regression helps to mitigate the problems of autocorrelation and heteroscedasticity effects (Gujarati, 2003; Wooldridge, 2013). The findings of model 1 of Table 6 show that CED has a significant negative effect on EM ( $-0.773^{***}$ ) at the 1% level of significance, which signifies that firms engaged in CED are less likely to engage in unethical behaviors such as EM in Jordan. In other words, environmentally *responsible* firms are not engaging in *irresponsible* behaviors such as EM practices. Our results, therefore, confirm the concept of corporate responsibility behaviors (i.e., more CED and less EM) among a sample of Jordanian companies. This means that H1 has been statistically supported. Our findings are consistent with those of previous studies (e.g., Gerged, Al-Haddad, & Al-Hajri, 2020; Patten & Trompeter, 2003; Sun et al., 2010) that have confirmed that companies with high CED practices are highly unlikely to manipulate their reported earnings. Theoretically, it appears that companies with good CED engagement tend to be conservative in accounting decisions, providing more accurate earnings information to their stakeholders (Gerged, Al-Haddad, & Al-Hajri, 2020). This means that CED is driven by managers' motivations to be ethical, honest, and trustworthy in order to legitimize their activities and enhance their survivability prospects (Kim et al., 2012).

As Table 3 shows, the applied EDI consists of 55 items cover five sub-indices are environmental policy (EDI1), pollution (EDI2), energy (EDI3), financial environmental category (EDI4), and others (EDI5). To check whether the negative association between the main EDI and EM proxy is driven by a particular category of these five sub-indices, we regress each one of these categories on EM individually (see Models 1–5 of Table 7). The results suggest that all the five sub-indices have been negatively associated with EM proxy in Jordan, which is in line with the main findings of examining the EDI-EM nexus. Specifically, EDI1, EDI2, EDI3, EDI4, and EDI5 have significant and negative relationships with EM at a 1% level of significance (i.e.,  $p = -0.785^{***}$ ,  $p = -0.914^{***}$ ,  $p = -0.914^{***}$ ,  $p = -0.554^{***}$ , and  $p = -0.928^{***}$ , respectively). In other words, corporate reporting on policy,

**TABLE 6** Environmental disclosure index and earnings management

Variable	Model1 (PooledOLS)	Model2 (RE)	Model3 (GMM)	Model4 (interaction)
BIND	0.335***	0.584***	0.874***	0.625***
BSIZE	0.003	0.007**	0.006	0.004
CEODUAL	-0.018	-0.007	0.026	0.002
MANGOW	-0.213***	-0.333***	-0.483***	-0.342***
INSTITOW	-0.082***	-0.088***	-0.113***	-0.029
FOREOW	0.113**	0.212***	0.210**	0.020
LARGEST	0.778***	0.845***	0.711***	0.270***
w_EDI	-0.773***	-0.777***	-0.330**	-0.209***
w_FSIZE	-0.009**	-0.008	-0.017	-0.008
w_LEV	0.019	-0.004	-0.030	-0.012
w_ROA	-0.010	-0.083	-0.010	-0.042
MKTB	0.009*	0.008	-0.001	0.008
BIG4	-0.005	-0.031**	-0.040	-0.022*
c.w_EDI#				
c.BIND				-0.178
c.w_EDI#				
c.BSIZE				0.125*
c.w_EDI#				
c.CEODUAL				-0.137
c.w_EDI#				
c.MANGOW				-0.107*
c.w_EDI#				
c.FOREOW				0.722
c.w_EDI#				
c.INSTITOW				-0.390***
c.w_EDI#				
c.LARGEST				-0.370***
EM			0.061*	
_cons	0.393***	0.279***	0.379	0.327
Observations	540	540	432	540
R <sup>2</sup>	.572	.558		.593
Year dummies	Yes	Yes		Yes
Firm dummies	Yes	Yes		Yes

Note: The research variables have been fully defined in Table 3.

\*Statistical significance at the 10%.

\*\*Statistical significance at the 5%.

\*\*\*Statistical significance at the 1%.

pollution, energy, financial, and other environmentally related information has led to reductions in managers' engagement in earnings manipulations among a sample of Jordanian listed firms. This implies that our main results are not sensitive to or driven by a specific type of environmental disclosure.

Given the fact that the five sub-indices of the EDI have not been equally weighted,<sup>1</sup> we check whether our primary results were sensitive to a WEDI. We, therefore, follow previous literature in constructing a WEDI (e.g., Gerged et al., 2018; Gerged, Al-Haddad, & Al-Hajri, 2020; Gerged, Beddewela, & Cowton, 2020; Gerged,

Variable	Model1	Model2	Model3	Model4	Model5
BIND	0.586***	0.586***	0.586***	0.586***	0.586***
BSIZE	0.008**	0.008**	0.008**	0.008**	0.008**
CEODUAL	-0.007	-0.007	-0.007	-0.007	-0.007
MANGOW	-0.336***	-0.336***	-0.336***	-0.336***	-0.336***
INSTITOW	-0.088***	-0.088***	-0.088***	-0.088***	-0.088***
FOREOW	0.213***	0.213***	0.213***	0.213***	0.213***
LARGEST	0.845***	0.845***	0.845***	0.845***	0.845***
w_FSIZE	-0.008	-0.008	-0.008	-0.008	-0.008
w_LEV	-0.004	-0.004	-0.004	-0.004	-0.004
w_ROA	-0.084	-0.084	-0.084	-0.084	-0.084
MKTB2	0.008	0.008	0.008	0.008	0.008
BIG4	-0.031**	-0.031**	-0.031**	-0.031**	-0.031**
EDI1	-0.785***				
EDI2		-0.914***			
EDI3			-0.940***		
EDI4				-0.554***	
EDI5					-0.928***
_cons	0.281***	0.281***	0.281***	0.281***	0.281***
Observations	540	540	540	540	540
R <sup>2</sup>	.532	.526	.536	.572	.549
Year dummies	Yes	Yes	Yes	Yes	Yes
Firm dummies	Yes	Yes	Yes	Yes	Yes

Note: The research variables have been fully defined in Table 3.

\*\*Statistical significance at the 5%.

\*\*\*Statistical significance at the 1%.

Matthews, & Elheddad, 2020; Ntim & Soobaroyen, 2013; Ntim, 2016). An alternative WEDI is constructed, where equal weights of 20% have been awarded to each of the five sub-indices. Model 1 of Table 8 shows the results of running an OLS regression model to examine the WEDI-EM nexus. The result indicates that WEDI is significantly and negatively associated with EM at a 1% level of significance ( $p = -0.221***$ ), which is consistent with the leading results presented in the Model 1 of Table 6. This means that our results have not been affected by weighting the five sub-indices differently.

Using the fixed-effects or random-effects estimations can address some statistical concerns that may not be tackled, employing OLS regression methods (Gujarati, 2003). Following Wooldridge (2010), we employ fixed-effects and random-effects techniques to control for unobservable firm heterogeneities over time that is likely to be constant, yet may affect the predictor-outcome nexus, which is probably not recognised by using OLS estimation method. The appropriateness of using a

TABLE 7 Environmental disclosure sub-indices and earnings management

random-effects rather than a fixed-effects estimation method was decided using the Hausman test, which confirmed that the unobserved firm-specific variables were significantly related to those of the other companies our sample. We found that the random-effects model is more appropriate than the fixed-effects model. Based on the random-effects model (model 2 in Table 6), there is a significant negative relationship between EDI and EM ( $p = -.777***$ ). Also, we found a negative and significant association between the weighted disclosure index (WEDI) and EM using a random-effects estimation (Refer to Model 2 of Table 8). This implies that the findings of running OLS methods, which were presented in Model 1 of Table 6, are not statistically affected by firm-level heterogeneities.

Remarkably, though not the focus of this study, the employed control variables have various effects on earnings manipulations in Jordan. For example, large-size firms (FSIZE) tend to be less engaged in earning manipulations, whereas MKTB is positively associated with EM. On the

**TABLE 8** Weighted environmental disclosure index and earnings management

Variable	Model1 (PooledOLS)	Model2 (RE)	Model3 (GMM)	Model4 (interaction)
BIND	0.586***	0.335***	0.874***	0.636***
BSIZE	0.008**	0.003	0.006	0.004
CEODUAL	-0.007	-0.018	0.026	0.001
MANGOW	-0.336***	-0.214***	-0.484***	-0.337***
INSTITOW	-0.088***	-0.082***	-0.113***	-0.033
FOREOW2	0.213***	0.113**	0.210**	0.020
LARGEST2	-0.845***	-0.779***	-0.714***	-0.776***
WEDI	-0.221***	-0.211***	-0.881**	-0.359***
w_FSIZE	-0.008	-0.009**	-0.018	-0.008
w_LEV	-0.004	0.020	-0.031	-0.013
w_ROA	-0.084	-0.011	-0.011	-0.041
MKTB2	0.008	0.009*	-0.001	0.008
BIG4	-0.031**	-0.005	-0.040	-0.022*
c.WEDI#				
c.BIND				-0.963
c.WEDI#				
c.BSIZE				0.162*
c.WEDI#				
c.CEODUAL				-0.963
c.WEDI#				
c.MANGOW				-0.188*
c.WEDI#				
c.FOREOW				0.244
c.WEDI#				
c.INSTITOW				-0.169*
c.WEDI#				
c.LARGEST				-0.220
EM			0.073*	
_cons	0.281***	0.394***	0.236**	0.236**
Observations	540	540	432	540
R <sup>2</sup>	.572	.566		.592
Year dummies	Yes	Yes		Yes
Firm dummies	Yes	Yes		Yes

Note: The research variables have been operationally defined in Table 3.

\*Statistical significance at the 10%.

\*\*Statistical significance at the 5%.

\*\*\*Statistical significance at the 1%.

other hand, profitability (ROA), leverage (DOA), and audit quality (big4) cannot predict EM in the context of our study (refer to Table 6). Our results in this regard are aligned with those of previous EM literature in emerging economies (e.g., Al-Haddad & Whittington, 2019; Gerged, Al-Haddad, & Al-Hajri, 2020).

### 4.3.2 | CG structures and earnings management

Model 1 of Table 6 suggests that compliance with the Jordanian Corporate Governance Code (JCGC) has a heterogeneous impact on corporate engagement in earnings



manipulations in that they might have either decreased or increased EM engagement in Jordan. This means that H2 has not been accepted. Specifically, BIND, FOREOW and LARGEST have significant positive relationships with EM ( $p = .335^{***}$ ,  $p = .113^{**}$  and  $p = .778^{***}$ ), respectively, whereas both of MANGOW and INSTITOW have a significant negative effect on EM ( $p = -.213^{***}$  and  $-p = .082^{***}$ ). On the contrary, we could not find any significant effects of both BSIZE and CEODUAL on EM.

As can be seen from Model 1 of Table 6, BIND is positively and significantly attributed to EM, suggesting that independent boards are unlikely to take control of earnings manipulation in Jordan. This result is in line with previous CG-to-EM studies such as Ge and Kim (2014), Sun and Liu (2016), and Al-Haddad and Whittington (2019). This positive coefficient is in line with the perspective of market pressure, which implies that stronger board governance is associated with a higher level of EM (Ge & Kim, 2014). In this regard, Osma (2008) suggest that managers might attempt to hide earnings-related information from the board in an effort to compromise the decision of independent directors. Also, the independence of directors in Jordan might be mostly questionable. For example, Al-Haddad and Whittington (2019) state that nepotism is a common factor affecting the appointment of board directors in Jordan. In line with the “Convergence of Interests’ Hypothesis,” MANGOW is found to be a useful CG mechanism in mitigating earnings manipulation in Jordan. This finding also confirms the findings of previous studies such as Ali et al. (2008); Klein (2002); Al-Haddad and Whittington (2019). With regard to the negative association between INSTITOW and EM, our finding is consistent with those of previous studies such as Roychowdhury (2006) and Zang (2012). This means that sophisticated INSTITOW in Jordan might have a greater capacity to analyze the managerial actions from a long-term perspective and deter managers from engaging in earnings manipulations.

Furthermore, Model 2 of Table 6 presents the results of estimating a Random-Effects model to investigate the CG-EM nexus. The results of running a random-effects regression model are consistent with the main results of using OLS regression in Model 1 of Table 6. Specifically, we found significant and negative effects of MANGOW and INSTITOW on earnings manipulations in Jordan. In contrast, the effects of BIND, BSIZE, FOREOW, LARGEST are positive on EM. In addition, there is no significant effect of CEODUAL on EM. The main findings of conducting a random-effects model are consistent with the finding of the OLS model. In other words, the effect of CG structure on earnings manipulations is

heterogeneous in that they might have either reduced or enhanced EM in Jordan. This implies that our results were not statistically affected by unobservable firm-level heterogeneities.

Our results, moreover, are in line with the results of those studies that have explored corporate compliance with CG arrangements voluntarily following the UK “comply-or-explain” compliance regime (e.g., Aguilera & Cuervo-Cazurra, 2009; Al-Haddad & Whittington, 2019; Cuervo-Cazurra & Dau, 2009; Filatotchev & Boyd, 2009), which emphasized the need for additional reforms. Compliance with CG mechanisms in Jordan is a voluntary type of practices because CG provisions are not primarily enforceable by law, and listed companies may not inevitably be responsible for being not compliant with a specific CG provision if they have provided a genuine explanation. Our findings suggest that implementing the JCGC voluntarily has yet to yield comprehensive reductions in EM in Jordan. This implies that introducing other mandatory enforcement arrangements for CG provisions, such as attaching CG provisions to listing rules for corporations to comply with, may result in reducing earnings manipulations for those well-governed firms in Jordan. This implication agrees with the findings of Low and Cowton (2004) that state that corporate compliance with CG codes may be subject to legal enforcement mechanisms.

#### 4.3.3 | The moderating effect of CG structures on the CED-EM nexus

To answer the third question in our study, we use the interaction of EDI with CG structures. More specifically, to determine the potential moderating effect of CG structures on the CED-EM nexus, Equation (1) is re-regressed with an inclusion of the EDI\*BIND, EDI\*FOREOW, EDI\*MANGOW, EDI\*INSTITOW, EDI\*BSIZE, EDI\*CEODUAL, and EDI\*LARGEST.

Observably, based on the interaction model, Table 6 model 4 shows a significant effect of MANGOW, INSTITOW, and BSIZE ownerships on the relationship between EDI and EM and consistent with the results of Sun et al. (2010), the coefficients of (EDI\* MANGOW), (EDI\*INSTITOW) and (BSIZE\*EDI) are significantly negative at 10 and 1% levels. This suggests that MANGOW, INSTITOW, and BSIZE moderate the relationship between EDI and EM; thus, firms with a higher percentage of MANGOW and INSTITOW and larger BSIZE tend to act ethically by reporting their environmental information along with accurate earnings figures simultaneously. In other words, some CG structures can enhance CED ability to explain variations in EM as compared with

examining the CED-EM nexus directly. This result suggests that H3 is empirically supported; thus, making a new important contribution to previous CED literature.

#### 4.3.4 | Additional sensitivity checks

Arellano and Bond (1991) claim that dynamic panel data methods perhaps are reliably estimated by applying random-effects and/or fixed-effects estimators only, where the regressor is, by nature, not firmly exogenous. Using the main proxies for CED (i.e., EDI and WEDI), CG structures (i.e., board and ownership structures), and EM (i.e., Kothari model), we, consequently, use a generalized method of moment (GMM) estimator as an additional sensitivity check to ensure that the principle findings of our study were not severely affected by the likely incidence of endogeneities.

Following previous literature (e.g., Adegbite, Guney, Kwabi, & Tahir, 2019; Gerged & Elheddad, 2020; Moumen, Othman, & Hussainey, 2015; Reguera-Alvarado, Blanco-Oliver, & Martín-Ruiz, 2016; Roberts & Whited, 2013; Ullah, Akhtar, & Zaefarian, 2018), we employ a two-step system GMM model as sensitivity check to address the potential occurrence of endogeneity problem arising from reverse causality association between CED and EM. Specifically, this research incorporates the lagged versions of past EM to differentiate between a “static” and a ‘dynamic’ panel data model. The specification of a two-step system GMM regression is shown in the following equation:

$$\begin{aligned} EM_{it} = & \alpha_0 + \beta_1 EM_{it-1} + \beta_2 EM_{it-2} + \beta_3 EDI_{it} + \beta_4 BIND_{it} \\ & + \beta_5 BSIZE_{it} + \beta_6 CEODUAL_{it} + \beta_7 MANGOW_{it} \\ & + \beta_8 INSTITOW_{it} + \beta_9 FOREOW_{it} + \beta_{10} LARGEST_{it} \\ & + \sum_{i=1}^n \beta_{10} CONTROLS_{it} + \mu_{it} + \varepsilon_{it} \end{aligned} \quad (2)$$

In Equation 2,  $EM_{it-1}$  indicates 1 year lag of the EM (previous year's EM), and  $EM_{it-2}$  represents a second lag of the EM (the dependent variable). These lagged values of the dependent variable are deemed as explanatory variables in the two-step GMM system. Roodman (2009) states that by including lags of the dependent variable (EM in this study), the 2-step GMM<sup>2</sup> estimation controls for endogeneity by transforming the data internally as a dependent variable's previous value is subtracted from its current value.

Model 3 of Table 6 and Model 3 of Table 8 present the findings of estimating the GMM models. Our results show that both EDI and WEDI still have a significant

and negative impact on EM at a 5% level of significance (refer to Model 3 of Tables 6 and 8). This means that our findings remain robust to endogeneity concerns.

In sum, our extra analyses make us fairly confident that the results do not suffer from any endogeneity problems, and are also not sensitive to alternative CED proxies.

## 5 | CONCLUSION

Despite theoretical arguments that boards and top management often drive the decision to engage in CED practices, though previous evidence on how and why CG mechanisms might moderate the CED-EM nexus is very rare. This study, thus, examines the vital subject of how and why a corporation's CED practices may be associated with its engagement in EM and consequently, whether CG structures can moderate this association in emerging economies.

Our findings suggest that CED is negatively associated with earnings manipulations, which signifies that firms engaged in CED are less likely to engage in EM in Jordan. Theoretically, high-CED companies seemed to be more conservative in accounting decisions, providing more accurate earnings information to their stakeholders. This means that CED is driven by managers' motivations to be ethical, honest, and trustworthy in order to legitimize their activities and to enhance their survival prospects (Kim et al., 2012). Furthermore, companies' compliance with the JCGC might have either reduced or enhanced EM engagement in Jordan. Our results emphasize the need for additional reforms as the JCGC of 2009 has yet to yield comprehensive reductions in EM in Jordan.

Additionally, some CG structures (i.e., BSIZE MANGOW, INSTITOW) have a moderating effect on the link between CED and EM in Jordan. The results are not sensitive to alternative measures for CED and CG variables, firm-level heterogeneity, and endogeneity problems.

Given the voluntary nature of CG regime on a “comply-or-explain” basis in Jordan and other emerging economies in the MENA region (see Gerged & Agwili, 2020; Gerged, Matthews, & Elheddad, 2020), our empirical findings reiterate the crucial need for more concerted efforts to be undertaken by the Jordanian government, the JSE and other national regulatory organizations, such as JES, to develop new enforcement arrangements for CG provisions that may lead to reducing earnings manipulations for those well-governed with high-CED firms in Jordan. Our empirical evidence can, therefore, help policymakers and corporate managers in other emerging

economies of a similar nature to the Jordanian context (i.e., voluntary CED and CG regimes, large ownership structures, controlling-to-minority shareholders agency types of conflicts), such as Egypt and Morocco, to effectively use CED practices as a tool aims to decrease EM engagements at higher levels of corporate compliance with CG arrangements.

Our results are rigorous and robust, whereas some limitations should be acknowledged. First, the CED, CG, and EM data were manually collected, which needed a lot of commitment in relation to time and therefore limited our focus to a sample of Jordanian listed companies. Further studies are recommended to extend this investigation beyond a single country setting to a cross-country setting such as the Middle East and North Africa (MENA) region. Second, although our CED indices are quantity and quality-oriented ones (weighted and unweighted), future researchers may improve this analysis by employing alternative CED and CG proxies (e.g., number of words/pages/sentences counted and CG index). Third, due to data limitations, the empirical examination is confined to internal CG structures. In the future, researchers are also recommended to offer new insights by investigating how and why external CG mechanisms such as national culture, laws, politics, and market forces can affect the CED-EM nexus in developed and developing countries.

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## CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

## HUMAN PARTICIPANTS

This article does not contain any studies involving human participants performed by any of the authors.

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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## ENDNOTES

<sup>1</sup> 5 environmental policy items (9%); 22 environmental pollution items (40%); 10 environmental energy items (18%); 7 environmental, financial items (13%) and 11 environmental others items (20%).

<sup>2</sup> We use the Sargan test and the Arellano–Bond tests as post-estimation to be able to determine the validity of the GMM models and whether the lags of EM in Equation 2 (i.e., the instruments) are correctly specified. The findings of conducting the two pre-estimation tests turn out to be insignificant, which implies that the included instruments in the GMM estimation are exogenous; thus, our instruments are proven to be valid.

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