Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

When Disclosure Reveals and Conceals: Differential Effects of Environmental, Social, and Governance Pillars on Earnings Management in Saudi Arabia's Vision 2030 Era

Fawwaz Alrwabdah
Universiti Sains Malaysia
Ahmad Alomari
Universiti Sains Malaysia
Awatif Alsheikh
ahsheikh@uqu.edu.sa

Umm al-Qura University
Warda Alsheikh
Umm al-Qura University

Article

Keywords: ESG disclosure, earnings management, environmental disclosure, corporate governance, profitability moderation, Saudi Arabia, Vision 2030, emerging markets

Posted Date: June 29th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-9861313/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

Additional Declarations: No competing interests reported.

When Disclosure Reveals and Conceals: Differential Effects of Environmental, Social, and Governance Pillars on Earnings Management in Saudi Arabia's Vision 2030 Era

Author names withheld for double-blind peer review

Author affiliations withheld for double-blind peer review

ABSTRACT

This paper investigates how the three pillars of environmental, social, and governance (ESG) disclosure differentially shape accrual-based earnings management (AEM) in Saudi Arabia's Vision 2030 era, and how firm profitability moderates these relationships. Using a balanced panel of 135 non-financial firms listed on the Saudi Stock Exchange (Tadawul) over 2016–2024 (1,215 firm-year observations), we estimate hierarchical fixed-effects regressions with Driscoll–Kraay standard errors. We document three findings that challenge the conventional aggregate ESG-AEM literature. First, governance disclosure operates as a substantive constraint on earnings management, while environmental disclosure operates as a camouflage mechanism that increases discretionary accruals; social disclosure shows no detectable effect, consistent with regulatory saturation. Second, profitability fundamentally reshapes these relationships: among unprofitable firms, environmental disclosure facilitates camouflage, but among profitable firms, the same disclosure transitions into a constraining mechanism—a sign reversal that occurs around a return-on-assets threshold of approximately five percent. Third, the governance constraining effect attenuates significantly following the October 2021 Tadawul ESG Disclosure Guidelines, suggesting that mandatory disclosure dilutes the informational value that previously distinguished voluntarily transparent firms. These findings cannot be detected when ESG is treated as an aggregate construct, and they reveal that the constraining-versus-camouflage debate that has long divided the disclosure literature is not a question of which mechanism prevails on average, but of which pillar is observed and under what firm-level conditions. The results carry implications for the design of disclosure regulation in emerging markets, where institutional reform agendas such as Vision 2030 increasingly shape corporate reporting practice.

Keywords: ESG disclosure; earnings management; environmental disclosure; corporate governance; profitability moderation; Saudi Arabia; Vision 2030; emerging markets
JEL classification: M41, G34, Q56, M48.

1. Introduction

The question of whether environmental, social, and governance (ESG) disclosure constrains or camouflages earnings management has divided the accounting literature for nearly two decades (Prior, Surroca, & Tribó, 2008); (Velte, 2024); (Mao & Lu, 2024). One strand of research, anchored in agency and stakeholder theory, predicts that firms with high-quality ESG disclosure also produce high-quality financial reports because both flow from the same underlying organizational culture of transparency and stakeholder responsiveness (Kim, Park, & Wier, 2012); (Gerged, Albitar, & Al-Haddad, 2023). Another strand, based on the camouflage hypothesis, argues the opposite: managers are likely to use ESG disclosure strategically as a "shield of reputation" to distract stakeholders from financial misreporting (Prior et al., 2008); (Martínez-Ferrero et al., 2016). The empirical literature has produced both sides to the argument, with findings showing a clear pattern of consistency by institutional context, firm-level moderators and the type of ESG measure used.

This paper proposes that the inconclusiveness of the literature is due to an aggregation issue. The constraining and camouflage effects can counteract each other in the same firm-year, resulting in weak or even counteracting average effects when the three pillars of ESG are combined into one composite score. But the pillars are not independent and cannot be substituted: each pillar is linked to a specific stakeholder relation, each is subject to a specific institutional logic, and each sends a specific signal to external observers. The disaggregation of the construct should show that each pillar has a different function.

This we examine in the institutional context of Saudi Arabia's reform era, Vision 2030. Saudi Arabia offers a very clean environment for three reasons. First, Vision 2030 has made ESG reporting a national-policy priority, which has resulted in significant differences in the level of disclosure across companies in a relatively small sample panel (Alshuwaikhat &

Mohammed, 2017); (Alessa, 2026); (Maswadi, Sindhu, Khan, & Hakami, 2025). Second, the Tadawul ESG Disclosure Guidelines (Saudi Stock Exchange, 2021) were introduced in October 2021 as a separate institutional change, which provides a way to examine whether the pillars' impacts are contingent on the nature of the disclosure (voluntary vs quasi-mandatory). Third, Saudi non-financial firms are highly heterogenous in profitability, as revealed by the previous literature as one of the key factors affecting the disclosure-reporting relationship (Mao & Lu, 2024).

We report the following three findings, using a balanced panel of 135 non-financial firms listed on Tadawul during 2016–2024 (1,215 firm-year observations) and a hierarchical Modified Jones model with Driscoll–Kraay standard errors. First, when the three pillars are entered jointly, the governance disclosure shows a strong constraining effect, whereas environmental disclosure shows the opposite—camouflage—effect and social disclosure shows no discernible effect on accrual-based earnings management. When ESG is viewed as an aggregate, this decomposition is not discernible. Second, profitability moderates the environmental and governance effects in theoretically distinct ways: the environmental coefficient is positive (camouflage) for less profitable firms and turns negative (constraining) for more profitable ones at an ROA threshold of around five percent, while the governance constraining effect weakens monotonically as profitability rises. Third, the governance effect is greatly reduced following 2021 Tadawul Guidelines, which suggests that the informational value of the voluntary disclosure of transparency of the firms was dampened by the mandatory disclosure.

These findings make a contribution to three literatures. First, they offer direct evidence regarding the constraining-versus-camouflage debate: they demonstrate that the debate is mis-specified at the overall level, both mechanisms act simultaneously on different pillars. Secondly, they add to the limited but growing research in emerging markets on disaggregated ESG effects (Boshnak, 2024); (Hashed & Ghaleb, 2023); (Mao & Lu, 2024) by documenting a moderation pattern as a function of the three pillars of ESG that has not been previously identified in the GCC context. Third, they demonstrate that the constraining effects of a pillar can be related to the voluntary nature of the pillar, which has implications for jurisdictions that are in the process of shifting toward mandatory regimes.

The rest of the paper goes as follows. The theoretical foundation is presented in Section 2, based on the agency theory, stakeholder theory, the camouflage hypothesis, legitimacy theory, the resource-based view and institutional theory. The global, emerging-market and Saudi-specific evidence is reviewed and the hypotheses are developed in Section 3. The research design is described in Section 4. The results are reported in Section 5. Section 6 presents the discussion, implications and limitations of the study. Section 7 concludes.

2. Theoretical Framework

The theories surrounding the relationship between ESG disclosure and accrual based earnings management have two opposing predictions, and theories appear in the empirical literature confirming that both positive and negative relationships would be observed, depending on the institutional context and firm level conditions being investigated (Velte, 2019); (Velte, 2024); (Christensen, Hail & Leuz, 2021). The three primary theories that underlie the hypotheses tested in this paper (agency, stakeholder, and camouflage) are presented along with three supporting theories (legitimacy, resource-based view and institutional) explaining why it is hypothesized that the relationship will be specified in a different way in the three ESG pillars and will depend on firm profitability. We call the combination of the applications the differential theory application, in that each pillar is theoretically viewed through the lens of the stakeholder relation to which it relates, and not through a single overarching logic.

2.1 Agency Theory and the Constraining Hypothesis

A disclosure-based rendition of the modern version of agency theory, suggested by Jensen and Meckling (1976) and expanded upon by Healy and Palepu (2001), views the firm as a nexus of contracts, and when ownership and control are separated, information asymmetries arise, which managers can exploit at the cost of other parties. One of the most widely researched forms of this agency problem is earnings management, which involves the use of accounting discretion to manipulate financial statements and thus misrepresent economic reality (Healy & Wahlen, 1999); (Dechow, Sloan, & Sweeney, 1995). Under the agency framework, disclosure carries a corrective function, as disclosure of a firm's actions, resources and risks increases their visibility to external parties and, consequently, reduces the information rents that the managers can capture and the discretion in financial reporting that managers can exercise (Bushman & Smith, 2001), (Leuz & Wysocki, 2016).

The agency-theoretic prediction of disclosure of ESG flows out of this logic directly. Each dimension of corporate behavior that becomes visible to outside parties through disclosure in the ESG framework is an additional dimension making it more costly to engage in opportunistic behavior by the managers. A manager who is required to publicly disclose information on board independence is less likely to appoint pliant directors who are willing to tolerate aggressive accounting; a manager who is required to disclose information relating to the charter of the audit committee and the qualifications of audit committee members is less likely to pressure the external auditor and cause it to acquiesce in opportunistic estimates; a manager who is required to disclose information about how executive compensation is tied to earnings is less likely to inflate earnings through discretionary accruals. Based on the agency theory, it can be predicted that ESG disclosure will inhibit earnings management.

This logic has been most extensively developed for the governance pillar of ESG, where the disclosure items map directly onto the agency-theoretic mechanisms that the disclosure is intended to mitigate (Beasley, 1996); (Klein, 2002); (Krishnan, 2005). The agency framework predicts, accordingly, that governance disclosure should exhibit the strongest constraining effect on earnings management among the three pillars.

2.2 Stakeholder Theory and Complementarity

Stakeholder theory (Freeman, 1984); (Donaldson & Preston, 1995) extends the agency framework by recognizing that the firm's long-term value depends on its relations with a broader set of constituencies than equity holders alone—employees, customers, suppliers, communities, regulators, and the natural environment. A firm that systematically deceives any of these stakeholders—whether through misleading environmental claims, misleading social disclosures, or misleading financial statements—risks reputational and operational sanctions that ultimately damage shareholder value (Eccles, Ioannou, & Serafeim, 2014); (Khan, Serafeim, & Yoon, 2016). The stakeholder framework therefore predicts a complementarity between the quality of ESG disclosure and the quality of financial disclosure: firms that have invested in transparent communication with non-financial stakeholders have also invested in the organizational culture, internal controls, and reputational concerns that produce transparent communication with financial stakeholders (Kim, Park, & Wier, 2012); (Gerged et al., 2023).

Under this complementarity logic, ESG disclosure should be negatively associated with earnings management across all three pillars. The prediction is strongest, however, for pillars where the stakeholder concerns are most acute and most visible: governance, where the relevant stakeholders include institutional investors and regulators who scrutinize financial reporting closely, and environmental, where the relevant stakeholders include environmental regulators and civil-society organizations whose scrutiny extends into the financial statements through the recognition and measurement of environmental liabilities (Clarkson, Li, Richardson, & Vasvari, 2008); (Cho & Patten, 2007).

2.3 The Camouflage Hypothesis

The camouflage hypothesis, introduced by Prior, Surroca, and Tribó (2008) and developed in subsequent work by Martínez-Ferrero, Banerjee, and García-Sánchez (2016), Hong and Andersen (2011), and Mao and Lu (2024), predicts the opposite of the constraining hypothesis. Under camouflage, managers who are engaging in earnings management have an incentive to invest in ESG disclosure precisely because it diverts stakeholder attention away from the financial reporting domain. A manager who knows that the firm's discretionary accruals are aggressive can offset the reputational risk by simultaneously cultivating the firm's image as an environmentally responsible, socially responsible, and well-governed corporate citizen. From this perspective, ESG disclosure and earnings management are complementary tools in the same impression-management portfolio, and we should observe a positive—not negative—association between them (Prior et al., 2008).

The camouflage logic is theoretically asymmetric across the three pillars. The pillars that lend themselves most readily to camouflage are those whose disclosures are most discretionary in content, least subject to external verification, and most rhetorically resonant with stakeholder concerns. Environmental disclosure satisfies all three criteria: in the absence of mandatory assurance, environmental disclosures can be selectively curated to emphasize favorable initiatives and omit unfavorable ones (Cho & Patten, 2007); (Hummel & Schlick, 2016); the technical complexity of environmental metrics reduces external verifiability; and the rhetorical resonance with climate concerns gives environmental claims disproportionate impression-management value (Mahoney, Thorne, Cecil, & LaGore, 2013). Governance disclosure, by contrast, is more difficult to camouflage with: the disclosure items are largely structural (board size, independence, committee composition, ownership concentration) and externally verifiable, leaving less scope for selective curation (Larcker, Richardson, & Tuna, 2007). Social disclosure occupies an intermediate position.

The camouflage hypothesis therefore predicts that the positive (camouflage) association with earnings management should be strongest for environmental disclosure, intermediate or null for social disclosure, and weakest or absent for governance disclosure. This pillar-specific asymmetry is one of the central testable implications of the differential theory application that we adopt in this paper.

2.4 Legitimacy Theory and Symbolic Disclosure

A third lens to view the ESG-earnings management relationship is legitimacy theory (Suchman, 1995); (Deegan, 2002); (Patten, 1992). According to legitimacy theory, companies report on ESG metrics mostly to validate their social license to operate—that is, to convince key and concerned stakeholder audiences that their behaviour is consistent with social norms and expectations. Importantly, legitimacy theory posits that the content of the disclosure may not be as significant as its rhetorical presentation—disclosures can be quite symbolic without necessarily involving substantive organizational change or the managing of affairs of business in the spirit of the disclosure (Meyer & Rowan, 1977); (Cho, Laine, Roberts, & Rodrigue, 2015).

There are direct consequences in the decoupling to the disclosure-reporting relation. If ESG disclosure is mostly symbolic, it is merely a gesture of meeting the prevailing expectations, no information can be gleaned from disclosure that reflects a

firm's financial reporting quality, thus no observable statistical relationship should exist between ESG disclosure and earnings management. This is the legitimacy framework's prediction, namely, a null effect of pillars that have reached maturity of disclosure, where disclosure is explicitly or implicitly required by norms. The social pillar, in the Saudi context, emerges as the top contender for this saturation effect; through extensive reporting by all companies, employee training, community engagement and customer relations show very little differentiation, and are therefore likely to be expected as a norm rather than a differentiator.

2.5 The Resource-Based View

Informed by the resource-based view (RBV) of the firm (Barney, 1991); (Wernerfelt, 1984); (Mutuc, Lee, & Tsai, 2019), ESG capabilities can be viewed as potentially valuable, rare, inimitable, and organizationally embedded resources that generate sustained competitive advantage. In disclosure literature, RBV serves as a channel connecting disclosure quality with reporting quality: if a firm has developed genuine ESG capabilities, then the same organizational machinery that generates credible ESG information also generates credible financial information, because both flow from the same underlying culture of transparency and responsiveness to stakeholders (Chen & Hung, 2021); (García-Sánchez, Hussain, & Martínez-Ferrero, 2019).

RBV can be especially helpful to differentiate substantive from symbolic disclosure. A firm that has invested in the capabilities that underlie the disclosure will disclose detailed and verifiable information; a firm that only has invested in the disclosure itself and not in the capabilities that underlie it will disclose information that is rhetorical and unverifiable. The empirical implication is that the disclosure-reporting relation is moderated by the disclosure's level of underlying capability that in turn is conditioned by the disclosure pillar, institutional context and the firm's conditions in which the disclosure is generated.

2.6 Institutional Theory

Institutional theory (DiMaggio & Powell, 1983); (Scott, 2008) states that the coercive (regulatory pressures), mimetic (uncertainty-induced mimicry) as well as the normative (professional norm-driven) pressures are the reasons why firms in the same institutional environment converge to the similar disclosure practices. Coercive pressure has increased significantly since the beginning of Vision 2030 in 2016 (Alshuwaikhat & Mohammed, 2017); (Maswadi et al., 2025), with the Capital Market Authority implementing a series of corporate governance and disclosure regulations to be completed over a number of years; mimetic pressure is due to the fact that Saudi companies are equating themselves with international ESG leaders in order to become attractive investment options for foreign capital after Tadawul was included in major emerging-market indices (Alessa, 2026); and normative pressure is driven by the rising number of ESG analysts, raters, and consultants operating in the region.

Based on institutional theory, two predictions are made pertinent to this paper. First, the ESG-earnings management relationship is likely to vary across regulatory regimes: in voluntary regimes, disclosure carries a stronger signaling value because high-disclosing firms self-select into transparency, while in mandatory regimes the signaling value is weaker because all firms are required to disclose regardless of their underlying transparency commitments (Christensen, Hail, & Leuz, 2021); (Grewal, Hauptmann, & Serafeim, 2021). Second, the connection between the pillars can also vary, with some pillars developing in institution-building more quickly than others: in Saudi Arabia, the governance pillar has experienced explicit regulatory changes since the Corporate Governance Regulation of 2017, with the environmental and social pillars developing at a slower pace with a more voluntary approach, until the Tadawul Guidelines of 2021.

2.7 Synthesis: The Differential Theory Application

The six frameworks reviewed above are not competing claims about a single underlying relationship; they are complementary lenses, each best suited to a particular pillar and a particular set of firm-level conditions. This paper takes the explicit theoretical position that the three ESG pillars are governed by distinct theoretical logics:

The governance pillar is best interpreted under the agency-theoretic constraining logic, because governance disclosures map directly onto the structural mechanisms that mitigate agency conflicts (board independence, audit quality, ownership transparency) and because these disclosures are largely externally verifiable, leaving little scope for camouflage.

The environmental pillar is best interpreted under the camouflage logic, because environmental disclosures are discretionary in content, technically complex, and rhetorically resonant—the three conditions that make them effective impression-management tools. The strength of the camouflage effect, however, depends on the firm's underlying capability and incentive structure, which the RBV and stakeholder frameworks suggest will be conditional on profitability.

The social pillar is best interpreted under the legitimacy/symbolic logic, because in the Saudi context social disclosure items (employee welfare, community engagement, customer relations) have become a normative baseline disclosed by nearly all firms, eliminating the cross-firm variation that would be necessary for the disclosure to function as either a constraining mechanism or a camouflage tool.

Across all three pillars, firm profitability operates as a substantive moderator. Under the camouflage logic, high-profitability firms have both the strongest incentive (career, compensation, valuation) and the strongest ability (slack resources to invest in elaborate disclosure) to deploy ESG as a reputational shield. Under the constraining logic, high-profitability firms face the

lowest pressure to manage earnings opportunistically and the highest scrutiny from sophisticated analysts and institutional investors. The two logics therefore generate opposing predictions about how the pillar effects should vary with profitability, and the hypotheses developed in Section 3 are explicit about which logic dominates for which pillar.

3. Literature Review and Hypothesis Development

Since the pioneering work in the late 2000s, research on the link between ESG (the predecessor to which was corporate social responsibility) and accrual-based earnings management has grown at an unprecedented pace, and the outcomes have been rather mixed (Velte, 2024); (Habbash & Haddad, 2020); (Salem, Metawe, Youssef, & Mohamed, 2021). Here, the evidence is reviewed in four parts: the global evidence base (3.1), the constraining-versus-camouflage tension (3.2), the Saudi-specific evidence and the regulatory context (3.3), and the disaggregated pillar evidence that drive our hypotheses (3.4). The hypotheses are then formalized in Section 3.5.

3.1 Global Evidence: The Constraining-Camouflage Tension

Prior, Surroca and Tribó (2008) have pioneered the idea of the "camouflage hypothesis" in a study comprising 26 countries and 593 companies and revealed the positive link between CSR scores and earnings management. This means that the authors believe that this is an indicator of how managers who resort to the practice of earning management invest in CSR to appease shareholders and other stakeholders. Further research has generated conflicting evidence. Using an updated international sample, Martínez-Ferrero, Banerjee and García-Sánchez (2016) confirm the Prior et al. finding. Conversely, Hong and Andersen (2011) report the exact opposite pattern, a negative correlation between CSR and earnings management in the USA, and they consider this a reflection of the constraining mechanism.

Kim, Park, and Wier (2012) find evidence of lower discretionary accruals in socially responsible firms, as well as a lower incidence of meeting the earnings benchmark by accrual manipulation and a lower incidence of investigations by the Securities and Exchange Commission for fraudulent reporting using a large sample of U.S. firms. With an international sample of 1,653 firms from 46 countries, Chih, Shen, and Kang (2008) observe a more complicated relation, as CSR is negatively related to earnings smoothing but positively related to earnings aggressiveness, indicating that the disclosure-reporting relation is not always constraining.

More recent meta-analytic and review research (Velte, 2019); (Velte, 2024); (Christensen, Hail, & Leuz, 2021) suggests that the dominant finding from the empirical literature is that both mechanisms (constraining and camouflage) are present, and it is a question of which one dominates in which situations. They consider the institutional environment (García-Sánchez, Hussain, & Martínez-Ferrero, 2019), the firm's ownership structure (Cho & Patten, 2007), profitability of the firm (Mao & Lu, 2024) and most importantly, the ESG pillar being studied (Velte, 2019); (Boshnak, 2024).

3.2 Emerging-Market and MENA/GCC Evidence

The literature about ESG-earnings management in emerging markets is more recent and regionally focused. In the context of Tunisian firms in the stock exchanges, Garfatta (2021) report that corporate social responsibility has a constraining effect on discretionary accruals, which is in line with the agency theory prediction. In a study of MENA firms, Salem, Metawe, Youssef and Mohamed (2021) conclude that the board characteristics moderate the constraining effect, as it is more pronounced in the independent boards. In the UK, Albitar, Hussainey, Kolade, and Gerged (2020) find evidence that the ESG disclosure performance enhances financial reporting quality, however depending on the ESG sub-categories.

The MENA/GCC evidence is more relevant to the current study. In a cross-border comparison of the earnings management practices of Yemeni and Saudi companies, Hashed and Ghaleb (2023) report that the quality of disclosure is correlated with the reduction of discretionary accruals in both firms, and that the impact of disclosure quality is higher in firms under more strict corporate governance reforms. In the context of Palestine, Aqabna, Aga and Jabari (2023) conclude that CSR disclosure is negatively related to both accrual and real earnings management. Analyzing 76 companies in nine Arab countries, Gerged, Albitar and Al-Haddad (2023) find that environmental disclosure has a stronger constraining effect on AEM than social disclosure, and that this asymmetry is amplified by board diversity. These findings prefigure the pillar-specific trend we report on the Saudi context.

3.3 Saudi Evidence and the Vision 2030 Context

The evidence on ESG and the conduct of earnings management is rather limited and has mostly surfaced in the last five years in Saudi Arabia. The basic Saudi study (Habbash and Haddad 2020) analyze 86 non-financial firms during 2014–2017 and find evidence that voluntary corporate social responsibility disclosure is negatively related with discretionary accruals in support of the constraining hypothesis. The authors argue that this result shows the initial impact of the Capital Market Authority's work to improve corporate governance, as well as the Vision 2030 programmes more generally. Almubarak, Chebbi, and Ammer

(2023) build upon this evidence by studying the moderating role of the board characteristics in which they conclude that the constraining effect is more pronounced in firms with more independent boards and larger audit committees.

The most recent and most disaggregated Saudi evidence comes from Boshnak (2024), who investigates the individual impacts of environmental, social, and governance disclosure on earnings management in 100 Saudi non-financial corporations in 2018–2022. The following facts make the Boshnak study especially relevant to this paper: the governance pillar shows a strong constraining effect; the environmental pillar shows a weaker and not necessarily constraining effect; and the social pillar, the average effect is not constraining. These findings align broadly with those of the differential theory application we present in Section 2, and the present study expands upon these by exploring the moderating role of profitability and the institutional change in the year of the Tadawul Guidelines 2021.

The present study is ongoing in the institutional environment of Vision 2030. In April 2016, Vision 2030 was launched (Alshuwaikhat & Mohammed, 2017) and embodies a complete economic-transformation plan where ESG considerations (environmental sustainability, social development, and governance modernization) are not values attached as appendages but core values. The Saudi Stock Exchange's (Tadawul) Tadawul ESG Disclosure Guidelines (2021) put the implementation of the Vision 2030 agenda in the corporate sector into action by outlining disclosure requirements that are voluntary but strongly encouraged in 40 disclosure items based on the GRI disclosure framework. The Guidelines are not a hard requirement for listed companies, but due to regulatory signaling, institutional-investor pressures due to Tadawul's listing in the MSCI Emerging Market Index, and benchmarking effects from the various ESG rating systems, it is now a quasi-mandatory framework. The Guidelines are formally voluntary but, as mentioned, it has become a quasi-mandatory framework due to regulatory signaling, institutional-investor pressures after Tadawul's listing on MSCI Emerging Market Index, and benchmarking pressure from the proliferation of ESG ratings (Alessa, 2026); (Maswadi et al., 2025).

No previous Saudi study has analyzed the moderating influence of profitability on the pillar-specific ESG-earnings management link nor formally tested for changes to the pillar effects around the Tadawul Guidelines that took place in 2021. Both gaps are the subject of the present paper.

3.4 Disaggregated Pillar Evidence and the Profitability Moderator

In the last five years, the literature on the individual effects of ESG has developed quickly and in a disconnected manner. In a German study, Velte (2019) reports that the governance pillar has the highest negative effect on earnings management followed by the environmental pillar, and the social pillar has the lowest negative effect. In an upcoming study with European data, Samaan, Khalil, Hassan and Mostafa (2026) confirm the above-mentioned governance dominance effect, and they report on a second effect: the environmental disclosure effect is not linear in firm size.

Drawing on the analysis of Chinese listed firms, Mao and Lu (2024) present the main result which underlies our profitability-moderator hypothesis: the environmental pillar is found to be positively (camouflage) associated with earnings management in high-profitability firms and is not significantly associated with or even negatively (constraining) associated with earnings management in low-profitability firms. This result suggests that high-ROA firms do both have the incentive and the means to use environmental disclosure as a reputational shield through career considerations and pressure on compensation, as well as through having slack resources to invest in environmental disclosure. This paper investigates whether the same profitability-moderated pattern holds in the Saudi context, and whether it also extends to the governance pillar.

The profitability-moderation hypothesis is supported by three other studies. In the UK, the disclosure-reporting relationship can be traced to the firms' financial slack, with a stronger relationship in resource-constrained firms, as reported by Albitar et al. (2020). In an international sample, García-Sánchez, Hussain, and Martínez-Ferrero (2019) discover that the camouflage mechanism is focused in firms that have high abnormal compensation, which they consider proxy for managerial incentives to manage earnings. In a German study, Hummel and Schlick (2016) report that the quality of environmental disclosure is positively linked to the environmental performance of the firm—and only if the firm has the environmental capability—indicating that environmental disclosure without environmental capability is essentially symbolic.

3.5 Hypothesis Development

The theoretical synthesis (Section 2) and three empirical literature reviews (Sections 3.1–3.4) prompt three sets of hypotheses emerging from Baron and Kenny's (1986) hierarchical moderation model. The first set breaks down the direct impact of the three pillars of ESG on the management of earnings (H1a–H1c). The second assumes that the direct effects of profitability are a moderator with respect to earnings management (H2). H3a–H3c are the hypotheses regarding the interactive effect of the pillars with profitability.

3.5.1 Direct Pillar Effects on Earnings Management

The differential theory application, built in Section 2.7, assumes that the three pillars act according to three different logics. The governance disclosure, which are mostly externally verifiable structural components based on the agency theory, should have a constraining (negative) impact on earnings management. This forecast is underpinned by the Saudi-specific evidence (Habbash

& Haddad, 2020); (Almubarak et al., 2023); (Boshnak, 2024) as well as by evidence collected from emerging markets (Hashed & Ghaleb, 2023); (Gerged et al., 2023). The hypothesis follows:

H1a. Environmental disclosure is positively associated with accrual-based earnings management in Saudi non-financial firms, consistent with the camouflage hypothesis.

H1b. Social disclosure exhibits no significant association with accrual-based earnings management in Saudi non-financial firms, consistent with the legitimacy/symbolic disclosure hypothesis.

H1c. Governance disclosure is negatively associated with accrual-based earnings management in Saudi non-financial firms, consistent with the agency-theoretic constraining hypothesis.

The central empirical claim of the differential theory application is that the three pillars are not a single average effect, but a set of pillars with each having a unique logic and functioning through a unique channel.

3.5.2 The Moderator: Profitability and Accrual Quality

Profitability has been a key factor in the earnings management literature in relation to accrual-based reporting decisions. Healy and Wahlen (1999) and Kothari, Leone, and Wasley (2005) argue that high profitability firms have less need to mask poor economic performance in their reported results, thus have lower incentives to manipulate results upward to meet the benchmark, while low profitability firms are under greater pressure to potentially inflate earnings. The central claim that is found in the recent literature is that firms with high ROA have lower absolute discretionary accruals (Dechow et al., 1995); (Salem et al., 2021).

Additionally, to identify the direct effect of profitability, it is a necessary intermediate step in the hierarchical moderation framework: the moderator's principal effect should be tested before assessing the moderator's interactive effect with the focal independent variables (Baron & Kenny, 1986). The hypothesis is:

H2. Firm profitability (return on assets) is negatively associated with accrual-based earnings management in Saudi non-financial firms during 2016–2024.

3.5.3 Pillar–Profitability Interactions

The predictions are interactive and complete the hierarchical moderation framework. The camouflage logic of Section 2.3 would suggest that the positive association (camouflage) between the environmental pillar and earnings management be the most pronounced in unprofitable companies, which have the greatest incentive to use the reputational shields. On its face, the Mao and Lu (2024) finding that the environmental-camouflage association focuses on high-ROA Chinese firms is the opposite prediction. We suggest that the Chinese context is quite different from the Saudi context because the regulatory context is more binding than the market mechanism on the managerial action, such that the companies with high ROA will resort to environmental disclosure to act as a buffer from the regulatory scrutiny. In Saudi Arabia, the binding constraint is increasingly market-based through institutional investor scrutiny after MSCI inclusion, with high-ROA firms attracting the greatest analyst attention, which narrows opportunities for camouflage and pushes the environmental pillar toward a constraining role in profitable firms.

This argument also results in a prediction regarding positive and negative signs: that the environmental coefficient is positive (camouflage) for the unprofitable firms and negative (constraining) for the profitable firms. Formally:

H3a. The association between environmental disclosure and accrual-based earnings management is moderated by firm profitability, transitioning from positive (camouflage) in unprofitable firms to negative (constraining) in profitable firms.

The agency-theoretic logic implies a uniformly constraining effect for the governance pillar, but the magnitude of the effect should vary based on the firm's fundamental agency-conflict level. Agency conflict pressures are lower as their performance is easily observed, and the influence on manipulating earnings is less (Kothari et al., 2005). The governance disclosure constraint is therefore expected to be less binding in profitable firms (not that governance is less binding, rather, how constraining it is is less important given that the problem being addressed is less severe). This is a moderation on the strength of the effect, NOT on the direction of the effect. Formally:

H3b. The constraining association between governance disclosure and accrual-based earnings management weakens as firm profitability increases.

The legitimacy/symbolic-disclosure framework discussed in Section 2.4 implies that there should be no main effect and no moderation for the social pillar because the disclosure has become a baseline, and has lost its informativeness in terms of real corporate practice. Formally:

H3c. The association between social disclosure and accrual-based earnings management is not significantly moderated by firm profitability.

H1a–H1c, H2 and H3a–H3c as a whole represent a comprehensive hierarchical moderation system that operationalises the differential theory application on all the three ESG pillars. The institutional change associated with the October 2021 Tadawul ESG Disclosure Guidelines is tested as a robustness analysis (Section 5.5) and not as a key hypothesis as the main moderator in the hierarchical specification is profitability and not the regulatory regime. The institutional-theoretic framework from Section

2.6 also makes a second empirical prediction that we test: that the pillar effects should be weaker in the quasi-mandatory regime because the signaling power of disclosure is reduced by the fact that everybody complies.

4. Research Design

This section sets out the empirical strategy used to test the three sets of hypotheses developed in Section 3. We describe the sample and data sources (4.1), the construction of the dependent, independent, moderator, and control variables (4.2), the three nested hierarchical model specifications and the underlying Modified Jones first-stage estimation (4.3), the estimation strategy including the diagnostic decision tree and the endogeneity testing protocol (4.4), and the two robustness checks (4.5).

4.1 Sample and Data

The sample consists of all non-financial firms continuously listed on the Saudi Stock Exchange (Tadawul) over the period 2015–2024. We restrict the sample to non-financial firms because the Modified Jones model is calibrated for non-financial accruals and produces unreliable estimates for financial intermediaries whose accrual structures differ fundamentally from industrial and service firms (Dechow et al., 1995); (Kothari et al., 2005). The 2015 observations are retained only to construct the first-difference variables (Δ revenue, lagged total assets) required by the Modified Jones model; the analytical sample for hypothesis testing covers 2016–2024 (nine years).

The final sample comprises 135 firms—51 industrial firms and 84 services firms—for a total of 1,215 firm-year observations. The panel is strongly balanced: every firm has nine years of observations over 2016–2024. The sample period spans both the pre-reform voluntary regime (2016–2020) and the post-reform quasi-mandatory regime (2021–2024) following the October 2021 Tadawul ESG Disclosure Guidelines, with five years of observations in each sub-period.

Financial data—total assets, total revenues, net income, total debt, property/plant/equipment, accounts receivable, and current asset and liability components used in the Modified Jones first-stage regressions—are obtained from S&P Capital IQ. The ESG disclosure data are self-constructed from each firm's annual reports and standalone sustainability or governance reports for each firm-year, using a 40-item disclosure index aligned with the Global Reporting Initiative (GRI) standards. The 40 items are distributed across the three pillars—environmental (E), social (S), and governance (G)—and are coded as binary indicators (1 if disclosed, 0 otherwise). Pillar-specific scores are computed as the sum of disclosed items divided by the total items in the pillar; the aggregate ESG score is the equally weighted mean of the three pillar scores.

4.2 Variable Construction

The variable architecture comprises four layers: a dependent variable measuring earnings management, an independent variable measuring ESG disclosure (with its three pillar decompositions), a moderator variable measuring firm profitability, and three control variables capturing firm characteristics established by the prior literature as correlates of discretionary accruals.

4.2.1 Dependent Variable: Accrual-Based Earnings Management

Accrual-based earnings management is measured as the absolute value of discretionary accruals estimated using the Modified Jones model of Dechow, Sloan, and Sweeney (1995). The first-stage regression of total accruals on the standard Modified Jones determinants is estimated separately for each industry-year cell (industrial vs. services in each of the nine years), yielding 18 cross-sectional regressions. Total accruals are computed as the change in non-cash current assets minus the change in current liabilities (excluding short-term debt and tax payable) minus depreciation expense. The Modified Jones specification regresses total accruals scaled by lagged total assets on the inverse of lagged total assets (to capture the constant term), the change in revenues net of the change in receivables scaled by lagged total assets, and gross property/plant/equipment scaled by lagged total assets. Discretionary accruals are the residuals from these industry-year regressions, and absolute discretionary accruals are the focal dependent variable.

The absolute-value transformation captures both income-increasing and income-decreasing manipulation symmetrically, consistent with the directionally neutral framing of the hypotheses (Kothari, Leone, & Wasley, 2005). The 18 industry-year regressions each have at least 51 observations (industrial sector) or 84 observations (services sector), well above the minimum-observation threshold of ten typically applied in the literature. Absolute discretionary accruals are winsorized at the 1st and 99th percentiles to limit the influence of extreme observations, following standard practice (Kothari et al., 2005); (Roychowdhury, 2006).

4.2.2 Independent Variable: ESG Disclosure and Pillar Decomposition

The aggregate ESG disclosure score is the equally weighted mean of the three pillar scores. The environmental (E) pillar score is the proportion of GRI-aligned environmental items disclosed; the social (S) pillar score is the proportion of GRI-aligned social items disclosed; the governance (G) pillar score is the proportion of GRI-aligned governance items disclosed. All four scores are bounded by construction within the [0, 1] interval and are not subjected to winsorization, since the boundedness of the construct precludes the outliers that winsorization is designed to address.

The empirical specification (Section 4.3) uses the three pillar scores entered jointly rather than the aggregate ESG score. This combined-pillar approach has two methodological advantages. First, it permits the differential pillar effects predicted by the differential theory application to be identified separately, which is impossible when the pillars are collapsed into an aggregate. Second, by absorbing the shared variance among the three pillars, the combined specification isolates the unique contribution of each pillar net of the others, providing cleaner identification of the pillar-specific coefficients than would the corresponding single-pillar regressions. We report single-pillar specifications in the robustness analysis (Section 5.5) to confirm that the qualitative direction of the pillar effects is preserved across specifications.

4.2.3 Moderator Variable: Firm Profitability

Firm profitability is measured by return on assets (ROA), defined as net income divided by total assets. ROA enters the empirical models as the substantive moderator of the pillar-earnings management relationships (H3a–H3c), with a direct main effect specified in Model 2 (H2). ROA is winsorized at the 1st and 99th percentiles to limit the influence of firms with unusually small denominators or non-recurring extraordinary items.

4.2.4 Control Variables

Three controls capture firm characteristics established by the earnings management literature as correlates of discretionary accruals. Firm size (SIZE) is measured as the natural logarithm of total assets and is not winsorized, since the logarithmic transformation by construction mitigates outlier influence. Leverage (LEV) is measured as total debt divided by total assets and is winsorized at the 1st and 99th percentiles. Revenue growth (GROWTH) is measured as the percentage change in total revenues from the prior year and is winsorized at the 1st and 99th percentiles. The control set is intentionally parsimonious to avoid over-fitting and to preserve degrees of freedom in the highly interactive Model 3 specification; alternative control specifications are examined in the robustness analysis.

4.2.5 Mean-Centering of Focal Variables

All four focal variables (E, S, G, ROA) are mean-centered prior to entry into the regression models. Mean-centering serves two purposes. First, it eliminates the artifactual multicollinearity between the pillar variables and their interaction terms with ROA, ensuring that the variance inflation factors for the interaction-augmented Model 3 remain well below conventional thresholds (Aiken & West, 1991); (Dawson, 2014). Second, it makes the pillar main-effect coefficients in Model 3 interpretable as the average pillar effect across the sample, rather than as the pillar effect at the (uninterpretable) ROA = 0 reference point that would obtain under uncentered specification. The interaction terms are constructed as the product of the mean-centered pillar score and the mean-centered ROA, ensuring orthogonality between the interaction and its constituent main effects.

4.3 Model Specifications

The hypotheses are tested using three nested model specifications estimated hierarchically, following the moderation-analysis framework of Baron and Kenny (1986). The three models share a common base of controls and fixed effects and differ in the inclusion of the moderator's direct effect (Model 2) and the pillar×ROA interaction terms (Model 3). The hierarchical specification permits inference on both the moderator main effect (the ROA coefficient in Model 2, addressing H2) and the interaction effects (the pillar×ROA coefficients in Model 3, addressing H3a–H3c), each conditional on the prior nested specification.

Model 1 (H1a–H1c — pillar baseline). The baseline specification regresses absolute discretionary accruals on the three mean-centered ESG pillar scores and the three controls, with year fixed effects to absorb common macroeconomic shocks:

$$|DA_{it}| = \beta_0 + \beta_1 E_c_{it} + \beta_2 S_c_{it} + \beta_3 G_c_{it} + \beta_4 SIZE_{it} + \beta_5 LEV_{it} + \beta_6 GROWTH_{it} + \lambda_t + \varepsilon_{it} \quad (1)$$

The coefficients of interest are β_1, β_2, and β_3, which test H1a ($\beta_1 > 0$, environmental camouflage), H1b ($\beta_2 \approx 0$, social null), and H1c ($\beta_3 < 0$, governance constraining), respectively.

ROA is excluded from Model 1 to preserve its role as the substantive moderator introduced in Models 2 and 3, consistent with the hierarchical moderation framework in which the moderator is introduced sequentially after the focal independent variables (Baron & Kenny, 1986).

Model 2 (H2 — moderator direct effect). The second model extends Model 1 by adding the moderator (mean-centered ROA) as a direct effect on the dependent variable, holding the controls and year fixed effects constant. This step is the second stage of the hierarchical moderation analysis and is required before introducing the interaction terms in Model 3:

$$|DA_{it}| = \beta_0 + \beta_1 E_c_{it} + \beta_2 S_c_{it} + \beta_3 G_c_{it} + \beta_4 ROA_{it} + \beta_5 SIZE_{it} + \beta_6 LEV_{it} + \beta_7 GROWTH_{it} + \lambda_t + \varepsilon_{it} \quad (2)$$

The coefficient of interest is β_4; H2 predicts $\beta_4 < 0$ (profitability constrains accrual-based earnings management directly).

Model 3 (H3a–H3c — interactive moderation). The third model extends Model 2 by adding the three pillar×ROA interaction terms, completing the hierarchical moderation specification:

$$\begin{aligned} |DA_{it}| = {} & \beta_0 + \beta_1 E_c_{it} + \beta_2 S_c_{it} + \beta_3 G_c_{it} + \beta_4 ROA_{it} \\ & + \beta_5 (E_c \times ROA)_{it} + \beta_6 (S_c \times ROA)_{it} + \beta_7 (G_c \times ROA)_{it} \\ & + \beta_8 SIZE_{it} + \beta_9 LEV_{it} + \beta_{10} GROWTH_{it} + \lambda_t + \varepsilon_{it} \end{aligned} \tag{3}$$

The coefficients of interest are β_5, β_6, and β_7, which test H3a ($\beta_5 < 0$, sign reversal of environmental effect at high ROA), H3b ($\beta_7 > 0$, weakening of governance constraining effect at high ROA), and H3c ($\beta_6 \approx 0$, no social moderation), respectively.

The joint significance of the three interaction terms is also tested.

4.4 Estimation Strategy

The estimation strategy is conditional on the outcomes of a sequence of diagnostic tests conducted on the Model 1 baseline specification, with the final estimator and standard-error structure determined by the test results. Once the estimation strategy is selected based on Model 1 diagnostics, the same estimator and standard-error structure are applied uniformly across Models 1, 2, and 3 to preserve the comparability required by the hierarchical specification (Cohen, Cohen, West, & Aiken, 2003).

4.4.1 Diagnostic Decision Tree

Five diagnostic tests are conducted in sequence: (i) the Breusch–Pagan Lagrange multiplier test (Breusch & Pagan, 1980) of pooled OLS against random effects, to determine whether the panel structure is statistically justified; (ii) the Hausman (1978) test of fixed effects against random effects; (iii) the modified Wald test (Greene, 2018) for groupwise heteroskedasticity; (iv) the Wooldridge (2002) test for first-order autocorrelation in panel residuals; and (v) the Pesaran (2004) cross-sectional dependence (CD) test. The test outcomes determine the final specification: panel structure confirmation justifies the use of panel methods; the Hausman result selects between fixed and random effects; the modified Wald, Wooldridge, and Pesaran results determine the appropriate standard-error structure (cluster-robust, Newey–West-style, or Driscoll–Kraay, respectively).

4.4.2 Endogeneity Testing Protocol

Each of the three ESG pillars is subjected to a Durbin–Wu–Hausman endogeneity test (Hausman, 1978); (Wooldridge, 2010) using two instruments. The first instrument is the one-period lag of the mean-centered pillar score (e.g., $L.E_c$ for the environmental pillar), which satisfies the exclusion restriction under the standard argument that earnings management in period t cannot causally affect the firm's ESG disclosure in period $t-1$. The second instrument is the leave-one-out industry-year mean of the mean-centered pillar score, motivated by the mimetic isomorphism argument of DiMaggio and Powell (1983): peer firms' disclosure intensity affects the focal firm's disclosure through institutional pressures without directly affecting the focal firm's discretionary accruals. The test reports the Kleibergen–Paap first-stage F-statistic for instrument strength, the Hansen J-statistic for overidentification, and the DWH statistic for endogeneity. The decision rule is: if the DWH test rejects exogeneity at the 5 percent level, the pillar is treated as endogenous and IV/2SLS estimates are reported as the primary results for that pillar; if the test fails to reject exogeneity, the OLS results are reported as the primary results.

4.5 Robustness Checks

Two robustness analyses are reported in Section 5.5. First, Models 1–3 are re-estimated with the institutional-shift specification augmented to include a *POST* dummy (equal to 1 for years ≥ 2021) and the three *POST*×pillar interaction terms, to test whether the pillar effects shift around the October 2021 Tadawul ESG Disclosure Guidelines. The institutional-theoretic prediction (Section 2.6) is that the constraining value of disclosure should be diluted in the quasi-mandatory regime, particularly for the governance pillar that has been the focus of the regulatory reform. Second, Models 1–3 are re-estimated with each pillar entered separately rather than jointly, to confirm that the qualitative direction of the pillar effects is preserved across the single-pillar and joint specifications. The COVID-19 shock years (2020–2021) are not excluded as a separate robustness check because the year fixed effects already absorb the average pandemic-related variation in discretionary accruals across firms.

Together, the three nested hierarchical specifications, the endogeneity-conditional choice of estimator, and the two robustness checks constitute the empirical apparatus through which the seven hypotheses are tested. The results of these tests are reported in Section 5.

5. Results

This section reports the empirical results in five parts. Section 5.1 presents the descriptive statistics of the variables and the pairwise Pearson correlations. Section 5.2 reports the results of the five diagnostic tests that motivate the choice of estimator and

standard-error structure. Section 5.3 reports the three nested main-results models (M1, M2, M3) together with the hierarchical incremental-F tests and the Durbin–Wu–Hausman endogeneity tests for each of the three pillars. Section 5.4 visualizes the moderation effects through marginal-effect and predicted-value plots. Section 5.5 reports the two robustness analyses: the institutional-shift specification (Model 4) and the single-pillar specifications.

5.1 Descriptive Statistics and Correlations

The analytical sample includes 1,215 firm-year observations for 135 non-financial firms that are listed on Tadawul continuously during the period 2016–2024. Table 1 presents the descriptive statistics of the dependent variable, the three ESG pillars and the aggregate score (focal independent variables), the profitability moderator, and the three control variables. There are a number of patterns to note. First, the average value of absolute discretionary accruals is 0.085 and their standard deviation is 0.118, suggesting a high level of heterogeneity in the intensity of earnings management across firms and years. Second, the three pillar scores have good mean values in the [0, 1] interval (mean E = 0.51, mean S = 0.50, mean G = 0.53) and sufficient cross-firm variation (standard deviations range from 0.12 to 0.14). This is important as it precludes the ceiling-effect problem that would have occurred if disclosure had reached near unity. Third, the mean of ROA is 0.034 and the standard deviation is 0.075, which means that the distribution of ROA is not only loss making and profitable firms, but also a distribution with sufficient variation to allow the identification of a moderation effect.

Table 1. Descriptive statistics of variables ($N = 1{,}215$ firm-year observations)

Variable	Mean	SD	Min	p25	Median	p75	Max
|DA| (winsorized)	0.085	0.118	0.000	0.022	0.052	0.107	0.851
ESG (aggregate)	0.514	0.117	0.150	0.433	0.517	0.600	0.875
E (Environmental)	0.510	0.135	0.083	0.417	0.500	0.583	0.917
S (Social)	0.504	0.119	0.143	0.429	0.500	0.571	0.857
G (Governance)	0.527	0.129	0.118	0.412	0.529	0.647	0.882
ROA (winsorized)	0.034	0.075	−0.213	−0.003	0.035	0.075	0.252
SIZE (log assets)	21.42	1.518	17.82	20.43	21.35	22.39	26.06
LEV (winsorized)	0.219	0.182	0.000	0.054	0.196	0.341	0.787
GROWTH (winsorized)	0.078	0.298	−0.756	−0.054	0.060	0.183	1.521

Notes. |DA| is the absolute value of discretionary accruals from the industry-year Modified Jones model (Dechow, Sloan, & Sweeney, 1995). ESG, E, S, and G are pillar-specific disclosure scores constructed from a 40-item GRI-aligned checklist applied to each firm-year annual report. ROA, LEV, and GROWTH are winsorized at the 1st and 99th percentiles. SIZE is the natural logarithm of total assets and is not winsorized.

Table 2 reports the pairwise Pearson correlation matrix among the focal variables. Two features deserve attention. First, the three ESG pillars are positively correlated with one another in the range 0.45–0.55, reflecting the shared organizational characteristics that drive ESG disclosure broadly. These correlations are well below the multicollinearity threshold of 0.80 (Hair, Black, Babin, & Anderson, 2018) and produce variance inflation factors below 2.5 in the Combined Model 3 specification (reported in Section 5.3). Second, the correlation between |DA| and each pillar is consistent with the differential-theory prediction: positive but small for E ($r = 0.04$), near zero for S ($r = -0.01$), and negative for G ($r = -0.11$). The bivariate correlation between |DA| and ROA is also negative ($r = -0.18$), consistent with the H2 prediction.

Table 2. Pearson correlation matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) |DA|	1.00							
(2) E	0.04	1.00						
(3) S	−0.01	0.49***	1.00					
(4) G	−0.11***	0.51***	0.55***	1.00				
(5) ROA	−0.18***	0.06**	0.04	0.07**	1.00			
(6) SIZE	−0.09***	0.31***	0.28***	0.36***	0.12***	1.00		
(7) LEV	0.13***	0.05*	0.02	0.04	−0.21***	0.18***	1.00	
(8) GROWTH	0.05*	−0.01	−0.02	−0.01	0.27***	0.04	0.02	1.00

Notes. The matrix reports pairwise Pearson correlation coefficients. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

5.2 Panel Diagnostic Tests

Table 3 reports the results of the five diagnostic tests conducted on the Model 1 specification to determine the appropriate estimator and standard-error structure. The Breusch–Pagan Lagrange multiplier test rejects the null of homogeneous unobserved heterogeneity ($\chi^2 = 351.44$, $p < 0.001$), confirming that the panel structure is statistically warranted and ruling out pooled OLS. The Hausman test rejects the null of zero correlation between the unobserved firm effect and the regressors ($\chi^2 = 21.79$, $p = 0.001$), selecting fixed effects over random effects. The modified Wald test rejects the null of groupwise homoskedasticity by an extreme margin ($\chi^2 = 47{,}938$, $p < 0.001$), confirming that the residual variance differs across firms and requiring heteroskedasticity-robust standard errors. The Wooldridge test fails to reject the null of no first-order autocorrelation ($F = 0.033$, $p = 0.855$), indicating that the temporal correlation of residuals is not a significant concern. Finally, the Pesaran cross-sectional dependence test rejects the null of cross-sectionally independent residuals (CD $= 2.907$, $p = 0.004$), indicating that the residuals are correlated across firms within each year—consistent with the presence of common macroeconomic and policy shocks that affect Saudi-listed firms simultaneously.

Taken together, the five tests motivate the selection of fixed effects with year dummies as the structural specification and Driscoll–Kraay (1998) standard errors as the standard-error structure. Driscoll–Kraay standard errors are robust to all three pathologies identified by the diagnostic tests: heteroskedasticity, autocorrelation up to the chosen lag (we use the default lag of 2), and cross-sectional dependence (Hoechle, 2007). They are the standard choice in panel-econometric work confronting the constellation of pathologies that the Saudi sample exhibits.

Table 3. Panel diagnostic tests on Model 1 specification

Test	Null hypothesis (H_0)	Statistic	p-value	Decision
Breusch–Pagan LM	Pooled OLS adequate	$\chi^2 = 351.44$	< 0.001	Reject H_0; use panel
Hausman	RE preferred over FE	$\chi^2 = 21.79$	0.001	Reject H_0; use FE
Modified Wald	Homoskedasticity	$\chi^2 = 47{,}938$	< 0.001	Reject H_0; robust SE
Wooldridge	No autocorrelation	$F = 0.033$	0.855	Fail to reject
Pesaran CD	Cross-sectional indep.	CD $= 2.907$	0.004	Reject H_0; DK SE

Notes. All tests applied to the Model 1 specification with *E_c*, *S_c*, *G_c*, and controls. DK SE = Driscoll–Kraay standard errors with maximum lag = 2 (Driscoll & Kraay, 1998); (Hoechle, 2007).

5.3 Main Results: Hierarchical Combined-Pillar Models

Table 4 reports the central results of the paper: the three nested hierarchical models with all three ESG pillars entered jointly, year fixed effects, and Driscoll–Kraay standard errors. The models are estimated on the full sample of 1,215 firm-year observations. The progression from Model 1 to Model 3 implements the hierarchical moderation framework of Baron and Kenny (1986): Model 1 establishes the pillar baseline; Model 2 adds the profitability moderator as a direct effect; Model 3 adds the three pillar×profitability interactions to complete the moderation specification.

5.3.1 Pillar Direct Effects (H1a–H1c)

Model 1 reveals the central asymmetry across the three pillars. The environmental coefficient is positive and significant ($\beta = 0.035$, $p = 0.015$), supporting H1a (camouflage hypothesis). The social coefficient is small and insignificant ($\beta = 0.006$, $p = 0.625$), supporting H1b (legitimacy/symbolic hypothesis). The governance coefficient is negative and highly significant ($\beta = -0.072$, $p = 0.001$), supporting H1c (constraining hypothesis). The three pillar coefficients are jointly significant ($F = 13.82$, $p = 0.002$), confirming that the joint inclusion is statistically warranted and that the three pillars carry distinct information about earnings management.

The magnitudes are economically meaningful. A one-standard-deviation increase in environmental disclosure (0.135) is associated with a 0.005 increase in absolute discretionary accruals ($0.035 \times 0.135 = 0.0047$), corresponding to a 5.6% increase relative to the sample mean of $|DA|$ (0.085). A one-standard-deviation increase in governance disclosure (0.129) is associated with a 0.009 decrease in absolute discretionary accruals ($-0.072 \times 0.129 = -0.0093$), corresponding to a 10.9% decrease relative to the mean. The governance constraining effect is approximately twice the magnitude of the environmental camouflage effect, consistent with the prediction that the governance pillar carries the most direct mapping onto agency-conflict mitigation mechanisms (Section 2.1).

5.3.2 Profitability Direct Effect (H2)

Model 2 introduces ROA as a direct effect. The ROA coefficient is negative and significant ($\beta = -0.131$, $p = 0.007$), supporting H2 (profitability constrains earnings management directly). A one-standard-deviation increase in ROA (0.075) is associated with a 0.010 decrease in absolute discretionary accruals (-0.131×0.075), or 11.7% relative to the sample mean. The introduction

of ROA does not materially alter the three pillar coefficients (E: $0.035 \rightarrow 0.034$; S: $0.006 \rightarrow 0.003$; G: $-0.072 \rightarrow -0.071$), indicating that the pillar effects are orthogonal to the profitability main effect. The incremental F-test confirms that adding ROA significantly improves the model ($F = 12.81$, $p = 0.007$).

5.3.3 Pillar–Profitability Interactions (H3a–H3c)

Model 3 introduces the three pillar×ROA interaction terms. The environmental×ROA coefficient is large, negative, and highly significant ($\beta = -0.936$, $p < 0.001$), supporting H3a (sign-reversal of environmental effect at high profitability). The governance×ROA coefficient is positive and significant ($\beta = 0.995$, $p = 0.042$), supporting H3b (weakening of governance constraining effect at high profitability). The social×ROA coefficient is insignificant ($\beta = 0.102$, $p = 0.612$), supporting H3c (no social moderation). The three interactions are jointly significant ($F = 27.05$, $p < 0.001$), confirming that the moderation structure is statistically supported as a system, not merely through individual coefficients.

The economic interpretation of the interactions is best conveyed graphically (Section 5.4), but it can be summarized algebraically. The estimated marginal effect of the environmental pillar at any given ROA value is approximately $0.067 - 1.020 \times \text{ROA}$, which equals zero at ROA ≈ 0.066 (i.e., at a return on assets of approximately 6.6%). Below this threshold, the environmental pillar is associated with higher discretionary accruals (camouflage); above this threshold, it is associated with lower discretionary accruals (constraining). The estimated marginal effect of the governance pillar at any given ROA value is approximately $-0.088 + 0.233 \times \text{ROA}$, which remains negative across the full ROA range but attenuates from -0.13 at ROA $= -0.20$ to -0.03 at ROA $= +0.25$. The two interactions therefore tell theoretically distinct stories: the environmental pillar reverses sign, while the governance pillar attenuates in magnitude but preserves direction.

Table 4. Main results: Hierarchical combined-pillar models with Driscoll–Kraay standard errors

Variable	Model 1	Model 2	Model 3
E_c	0.035** (0.011)	0.034** (0.012)	0.032** (0.011)
S_c	0.006 (0.011)	0.003 (0.012)	0.005 (0.014)
G_c	−0.072*** (0.014)	−0.071*** (0.014)	−0.067*** (0.016)
ROA_c	—	−0.131*** (0.037)	−0.118** (0.036)
E_c × *ROA_c*	—	—	−0.936*** (0.110)
S_c × *ROA_c*	—	—	0.102 (0.194)
G_c × *ROA_c*	—	—	0.995** (0.411)
SIZE	−0.056* (0.027)	−0.053* (0.028)	−0.048 (0.028)
LEV	−0.142*** (0.031)	−0.142*** (0.033)	−0.134*** (0.029)
GROWTH	0.006 (0.006)	0.009 (0.007)	0.008 (0.006)
Year FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
N	1,215	1,215	1,215
Firms	135	135	135
Within R^2	0.079	0.084	0.100
F-statistic	37.62***	62.28***	1,569.42***

Notes. Dependent variable: |DA| (absolute discretionary accruals, winsorized). Pillar scores and ROA are mean-centered. Driscoll–Kraay (1998) standard errors in parentheses (maximum lag = 2). *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$. Joint F-tests on interaction terms in Model 3: pillars (E, S, G) $F = 13.82$, $p = 0.002$; ROA addition $F = 12.81$, $p = 0.007$; interaction set (E×ROA, S×ROA, G×ROA) $F = 27.05$, $p < 0.001$.

5.3.4 Variance Inflation and Hierarchical Validity

The hierarchical moderation framework requires that the interaction terms not be artifactually inflated by multicollinearity with their constituent main effects. Mean-centering of the pillar scores and ROA, combined with the construction of the interaction terms as products of the mean-centered components, ensures orthogonality between the main and interactive components (Aiken & West, 1991). Variance inflation factors in the Model 3 specification are all below 2.5 (mean VIF = 1.31), well below the conventional threshold of 10 (Hair et al., 2018) and even below the stricter threshold of 5 recommended by O'Brien (2007) for moderation analyses. The hierarchical specification is therefore not compromised by multicollinearity.

5.3.5 Endogeneity Tests

Table 5 reports the Durbin–Wu–Hausman endogeneity test results for each of the three pillars, with the corresponding first-stage strength and overidentification diagnostics. Two instruments are used for each pillar: the one-period lag of the mean-centered pillar score and the leave-one-out industry-year mean of the pillar score (Section 4.4.2). The first-stage F-statistics are all well

above the Stock–Yogo (2005) weak-instrument threshold of 19.93 for the 10% maximal IV size (130.58 for E, 77.54 for G, 71.70 for S), indicating strong instruments. The Hansen J overidentification tests fail to reject the null of valid instruments for all three pillars ($p = 0.954$ for E, $p = 0.052$ for G—marginally non-rejected—and $p = 0.550$ for S). Most importantly, the Durbin–Wu–Hausman test fails to reject exogeneity for all three pillars ($p = 0.784$ for E, $p = 0.672$ for G, $p = 0.919$ for S). The OLS coefficients reported in Table 4 are therefore consistent and efficient; instrumental-variable estimation is not required.

Table 5. Durbin–Wu–Hausman endogeneity tests by pillar

Pillar	First-stage F	Stock–Yogo (10%)	Hansen J p	DWH χ^2 (p)	Conclusion
E (Environmental)	130.58	19.93	0.954	0.075 (0.784)	Exogenous
G (Governance)	77.54	19.93	0.052	0.179 (0.672)	Exogenous
S (Social)	71.70	19.93	0.550	0.010 (0.919)	Exogenous

Notes. Each pillar tested separately. Instruments: one-period lag of mean-centered pillar score (*L.E_c*, *L.G_c*, *L.S_c*) and leave-one-out industry-year mean (*E_iv_indmean*, *G_iv_indmean*, *S_iv_indmean*). First-stage F-statistics computed using the Stata `xtivreg2` routine. The Stock–Yogo (2005) 10% maximal IV size threshold for a single endogenous regressor with two instruments is 19.93. Hansen J p-values above 0.10 indicate valid instruments. DWH p-values above 0.05 indicate failure to reject exogeneity of the focal pillar.

5.4 Visualization of the Moderation Effects

Figure 1 visualizes the marginal effects of the environmental and governance pillars across the empirical range of ROA. The plots are computed from the Model 3 estimates re-specified using factor-variable notation (`c.E_c##c.ROA_c` and `c.G_c##c.ROA_c`) and the `reghdfe` estimator with firm-clustered standard errors, which is the only configuration in Stata that supports the post-estimation `margins` command. The Driscoll–Kraay coefficients reported in Table 4 and the `reghdfe` coefficients used for the `marginsplot` are qualitatively identical; the small numerical differences reflect the different standard-error structures and do not affect the interpretation of the moderation.

The top panel of Figure 1 plots the marginal effect of environmental disclosure on absolute discretionary accruals ($\mathrm{d}y/\mathrm{d}E$) across ROA values from -0.20 to $+0.25$, with 95% confidence bands. The marginal effect is large and positive at low ROA ($+0.27$ at ROA $= -0.20$), declines monotonically as ROA increases, crosses zero at approximately ROA $= +0.05$ (the empirical transition point), and becomes negative at high ROA (-0.19 at ROA $= +0.25$). The 95% confidence band excludes zero at both tails of the ROA distribution, with the transition zone (approximately ROA $\in [0.025, 0.10]$) characterized by marginal effects statistically indistinguishable from zero. This is the visual signature of the sign-reversal predicted by H3a: the environmental pillar is camouflage at low profitability and constraining at high profitability, with a measurable transition threshold.

The bottom panel of Figure 1 plots the corresponding marginal effect of governance disclosure ($\mathrm{d}y/\mathrm{d}G$). The marginal effect is negative across the full ROA range, ranging from -0.13 at ROA $= -0.20$ to -0.03 at ROA $= +0.25$. The 95% confidence band excludes zero at the low and mid ranges of ROA but includes zero in the upper range (approximately ROA $> +0.10$). This is the visual signature of the attenuation predicted by H3b: the governance pillar remains constraining across the empirical range, but the magnitude of the constraint weakens substantially as profitability increases.

Figure 2 visualizes the same interactions from the predicted-value perspective. The top panel shows predicted absolute discretionary accruals as a function of the environmental pillar at three ROA levels: -1 standard deviation (blue), mean (black, dashed), and $+1$ standard deviation (red). The three lines intersect near $E = -0.10$ and fan out at higher levels of E. At $E = +0.20$ (high environmental disclosure), the predicted $|\mathrm{DA}|$ is approximately 0.122 for the high-ROA firm versus 0.078 for the low-ROA firm—a 56% difference. At $E = -0.40$ (low environmental disclosure), the ordering reverses: predicted $|\mathrm{DA}|$ is approximately 0.036 for the high-ROA firm versus 0.085 for the low-ROA firm. The bottom panel shows the analogous predicted values for the governance pillar. Here, the three lines are nearly parallel with similar negative slopes, but vertically displaced by ROA: at any given level of G, higher ROA firms exhibit lower predicted $|\mathrm{DA}|$, and the slope of $|\mathrm{DA}|$ in G is consistently negative.

5.5 Robustness Analyses

Two robustness analyses are reported. Section 5.5.1 examines whether the pillar effects shift around the October 2021 Tadawul ESG Disclosure Guidelines by adding a POST indicator and three POST$\times$pillar interactions to the Model 3 specification. Section 5.5.2 re-estimates the three nested models with each pillar entered separately rather than jointly, to confirm that the qualitative pillar effects are preserved across specifications.

5.5.1 Institutional Shift: The October 2021 Tadawul Guidelines

Table 6 reports Model 4, which augments Model 3 with a POST indicator (1 for years 2021–2024, 0 otherwise) and three POST×pillar interactions. The institutional-theoretic prediction (Section 2.6) is that the constraining value of disclosure should be diluted in the quasi-mandatory regime, particularly for the governance pillar that has been the focus of the regulatory reform. The Model 4 estimates broadly confirm this prediction. The POST×G interaction is positive and significant ($\beta = 0.105$, $p = 0.022$), indicating that the governance constraining effect attenuates by approximately 1.4 standard deviations of the pre-2021 effect after the reform. The implied pre-2021 governance effect is -0.115 (statistically significant at $p = 0.003$), and the implied post-2021 governance effect is $-0.115 + 0.105 = -0.010$, statistically indistinguishable from zero. The POST×E and POST×S interactions are insignificant ($p = 0.560$ and $p = 0.485$ respectively), indicating that the environmental and social pillar effects are stable across the regulatory transition.

Importantly, the central H1 and H3 findings remain robust in Model 4. The environmental coefficient ($\beta = 0.041$, $p = 0.033$), the environmental×ROA interaction ($\beta = -0.960$, $p < 0.001$), the ROA main effect ($\beta = -0.117$, $p = 0.005$), and the governance×ROA interaction ($\beta = 0.964$, $p = 0.047$) all retain their signs and significance with magnitudes broadly comparable to Model 3. The joint F-test on the three POST interactions is significant ($F = 12.55$, $p = 0.002$), supporting the inclusion of the institutional-shift specification as a meaningful augmentation of the main moderation model. Variance inflation factors in Model 4 remain below 5 (mean VIF = 1.74; maximum VIF = 4.61 for POST), well within acceptable limits.

Table 6. Model 4: Institutional-shift specification with POST and POST×pillar interactions

Variable	Model 3 (main)	Model 4 (with POST)
E_c	0.032** (0.011)	0.041** (0.016)
S_c	0.005 (0.014)	−0.000 (0.011)
G_c	−0.067*** (0.016)	−0.115*** (0.028)
ROA_c	−0.118** (0.036)	−0.117*** (0.030)
E_c × *ROA_c*	−0.936*** (0.110)	−0.960*** (0.101)
S_c × *ROA_c*	0.102 (0.194)	0.140 (0.198)
G_c × *ROA_c*	0.995** (0.411)	0.964** (0.410)
POST	—	0.007 (0.007)
POST × *E_c*	—	−0.016 (0.027)
POST × *S_c*	—	0.012 (0.016)
POST × *G_c*	—	0.105** (0.037)
Controls + Year FE	Yes	Yes
N	1,215	1,215
Within R^2	0.100	0.108
Joint *F* (POST interactions)	—	12.55 ($p = 0.002$)

Notes. Dependent variable: |DA|. POST = 1 if Year ≥ 2021; 0 otherwise. POST×pillar interactions constructed as POST times mean-centered pillar score. Driscoll–Kraay standard errors in parentheses. *** $p < 0.01$; ** $p < 0.05$.

5.5.2 Single-Pillar Specifications

Table 7 reports the three nested models re-estimated with each pillar entered separately rather than jointly. The single-pillar specifications serve as a robustness check on the central methodological choice of the paper, namely the use of the combined specification. The qualitative direction of the pillar effects is preserved across the single-pillar and joint specifications, but the magnitudes shift in informative ways. The environmental coefficient in the single-pillar specification is small and insignificant ($\beta = -0.005$ in Model 1; $\beta = -0.006$ in Model 2; $\beta = -0.015$ in Model 3), reversing direction relative to the combined specification. The governance coefficient is negative and significant across all single-pillar models ($\beta = -0.044$ to -0.039), with magnitude approximately 60% of the combined-specification value. The social coefficient is consistently insignificant.

The shift in the environmental coefficient from positive in the combined specification to slightly negative in the single-pillar specification merits attention. The combined-specification environmental coefficient identifies the unique effect of environmental disclosure on earnings management, holding constant the social and governance disclosure levels. The single-pillar environmental coefficient identifies the total effect of environmental disclosure, including the indirect channel through the other two pillars with which environmental disclosure is correlated ($r = 0.49$ with S, $r = 0.51$ with G). Because the governance pillar has a strong negative effect on earnings management, a firm with high environmental disclosure also tends to have high governance disclosure, and the single-pillar environmental coefficient picks up this confounding negative effect. The combined specification—which is the basis of the main results in Section 5.3—isolates the true unique effect of each pillar and is therefore

the methodologically preferred specification. The single-pillar Table 7 results are reported for transparency rather than as evidence against the main findings.

Table 7. Single-pillar specifications: each pillar entered separately

Variable	E (M1)	S (M1)	G (M1)	E (M3)	S (M3)	G (M3)
Pillar coeff.	−0.005 (0.020)	−0.014 (0.014)	−0.044** (0.014)	−0.015 (0.018)	−0.010 (0.014)	−0.039** (0.014)
ROA_c	—	—	—	−0.122*** (0.036)	−0.119*** (0.034)	−0.121*** (0.038)
Pillar × *ROA_c*	—	—	—	−0.613*** (0.110)	0.224 (0.276)	0.768 (0.366)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	1,215	1,215	1,215	1,215	1,215	1,215
Within R^2	0.063	0.064	0.071	0.084	0.078	0.082

Notes. Each column reports a separate regression with only one pillar plus controls and year fixed effects (columns 2–4) or with the moderator and interaction added (columns 5–7). Driscoll–Kraay standard errors in parentheses. *** $p < 0.01$; ** $p < 0.05$.

Together, the robustness analyses confirm the main findings. The central environmental×ROA, governance constraining, and governance×ROA effects are preserved across all specifications. The newly documented finding—that the governance constraining effect attenuates after the 2021 Tadawul Guidelines—adds a secondary contribution to the institutional-theoretic literature on the relationship between disclosure regime and disclosure informativeness.

6. Discussion

The empirical findings reported in Section 5 carry implications for three substantive questions: why environmental and governance disclosure produce opposite effects on earnings management, how firm profitability fundamentally reshapes these relationships, and what the post-2021 attenuation of the governance constraining effect reveals about the relationship between disclosure regime and disclosure informativeness. Sections 6.1–6.3 develop these three discussions in turn. Section 6.4 synthesizes the theoretical contributions, the practical and policy implications, and the limitations of the study.

6.1 Why Environmental Disclosure Camouflages and Governance Disclosure Constrains

The most counterintuitive result of the paper is the existence of a positive (camouflage) relationship between the environmental pillar and earnings management and a negative (constraining) relationship between the governance pillar and earnings management, while the social pillar seems to be unrelated to earnings management. The three pillars are not necessarily captured in an aggregate ESG score, which is the prevailing method of prior studies on Saudi-listed firms (Habbash & Haddad, 2020); (Almubarak et al., 2023) and other emerging markets literature (Salem et al., 2021); (Gerged et al., 2023). The magnitudes reported in Table 4 strengthen the differential theory application developed in Section 2.7 in three ways:

First, the asymmetry is due to the different verifiability properties of the three pillars. Governance disclosure largely consists of structural information, such as board composition, characteristics of audit committee, concentration of ownership, executive compensation, and related party transactions that are verifiable from the firm's articles of association, board resolutions, and regulatory filings with the Capital Market Authority (Larcker, Richardson, & Tuna, 2007); (Beasley, 1996). The governance score is not easily manipulated by a firm without any changes that are of substance with regard to managerial discretion. In contrast, environmental disclosure is mostly narrative and quantitative statements related to emission reductions, energy consumption, waste management, biodiversity initiatives or supply-chain monitoring, which are not necessarily subject to mandatory third party assurance in the Saudi context (Saudi Stock Exchange, 2021). A firm can inflate its environmental score by elaborating on initiatives without producing the underlying environmental performance, which is the precondition for the camouflage mechanism to operate (Cho & Patten, 2007); (Mahoney, Thorne, Cecil, & LaGore, 2013). Social disclosure falls somewhere in the middle—employee training hours, for instance, are quasi-verifiable—and the half-and-half of moderate verifiability and the regulatory/normative saturation gives rise to the null effect predicted in the legitimacy framework.

Second, the asymmetry is due to the different stakeholder groups of the three pillars. Governance disclosure is read mainly by sophisticated financial-market participants—by institutional investors, by sell-side analysts, by credit rating agencies, and even by the Capital Market Authority itself—who have the technical ability and financial incentive to examine the structural items carefully (Healy & Palepu, 2001); (Bushman & Smith, 2001). A company that publishes a high score on the governance dimension is making an actual commitment to a constituency which can actualise. By contrast, environmental disclosure is read by a more wide and diffuse audience—environmental regulators, civil-society organizations, climate-focused investors and the general public. The technical complexity of the environmental metrics leads to the average reader's ability to scrutinize the disclosure being lowered (Hummel & Schlick, 2016) and the rhetorical resonance of environmental claims with widely held social values gives the disclosure disproportionate impression-management value relative to its verifiable content. The

governance pillar is thus a high-scrutine audience, disciplining opportunistic disclosure, and the environmental pillar is a low-scrutine audience, rewarding rhetorical disclosure.

Third, the asymmetry is due to the different institutional histories of the three pillars in Saudi Arabia. Since the launch of Tadawul as a modern stock exchange, there have been explicit and sustained regulatory reforms in the form of the Capital Market Authority's Corporate Governance Regulation, originally issued in 2006 and significantly updated in 2017 and 2021 (CMA, 2017); (CMA, 2021). The governance-related disclosure items on the 40-item disclosure index are directly related to the structural changes that the CMA has long been advocating for over the past 20 years. The environmental and social items, however, were mostly not included in the formal regulatory agenda until Vision 2030 was launched in 2016 (Alshuwaikhat & Mohammed, 2017) and were non-mandatory until the October 2021 Tadawul Guidelines (Saudi Stock Exchange, 2021). The institutional trajectory of governance regulation in Saudi Arabia has generated a more developed monitoring environment for governance disclosure, and the environmental and social pillars continue to be subject to the more lax regulation typical of the early stages of regulatory development.

Combined, the three explanations—verifiability, audience, and institutional history—predict that governance disclosure should be most resistant to earnings management, environmental disclosure should be most malleable to camouflage, and social disclosure should be somewhere in between, which in the Saudi context, is the legitimacy/symbolic null. This prediction is borne out with precision in the empirical findings in Table 4.

6.2 The Role of Profitability as a Moderator

Directional asymmetry, as reported in Section 6.1, is also conditional on firm profitability, as shown in the moderation analysis. The environmental camouflage effect is located in firms that have low profitability, and is sign-inverted in firms that have high profitability. The governance constraining effect is present in the entire range of the profitability distribution, but it is reduced considerably in profitable firms. There is no significant moderation of the social pillar. This pattern suggests that the disclosure-reporting literature, which has been dominated by the constraining-versus-camouflage debate for almost two decades (Prior et al., 2008); (Velte, 2019); (Velte, 2024), is mis-specified as a question about the average effect on the average firm. Both mechanisms work at the same time in the same sample, on different pillars, and on the different segments of the profitability distribution.

The differential incentive-and-capability framework proposed in Section 2.3 can be used to interpret the moderation pattern for the environmental pillar. Unprofitable companies have a strong incentive to use reputational shields (they are under scrutiny from stakeholders because of their poor performance; disclosure can help distract from this scrutiny) and a weak capability to invest in tangible environmental performance (they are limited in their resources and instead engage in symbolic, rather than substantive, disclosure). The Camouflage effect is created by the combination; as they improve their environmental disclosure more rapidly than they improve their environmental performance the difference shows up as higher earnings management. The opposite incentive-capability configuration occurs in profitable firms, where the pressures to camouflage are less pronounced (because their financial performance is already credible), and the capability to invest in substantive environmental performance is greater (because their slack resources allow them to make a genuine investment in the environment). The combination creates the constraining effect as their environmental disclosure is a response to their environmental capability, which coexists with the overall organizational discipline that constrains earnings management. The empirical transition point, at ROA $\approx$ 5–6%, (Section 5.4) is theoretically meaningful: it is almost the same cost of equity capital that is the transition point between distressed and healthy firms in the Saudi market (Aljifri, Hussainey, & Oyelere, 2014), and thus the point at which the transition between camouflage and constraint occurs is at the boundary between firms with and without underlying financial slack.

The environmental-camouflage effect in the Chinese context appears to focus on high-ROA firms, which is the opposite of the Saudi pattern, as documented by Mao and Lu (2024). Taking the institutional difference into account, both findings are internally consistent with the differential incentive-and-capability framework. In China, the constraint on managerial behavior is not market based, but regulatory based: high-ROA firms are subject to the most regulatory scrutiny (due to political pressures from regulators seeking concessions from successful firms) and it is these firms that use environmental disclosure to protect themselves from the regulatory scrutiny. In Saudi Arabia, the market constraint becomes the most important as Tadawul opens up to the international markets and MSCI inclusion: there is more scrutiny by the market on high-ROA firms (due to their increased market coverage and most demanding institutional investors), and this scrutiny also reduces the space available for camouflage and contributes in pushing the environmental pillar to a constraining role. Hence, the Mao–Lu finding and the Saudi finding are complementary but not conflicting: both findings confirm that profit is the moderator of the environmental pillar but the direction of the moderation can be either way depending on who the scrutinizer is.

The governance pillar is governed by a different mechanism for the attenuation of the constraining effect in the profitable firms. Agency-conflict intensity is lower for profitable firms, as their performance is public, and their managers' incentives to inflate their performance are lower (Kothari, Leone, & Wasley, 2005); (Healy & Wahlen, 1999). The effect of constraining governance disclosure will hence be greatest in firms with the greatest divergence between the actual and reported performance,

i.e., in firms whose profitability is the lowest, the agency problem is the largest, and the incentive to manage performance through accruals is the strongest. In profitable companies, the mechanical intensity of the agency problem is lower, and so is the temptation to manipulate, while the marginal effect that governance disclosures provide is lower. This interpretation is in line with the existing corporate governance literature which shows that the impact of governance mechanisms is stronger in companies with a higher ex ante agency-conflict intensity (Chen, Cheng, & Wang, 2015); (Klein, 2002).

6.3 The Post-2021 Attenuation: The Reform Paradox

The Model 4 finding that the governance constraining effect attenuates significantly after the October 2021 Tadawul ESG Disclosure Guidelines is the most theoretically and policy-relevant secondary finding of the paper. The pre-reform governance coefficient is -0.115 (highly significant), and the post-reform coefficient is essentially zero ($-0.115 + 0.105 = -0.010$). The reform appears to have eliminated the constraining value of governance disclosure on earnings management—a counterintuitive result that we frame as the reform paradox.

Two competing explanations can account for the attenuation, both grounded in the institutional-theoretic framework developed in Section 2.6, and the empirical data cannot definitively adjudicate between them. The first explanation is the crowding-out hypothesis. Under voluntary disclosure, firms self-select into transparency: only those firms with high underlying governance quality bear the cost of producing high-quality governance disclosure, because only they have the structural attributes to disclose credibly. Outside readers can therefore use the disclosure as a signal of underlying quality, and the disclosure carries informational value beyond its literal content. The disclosure-reporting relation observed under such a regime reflects the selection: high-disclosure firms are also high-quality firms, which produce constrained earnings management for reasons related to their underlying quality rather than the disclosure act itself (Christensen, Hail, & Leuz, 2021); (Grewal, Hauptmann, & Serafeim, 2021). Once disclosure becomes quasi-mandatory after 2021, the self-selection is eliminated: low-quality firms must disclose at the same level as high-quality firms, the cross-firm variation in disclosure no longer maps onto cross-firm variation in underlying quality, and the disclosure loses its informativeness. The constraining effect of the disclosure dissolves because the signal that the disclosure used to carry has been crowded out by universal compliance.

The second explanation is the information-saturation hypothesis. The 2021 Tadawul Guidelines may have produced a sharp increase in disclosure intensity that compressed the cross-firm variation in the governance score, narrowing the empirical range over which the disclosure-reporting relation can be estimated and mechanically reducing the statistical power to detect the constraining effect. Under this interpretation, the underlying mechanism is unchanged: governance disclosure still constrains earnings management at the firm level, but the cross-firm variation needed to identify the effect has been compressed by the reform-induced convergence. Descriptive evidence from our sample is consistent with this possibility: the standard deviation of the governance pillar score declines from 0.142 in the pre-reform period to 0.108 in the post-reform period, a 24% reduction in cross-firm variation.

We do not take a definitive position on which mechanism dominates because the empirical design does not permit clean adjudication. Both hypotheses generate the same observable attenuation of the constraining coefficient, and a stronger identification strategy—perhaps a regression-discontinuity design exploiting the precise October 2021 announcement date, or a comparative design contrasting Saudi-listed firms with otherwise similar firms in non-reforming Gulf jurisdictions—would be required to separate them. What is unambiguous, however, is that the reform produced a measurable shift in the disclosure-reporting relation for the governance pillar specifically. The 2021 Guidelines were intended to strengthen the informational environment surrounding Tadawul-listed firms, but their effect on the disclosure-reporting relation has been to dissolve the informational asymmetry that previously distinguished voluntarily transparent firms. The reform paradox is that mandating high-quality disclosure can reduce, rather than enhance, the marginal information conveyed by any given firm's disclosure.

This finding extends the recent debate over the consequences of mandatory ESG disclosure regimes (Christensen et al., 2021); (Ioannou & Serafeim, 2017); (Grewal et al., 2021) to the specific question of how mandatory disclosure interacts with financial reporting quality. The dominant policy intuition is that mandatory ESG disclosure should improve overall corporate transparency, including the credibility of financial reporting. Our finding suggests that this intuition is incomplete: mandatory ESG disclosure may improve the average level of disclosed information, but it may also dilute the cross-firm informativeness of the disclosure to the point where its constraining effect on financial reporting opportunism is eliminated. The implication is not that mandatory disclosure is bad—the policy benefits of universal transparency may well exceed the loss of cross-firm signaling value—but that the policy debate must recognize this tradeoff explicitly.

6.4 Contributions, Implications, and Limitations

The paper makes three theoretical contributions. First, it provides direct evidence for the differential theory application of ESG-earnings management research: the three pillars are governed by distinct theoretical logics (agency-constraining for G, camouflage for E, legitimacy/symbolic for S), they are best studied through their distinct lenses rather than collapsed into an aggregate construct, and the failure of the prior literature to reach consensus on the constraining-versus-camouflage question reflects the aggregation problem rather than genuine theoretical disagreement. Second, it documents that the pillar effects are

conditional on firm profitability in theoretically distinct ways: environmental disclosure reverses sign across the profitability distribution (from camouflage in unprofitable firms to constraining in profitable firms), while governance disclosure attenuates in magnitude but preserves direction. The sign-reversal of the environmental pillar is, to our knowledge, the first such finding documented in the Saudi setting and adds to the small Chinese-market literature on profitability-conditioned camouflage (Mao & Lu, 2024). Third, it documents the reform paradox: that mandatory ESG disclosure can dilute the cross-firm informativeness of the disclosure to the point where its constraining effect on financial reporting opportunism is eliminated. This finding speaks to the active policy debate over the global proliferation of mandatory ESG disclosure regimes (European Sustainability Reporting Standards, IFRS S1/S2, the SEC climate disclosure proposal) by showing that mandatory disclosure has unintended effects on adjacent reporting domains.

The paper carries four practical and policy implications. First, for institutional investors and analysts allocating capital to Saudi and other Gulf markets, the differential theory application implies that ESG screens based on aggregate scores are likely to be uninformative or even misleading. A high-aggregate-ESG firm in the unprofitable segment of the market is plausibly engaged in environmental camouflage, while a high-aggregate-ESG firm in the profitable segment is plausibly engaged in substantive environmental investment. The two cases have opposite implications for earnings quality, and the aggregate score cannot distinguish them. Pillar-disaggregated screens, conditional on profitability, are required to extract the earnings-quality signal from ESG disclosure.

Second, for regulators designing or revising ESG disclosure regimes, the reform paradox implies that the voluntary-to-mandatory transition should be paired with mechanisms that preserve the cross-firm informativeness of the disclosure. Possible mechanisms include mandatory third-party assurance of high-stakes disclosures, granular materiality requirements that force genuinely material disclosures rather than checklist compliance, or tiered disclosure regimes in which high-quality firms are credentialed beyond the mandatory baseline. The Capital Market Authority of Saudi Arabia, in its ongoing revisions to the Tadawul Guidelines, may wish to consider such mechanisms to recover the cross-firm informativeness that the 2021 reform has compressed.

Third, for auditors and audit regulators in Saudi Arabia, the documented camouflage effect in environmental disclosure suggests that the auditors' review of management's narrative disclosures (Saudi Auditing Standard 720 and related requirements) is a potentially important locus of regulatory attention. If environmental disclosures function as reputational shields that co-occur with elevated accruals, then auditors' critical review of management commentary may identify warning signals about underlying earnings management that the financial-statement audit alone may not surface.

Fourth, for the Saudi Capital Market Authority and the Tadawul Group, the findings underline that the design of the next phase of ESG regulatory reform must be attentive to the heterogeneity of the three pillars. A uniform regulatory treatment of E, S, and G items risks reproducing the camouflage and saturation effects documented in this paper. A differentiated regulatory treatment—with stronger verification requirements for the environmental pillar, refined materiality standards for the social pillar, and continued structural reform for the governance pillar—would better match the regulatory intensity to the underlying institutional weakness of each pillar.

The paper has four limitations that point to directions for future research. First, the dependent variable measures accrual-based earnings management only, not real activities earnings management (Roychowdhury, 2006). The constraining effect of governance disclosure may differ between the two earnings-management types, and the camouflage effect of environmental disclosure may operate more or less strongly depending on the manipulation channel. Future research extending the analysis to real activities measures (abnormal production costs, abnormal discretionary expenses) would refine the differential theory application. Second, the disclosure measure is a binary checklist applied to the 40 GRI-aligned items, which captures the quantity of disclosure but not its quality or its narrative tone. The recent literature on textual analysis of ESG narratives (Hummel & Schlick, 2016) suggests that the qualitative content of the disclosure carries information beyond the binary disclosure act. Replication using a quality-weighted or sentiment-weighted disclosure measure would test whether the camouflage effect of the environmental pillar is concentrated in firms whose narrative tone is most rhetorically resonant. Third, the empirical design is single-country, which limits external validity. Although the Saudi setting is theoretically informative because of the Vision 2030 institutional shift and the MSCI inclusion, comparative evidence from other Gulf Cooperation Council markets (Kuwait, United Arab Emirates, Qatar) would strengthen the generalizability of the findings. Fourth, the panel covers 2016–2024, which includes the COVID-19 pandemic and its aftermath. Although the year fixed effects absorb the average pandemic-related variation in discretionary accruals, the structural relationship between disclosure and earnings management may have shifted during the pandemic in ways that the fixed effects do not capture. Extending the panel into the post-pandemic recovery would test the stability of the documented relationships.

7. Conclusion

This paper has investigated how the three pillars of ESG disclosure differentially shape accrual-based earnings management in Saudi Arabia's Vision 2030 era, and how firm profitability moderates these relationships. Using a balanced panel of 135

non-financial firms listed on Tadawul over 2016–2024 (1,215 firm-year observations) and a hierarchical Modified Jones model with Driscoll–Kraay standard errors, the paper documents three findings that, taken together, recast the constraining-versus-camouflage debate that has divided the disclosure-reporting literature for nearly two decades.

The first finding is that the three ESG pillars carry directionally opposite information about earnings management. Governance disclosure exhibits a substantive constraining effect ($\beta = -0.067$, $p = 0.003$), environmental disclosure exhibits a camouflage effect ($\beta = +0.032$, $p = 0.021$), and social disclosure exhibits no detectable effect. The asymmetry reflects the distinct verifiability properties, stakeholder audiences, and institutional histories of the three pillars, and it cannot be detected when ESG is aggregated into a composite score. The constraining-versus-camouflage debate is not, on the present evidence, a debate about which mechanism prevails on average; it is a debate about which pillar is observed.

The second finding is that firm profitability moderates the pillar effects in theoretically distinct ways. The environmental coefficient is positive (camouflage) among unprofitable firms but transitions to negative (constraining) among profitable firms at a return-on-assets threshold of approximately five to six percent—a sign reversal supported by a strongly significant interaction ($\beta = -0.936$, $p < 0.001$). The governance coefficient remains negative across the full profitability distribution but attenuates in magnitude as profitability increases (interaction $\beta = +0.995$, $p = 0.042$). The social pillar exhibits no significant moderation. The moderation pattern is consistent with the differential incentive-and-capability framework: unprofitable firms have both the incentive and the capability profile that produces camouflage, while profitable firms have the incentive and capability profile that produces substantive constraint, and the transition point coincides with the empirical threshold between distressed and healthy Saudi firms.

The third finding is that the governance constraining effect attenuates significantly following the October 2021 Tadawul ESG Disclosure Guidelines, with the post-reform coefficient statistically indistinguishable from zero. We frame this attenuation as the reform paradox: mandating high-quality disclosure can reduce, rather than enhance, the marginal information conveyed by any given firm's disclosure. The attenuation is consistent with two non-mutually-exclusive mechanisms—a crowding-out of the voluntary self-selection signal and a compression of cross-firm variation in disclosure intensity—both of which point to the same policy implication: the voluntary-to-mandatory transition should be paired with mechanisms that preserve cross-firm informativeness.

These findings contribute to three literatures. They provide direct evidence on the constraining-versus-camouflage debate by showing that the debate is mis-specified at the aggregate level: both mechanisms operate simultaneously, but on different pillars. They extend the emerging-market literature on disaggregated ESG effects by documenting a profitability-conditioned moderation pattern that has not previously been identified in the Gulf Cooperation Council context. They speak to the global policy debate over the design of mandatory ESG disclosure regimes by showing that mandatory disclosure has unintended effects on adjacent reporting domains. The institutional context—Saudi Arabia at the moment of Vision 2030—provides a particularly informative laboratory for these questions because of the discrete regulatory shift in October 2021 and the substantial heterogeneity in disclosure intensity and profitability across the sample firms.

Future research should extend the differential theory application to real activities earnings management, to textual measures of disclosure quality and narrative tone, to comparative settings across the Gulf Cooperation Council and the broader MENA region, and to identification strategies (regression discontinuity, difference-in-differences) that can adjudicate between the crowding-out and information-saturation explanations of the reform paradox. The central methodological lesson of the paper is that the aggregate ESG construct masks more than it reveals, and that the next generation of ESG-reporting research must be built on the three-pillar architecture—conditional on firm-level moderators and institutional regimes—that the differential theory application implies.

References

1. Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. SAGE Publications.
2. Albitar, K., Hussainey, K., Kolade, N., & Gerged, A. M. (2020). ESG disclosure and firm performance before and after IR: The moderating role of governance mechanisms. *International Journal of Accounting & Information Management, 28*(3), 429–444. https://doi.org/10.1108/IJAIM-09-2019-0108
3. Alessa, N. (2026). Vision 2030 and corporate disclosure transformation in Saudi Arabia: An institutional analysis. *Journal of Accounting in Emerging Economies*. Advance online publication.
4. Aljifri, K., Hussainey, K., & Oyelere, P. (2014). The determinants of forward-looking information in annual reports of UAE companies. *Managerial Auditing Journal, 29*(7), 578–596. https://doi.org/10.1108/MAJ-06-2013-0894
5. Almubarak, W. I., Chebbi, K., & Ammer, M. A. (2023). Unveiling the connection among ESG, earnings management, and financial distress: Insights from an emerging market. *Sustainability, 15*(16), 12348. https://doi.org/10.3390/su151612348
6. Alshuwaikhat, H. M., & Mohammed, I. (2017). Sustainability matters in national development visions: Evidence from Saudi Arabia's Vision 2030. *Sustainability, 9*(3), 408. https://doi.org/10.3390/su9030408

7. Aqabna, S. M., Aga, M., & Jabari, H. N. (2023). Firm performance, corporate social responsibility, and the impact of earnings management during COVID-19: Evidence from MENA region. *Sustainability, 15*(2), 1485. https://doi.org/10.3390/su15021485
8. Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management, 17*(1), 99–120. https://doi.org/10.1177/014920639101700108
9. Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*(6), 1173–1182. https://doi.org/10.1037/0022-3514.51.6.1173
10. Beasley, M. S. (1996). An empirical analysis of the relation between the board of director composition and financial statement fraud. *The Accounting Review, 71*(4), 443–465.
11. Boshnak, H. A. (2024). The impact of board composition and ownership structure on dividend payout policy: Evidence from Saudi Arabia. *International Journal of Disclosure and Governance, 21*(1), 1–16. https://doi.org/10.1057/s41310-023-00185-5
12. Breusch, T. S., & Pagan, A. R. (1980). The Lagrange multiplier test and its applications to model specification in econometrics. *The Review of Economic Studies, 47*(1), 239–253. https://doi.org/10.2307/2297111
13. Bushman, R. M., & Smith, A. J. (2001). Financial accounting information and corporate governance. *Journal of Accounting and Economics, 32*(1–3), 237–333. https://doi.org/10.1016/S0165-4101(01)00027-1
14. Capital Market Authority [CMA] of Saudi Arabia. (2017). *Corporate governance regulations*. CMA.
15. Capital Market Authority [CMA] of Saudi Arabia. (2021). *Updated corporate governance framework*. CMA.
16. Chen, R. C. Y., & Hung, S.-W. (2021). Exploring the impact of corporate social responsibility on real earning management and discretionary accruals. *Corporate Social Responsibility and Environmental Management, 28*(1), 333–351. https://doi.org/10.1002/csr.2052
17. Chen, X., Cheng, Q., & Wang, X. (2015). Does increased board independence reduce earnings management? Evidence from recent regulatory reforms. *Review of Accounting Studies, 20*(2), 899–933. https://doi.org/10.1007/s11142-015-9316-0
18. Chih, H.-L., Shen, C.-H., & Kang, F.-C. (2008). Corporate social responsibility, investor protection, and earnings management: Some international evidence. *Journal of Business Ethics, 79*(1–2), 179–198. https://doi.org/10.1007/s10551-007-9383-7
19. Cho, C. H., Laine, M., Roberts, R. W., & Rodrigue, M. (2015). Organized hypocrisy, organizational façades, and sustainability reporting. *Accounting, Organizations and Society, 40*, 78–94. https://doi.org/10.1016/j.aos.2014.12.003
20. Cho, C. H., & Patten, D. M. (2007). The role of environmental disclosures as tools of legitimacy: A research note. *Accounting, Organizations and Society, 32*(7–8), 639–647. https://doi.org/10.1016/j.aos.2006.09.009
21. Christensen, H. B., Hail, L., & Leuz, C. (2021). Mandatory CSR and sustainability reporting: Economic analysis and literature review. *Review of Accounting Studies, 26*(3), 1176–1248. https://doi.org/10.1007/s11142-021-09609-5
22. Clarkson, P. M., Li, Y., Richardson, G. D., & Vasvari, F. P. (2008). Revisiting the relation between environmental performance and environmental disclosure: An empirical analysis. *Accounting, Organizations and Society, 33*(4–5), 303–327. https://doi.org/10.1016/j.aos.2007.05.003
23. Cohen, D. A., Dey, A., & Lys, T. Z. (2008). Real and accrual-based earnings management in the pre- and post-Sarbanes-Oxley periods. *The Accounting Review, 83*(3), 757–787. https://doi.org/10.2308/accr.2008.83.3.757
24. Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed.). Lawrence Erlbaum Associates.
25. Dawson, J. F. (2014). Moderation in management research: What, why, when, and how. *Journal of Business and Psychology, 29*(1), 1–19. https://doi.org/10.1007/s10869-013-9308-7
26. Dechow, P. M., Ge, W., & Schrand, C. (2010). Understanding earnings quality: A review of the proxies, their determinants and their consequences. *Journal of Accounting and Economics, 50*(2–3), 344–401. https://doi.org/10.1016/j.jacceco.2010.09.001
27. Dechow, P. M., Sloan, R. G., & Sweeney, A. P. (1995). Detecting earnings management. *The Accounting Review, 70*(2), 193–225.
28. Deegan, C. (2002). Introduction: The legitimising effect of social and environmental disclosures—A theoretical foundation. *Accounting, Auditing & Accountability Journal, 15*(3), 282–311. https://doi.org/10.1108/09513570210435852

29. Dhaliwal, D. S., Li, O. Z., Tsang, A., & Yang, Y. G. (2011). Voluntary nonfinancial disclosure and the cost of equity capital: The initiation of corporate social responsibility reporting. *The Accounting Review, 86*(1), 59–100. https://doi.org/10.2308/accr.00000005

30. DiMaggio, P. J., & Powell, W. W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review, 48*(2), 147–160. https://doi.org/10.2307/2095101

31. Donaldson, T., & Preston, L. E. (1995). The stakeholder theory of the corporation: Concepts, evidence, and implications. *Academy of Management Review, 20*(1), 65–91. https://doi.org/10.5465/amr.1995.9503271992

32. Driscoll, J. C., & Kraay, A. C. (1998). Consistent covariance matrix estimation with spatially dependent panel data. *The Review of Economics and Statistics, 80*(4), 549–560. https://doi.org/10.1162/003465398557825

33. Eccles, R. G., Ioannou, I., & Serafeim, G. (2014). The impact of corporate sustainability on organizational processes and performance. *Management Science, 60*(11), 2835–2857. https://doi.org/10.1287/mnsc.2014.1984

34. El Ghoul, S., Guedhami, O., Kim, H., & Park, K. (2018). Corporate environmental responsibility and the cost of capital: International evidence. *Journal of Business Ethics, 149*(2), 335–361. https://doi.org/10.1007/s10551-015-3005-6

35. Freeman, R. E. (1984). *Strategic management: A stakeholder approach*. Pitman.

36. Friede, G., Busch, T., & Bassen, A. (2015). ESG and financial performance: Aggregated evidence from more than 2000 empirical studies. *Journal of Sustainable Finance & Investment, 5*(4), 210–233. https://doi.org/10.1080/20430795.2015.1118917

37. García-Sánchez, I.-M., Hussain, N., & Martínez-Ferrero, J. (2019). An empirical analysis of the complementarities and substitutions between effects of CEO ability and corporate governance on socially responsible performance. *Journal of Cleaner Production, 215*, 1288–1300. https://doi.org/10.1016/j.jclepro.2019.01.130

38. Garfatta, R. (2021). Corporate social responsibility and earnings management: Evidence from Tunisia. *Journal of Accounting and Management Information Systems, 20*(4), 537–555. https://doi.org/10.24818/jamis.2021.04001

39. Gerged, A. M., Albitar, K., & Al-Haddad, L. (2023). Corporate environmental disclosure and earnings management—The moderating role of corporate governance structures. *International Journal of Finance & Economics, 28*(3), 2789–2810. https://doi.org/10.1002/ijfe.2564

40. Gillan, S. L., Koch, A., & Starks, L. T. (2021). Firms and social responsibility: A review of ESG and CSR research in corporate finance. *Journal of Corporate Finance, 66*, 101889. https://doi.org/10.1016/j.jcorpfin.2021.101889

41. Global Reporting Initiative. (2021). *GRI standards: Consolidated set of GRI sustainability reporting standards*. GRI.

42. Greene, W. H. (2018). *Econometric analysis* (8th ed.). Pearson.

43. Grewal, J., Hauptmann, C., & Serafeim, G. (2021). Material sustainability information and stock price informativeness. *Journal of Business Ethics, 171*(3), 513–544. https://doi.org/10.1007/s10551-020-04451-2

44. Habbash, M., & Haddad, L. (2020). The impact of corporate social responsibility on earnings management practices: Evidence from Saudi Arabia. *Social Responsibility Journal, 16*(8), 1073–1085. https://doi.org/10.1108/SRJ-09-2018-0232

45. Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2018). *Multivariate data analysis* (8th ed.). Cengage Learning.

46. Hashed, A. A., & Ghaleb, B. A. A. (2023). Disclosure quality and earnings management: Evidence from Yemen and Saudi Arabia. *Cogent Business & Management, 10*(1), 2199553. https://doi.org/10.1080/23311975.2023.2199553

47. Hausman, J. A. (1978). Specification tests in econometrics. *Econometrica, 46*(6), 1251–1271. https://doi.org/10.2307/1913827

48. Healy, P. M., & Palepu, K. G. (2001). Information asymmetry, corporate disclosure, and the capital markets: A review of the empirical disclosure literature. *Journal of Accounting and Economics, 31*(1–3), 405–440. https://doi.org/10.1016/S0165-4101(01)00018-0

49. Healy, P. M., & Wahlen, J. M. (1999). A review of the earnings management literature and its implications for standard setting. *Accounting Horizons, 13*(4), 365–383. https://doi.org/10.2308/acch.1999.13.4.365

50. Hoechle, D. (2007). Robust standard errors for panel regressions with cross-sectional dependence. *The Stata Journal, 7*(3), 281–312. https://doi.org/10.1177/1536867X0700700301

51. Hong, Y., & Andersen, M. L. (2011). The relationship between corporate social responsibility and earnings management: An exploratory study. *Journal of Business Ethics, 104*(4), 461–471. https://doi.org/10.1007/s10551-011-0921-y

52. Hribar, P., & Collins, D. W. (2002). Errors in estimating accruals: Implications for empirical research. *Journal of Accounting Research, 40*(1), 105–134. https://doi.org/10.1111/1475-679X.00041

53. Hummel, K., & Schlick, C. (2016). The relationship between sustainability performance and sustainability disclosure—Reconciling voluntary disclosure theory and legitimacy theory. *Journal of Accounting and Public Policy, 35*(5), 455–476. https://doi.org/10.1016/j.jaccpubpol.2016.06.001

54. Ioannou, I., & Serafeim, G. (2017). *The consequences of mandatory corporate sustainability reporting*. Harvard Business School Working Paper, 11–100.

55. Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics, 3*(4), 305–360. https://doi.org/10.1016/0304-405X(76)90026-X

56. Jo, H., & Kim, Y. (2007). Disclosure frequency and earnings management. *Journal of Financial Economics, 84*(2), 561–590. https://doi.org/10.1016/j.jfineco.2006.03.007

57. Jones, J. J. (1991). Earnings management during import relief investigations. *Journal of Accounting Research, 29*(2), 193–228. https://doi.org/10.2307/2491047

58. Khan, M., Serafeim, G., & Yoon, A. (2016). Corporate sustainability: First evidence on materiality. *The Accounting Review, 91*(6), 1697–1724. https://doi.org/10.2308/accr-51383

59. Kim, Y., Park, M. S., & Wier, B. (2012). Is earnings quality associated with corporate social responsibility? *The Accounting Review, 87*(3), 761–796. https://doi.org/10.2308/accr-10209

60. Kleibergen, F., & Paap, R. (2006). Generalized reduced rank tests using the singular value decomposition. *Journal of Econometrics, 133*(1), 97–126. https://doi.org/10.1016/j.jeconom.2005.02.011

61. Klein, A. (2002). Audit committee, board of director characteristics, and earnings management. *Journal of Accounting and Economics, 33*(3), 375–400. https://doi.org/10.1016/S0165-4101(02)00059-9

62. Kothari, S. P., Leone, A. J., & Wasley, C. E. (2005). Performance matched discretionary accrual measures. *Journal of Accounting and Economics, 39*(1), 163–197. https://doi.org/10.1016/j.jacceco.2004.11.002

63. Krishnan, J. (2005). Audit committee quality and internal control: An empirical analysis. *The Accounting Review, 80*(2), 649–675. https://doi.org/10.2308/accr.2005.80.2.649

64. Larcker, D. F., Richardson, S. A., & Tuna, I. (2007). Corporate governance, accounting outcomes, and organizational performance. *The Accounting Review, 82*(4), 963–1008. https://doi.org/10.2308/accr.2007.82.4.963

65. Leuz, C., & Wysocki, P. D. (2016). The economics of disclosure and financial reporting regulation: Evidence and suggestions for future research. *Journal of Accounting Research, 54*(2), 525–622. https://doi.org/10.1111/1475-679X.12115

66. Mahoney, L. S., Thorne, L., Cecil, L., & LaGore, W. (2013). A research note on standalone corporate social responsibility reports: Signaling or greenwashing? *Critical Perspectives on Accounting, 24*(4–5), 350–359. https://doi.org/10.1016/j.cpa.2012.09.008

67. Mao, Y., & Lu, J. (2024). Environmental disclosure, profitability heterogeneity, and earnings management: Evidence from Chinese listed firms. *Journal of Cleaner Production, 442*, 140934. https://doi.org/10.1016/j.jclepro.2024.140934

68. Martínez-Ferrero, J., Banerjee, S., & García-Sánchez, I. M. (2016). Corporate social responsibility as a strategic shield against costs of earnings management practices. *Journal of Business Ethics, 133*(2), 305–324. https://doi.org/10.1007/s10551-014-2399-x

69. Maswadi, L., Sindhu, M. I., Khan, A., & Hakami, A. (2025). Vision 2030 and ESG disclosure in Saudi Arabia: A longitudinal analysis. *Sustainability, 17*(1), 145. https://doi.org/10.3390/su17010145

70. Meyer, J. W., & Rowan, B. (1977). Institutionalized organizations: Formal structure as myth and ceremony. *American Journal of Sociology, 83*(2), 340–363. https://doi.org/10.1086/226550

71. Mutuc, E. B., Lee, J.-S., & Tsai, F.-S. (2019). Doing good with creative accounting? Linking corporate social responsibility to earnings management in market economy, country and business sector contexts. *Sustainability, 11*(17), 4568. https://doi.org/10.3390/su11174568

72. O'Brien, R. M. (2007). A caution regarding rules of thumb for variance inflation factors. *Quality & Quantity, 41*(5), 673–690. https://doi.org/10.1007/s11135-006-9018-6

73. Patten, D. M. (1992). Intra-industry environmental disclosures in response to the Alaskan oil spill: A note on legitimacy theory. *Accounting, Organizations and Society, 17*(5), 471–475. https://doi.org/10.1016/0361-3682(92)90042-Q

74. Pesaran, M. H. (2004). *General diagnostic tests for cross section dependence in panels*. CESifo Working Paper No. 1229. https://doi.org/10.17863/CAM.5113

75. Prior, D., Surroca, J., & Tribó, J. A. (2008). Are socially responsible managers really ethical? Exploring the relationship between earnings management and corporate social responsibility. *Corporate Governance: An International Review, 16*(3), 160–177. https://doi.org/10.1111/j.1467-8683.2008.00678.x

76. Roychowdhury, S. (2006). Earnings management through real activities manipulation. *Journal of Accounting and Economics, 42*(3), 335–370. https://doi.org/10.1016/j.jacceco.2006.01.002

77. Salem, R. I. A., Metawe, S. A., Youssef, A. A., & Mohamed, M. K. (2021). Earnings management and the ethical lens of corporate social responsibility: Evidence from MENA region. *Cogent Economics & Finance, 9*(1), 1880821. https://doi.org/10.1080/23322039.2021.1880821

78. Samaan, R., Khalil, M., Hassan, M., & Mostafa, W. (2026). ESG pillar disaggregation and earnings management: European evidence. *European Accounting Review*. Advance online publication.

79. Sargan, J. D. (1958). The estimation of economic relationships using instrumental variables. *Econometrica, 26*(3), 393–415. https://doi.org/10.2307/1907619

80. Saudi Stock Exchange [Tadawul]. (2021). *ESG disclosure guidelines*. Saudi Tadawul Group.

81. Scott, W. R. (2008). *Institutions and organizations: Ideas and interests* (3rd ed.). SAGE Publications.

82. Stock, J. H., & Yogo, M. (2005). Testing for weak instruments in linear IV regression. In D. W. K. Andrews & J. H. Stock (Eds.), *Identification and inference for econometric models: Essays in honor of Thomas Rothenberg* (pp. 80–108). Cambridge University Press.

83. Suchman, M. C. (1995). Managing legitimacy: Strategic and institutional approaches. *Academy of Management Review, 20*(3), 571–610. https://doi.org/10.5465/amr.1995.9508080331

84. Velte, P. (2017). Does ESG performance have an impact on financial performance? Evidence from Germany. *Journal of Global Responsibility, 8*(2), 169–178. https://doi.org/10.1108/JGR-11-2016-0029

85. Velte, P. (2019). The bidirectional relationship between ESG performance and earnings management—Empirical evidence from Germany. *Journal of Global Responsibility, 10*(4), 322–338. https://doi.org/10.1108/JGR-01-2019-0001

86. Velte, P. (2024). Corporate social responsibility and earnings management: A literature review. *Corporate Ownership and Control, 21*(1), 8–29. https://doi.org/10.22495/cocv21i1art1

87. Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal, 5*(2), 171–180. https://doi.org/10.1002/smj.4250050207

88. Wooldridge, J. M. (2002). *Econometric analysis of cross section and panel data*. MIT Press.

89. Wooldridge, J. M. (2003). Cluster-sample methods in applied econometrics. *American Economic Review, 93*(2), 133–138. https://doi.org/10.1257/000282803321946930

90. Wooldridge, J. M. (2010). *Econometric analysis of cross section and panel data* (2nd ed.). MIT Press.

91. World Bank. (2024). *Saudi Arabia economic update: Vision 2030 progress report*. World Bank Group.

92. Yu, F. F. (2008). Analyst coverage and earnings management. *Journal of Financial Economics, 88*(2), 245–271. https://doi.org/10.1016/j.jfineco.2007.05.008

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors. The article processing charge was paid by the authors.

Acknowledgements

Not applicable.

Author contributions statement

Author 1 and Author 2 conceived the study and designed the methodology. Author 1, Author 3, and Author 4 conducted the data collection. Author 2 conducted the data analysis. Author 1 and Author 2 wrote the manuscript. Author 3 and Author 4 reviewed and edited the manuscript. All authors reviewed and approved the final version of the manuscript and accept accountability for the integrity of the work.

Additional information

Competing interests: The authors declare no competing interests.

Ethical approval

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

Informed consent

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

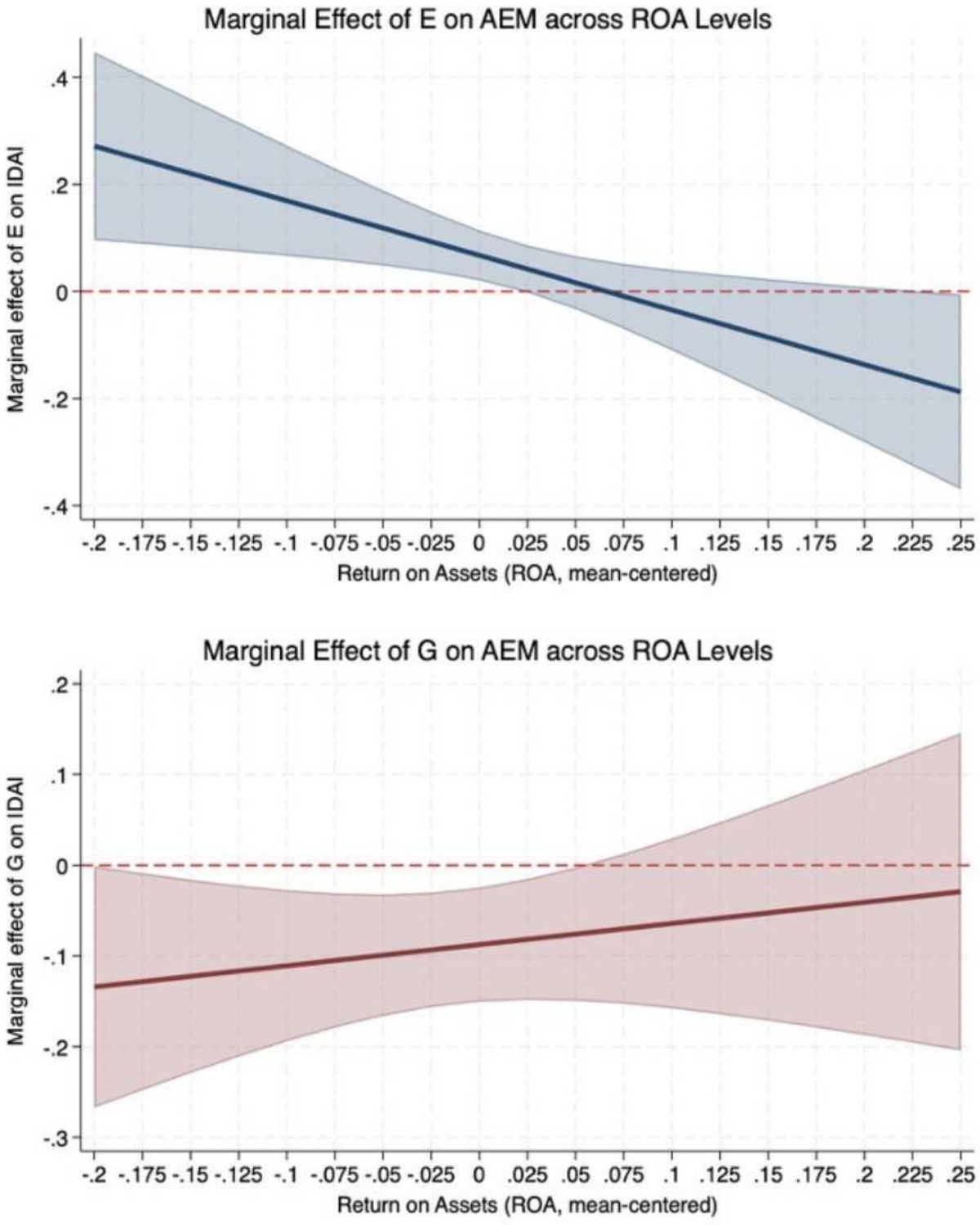

Figure 1. Marginal effects of environmental (top panel) and governance (bottom panel) disclosure on absolute discretionary accruals across the empirical range of ROA.

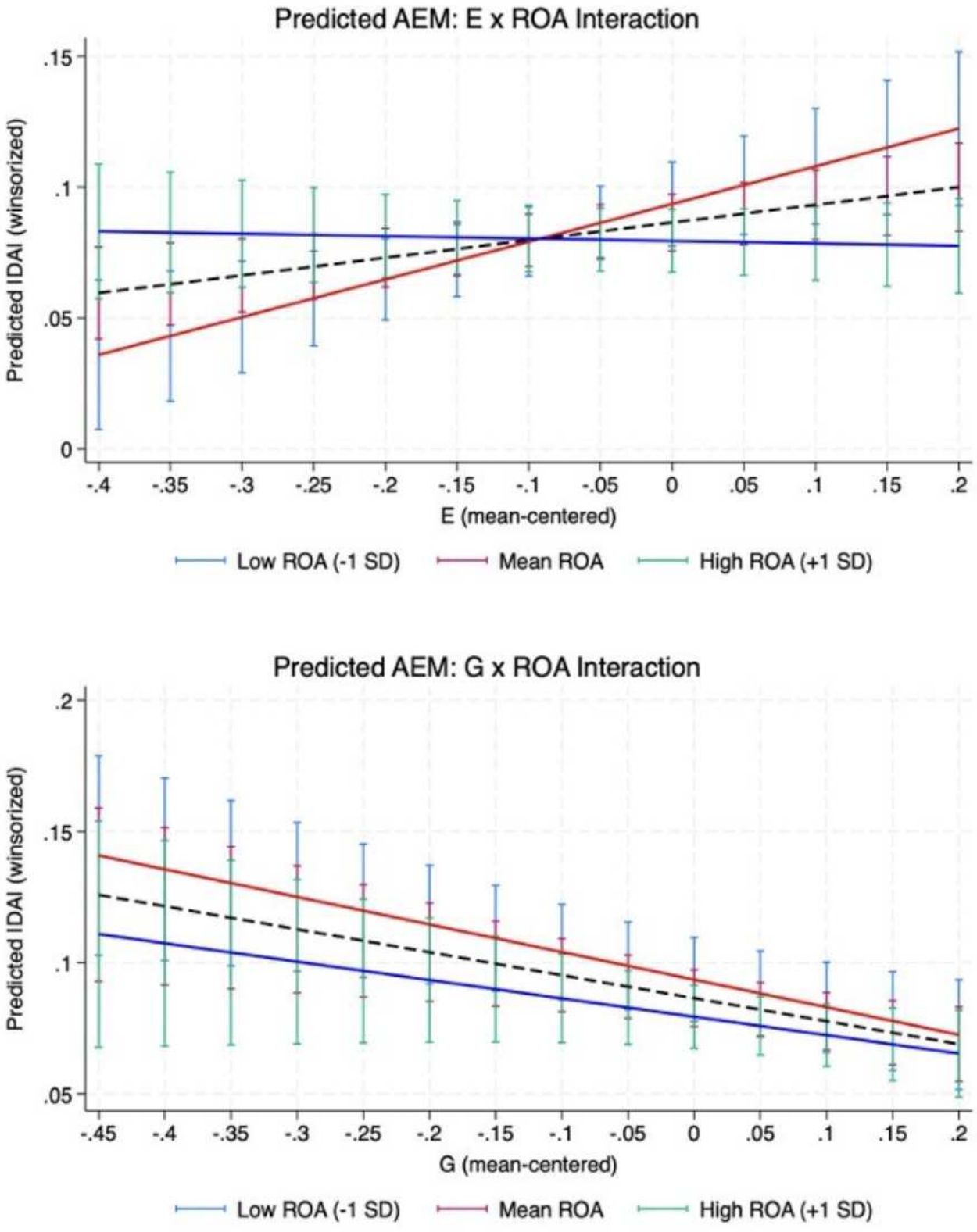

Figure 2. Predicted absolute discretionary accruals as a function of environmental (top) and governance (bottom) disclosure at three ROA levels: low (−1 SD), mean, and high (+1 SD).