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Board gender diversity, ESG and earnings management: evidence from the Southeast Asian firms

Ahlam Mohamed AlKhayyal and Aziz Jaafar
Department of Accounting,
College of Business Administration, University of Sharjah,
Sharjah, United Arab Emirates

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Abstract

Purpose – This study aims to investigate how board gender diversity (BGD) affects earnings management (EM) and how environmental, social and governance (ESG) engagement moderates this relationship in Southeast Asian firms. It addresses the limited evidence on how gender-inclusive boards and sustainability practices jointly enhance financial reporting quality in emerging cross-country markets.

Design/methodology/approach – This study employs panel data comprising 1,643 firm-year observations from Malaysia, Indonesia, Singapore and Thailand (2012–2022) and applies the fixed effects regressions. Earnings management is estimated through both accrual-based and real earnings management measures.

Findings – The main results indicate that gender-diverse boards mitigate earnings management, particularly in Malaysia and Indonesia, where stronger ESG engagement amplifies this effect. In contrast, weak or symbolic ESG practices, as observed in Thailand, can diminish these benefits.

Practical implications – Regulators and firms should move beyond symbolic gender quotas by fostering genuine inclusion and ESG integration to strengthen governance credibility and transparency.

Originality/value – This study provides novel cross-country evidence linking BGD, ESG and earnings management, extending governance theory within the Southeast Asian context.

Keywords Board gender diversity, ESG, Accruals earnings management, Real earnings management

Paper type Research article

1. Introduction

The increasing representation of women on corporate boards is not only a step toward gender equality but also a strategic component of improved corporate governance and financial transparency. As global stakeholders demand greater accountability and ethical conduct, board gender diversity (BGD) has emerged as a crucial mechanism influencing firms' financial behaviour and sustainability practices. Despite growing global evidence linking diverse boards to stronger governance outcomes (Bhatia and Gulati, 2021), the impact of female directors on earnings management (EM) [1] remains underexplored in emerging markets, especially in Southeast Asia, an institutional setting characterized by heterogeneous governance systems, concentrated ownership structures, and distinct cultural norms (Oehmichen, 2018). In particular, ESG practices and corporate governance frameworks vary markedly across Asian economies, reflecting differences in regulatory enforcement, board diversity mandates, and sustainability disclosure regimes ranging from strong, well-enforced systems in Singapore and Malaysia to more evolving frameworks in Indonesia and Thailand. Consistent with institutional theory, these cross-country differences suggest that the effectiveness of board gender diversity and ESG engagement in improving financial reporting quality is likely to be context-dependent, motivating a comparative analysis.

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While prior research suggests that female participation on boards can mitigate earnings management (EM) and enhance financial reporting credibility (Srinidhi *et al*., 2011; Arun *et al*., 2015), empirical findings remain mixed and context-dependent (Gull *et al*., 2018; Orazalin, 2020). Much of the existing evidence is derived from developed economies with robust regulatory frameworks and mature governance mechanisms, leaving a significant gap in understanding how gender diversity operates in institutionally weaker, culturally diverse environments, such as those in Southeast Asia. This gap is particularly important because board effectiveness in emerging markets often depends not only on regulatory compliance but also on informal norms, ownership concentration, and societal expectations regarding gender roles (Nguyen *et al*., 2015).

To further ground the study in theory, we draw on three complementary perspectives that explain how board gender diversity may influence earnings management. First, resource dependence theory suggests that female directors enhance oversight through their diverse expertise, ethical sensitivity, and stronger stakeholder orientation, thereby constraining opportunistic managerial behaviour. Second, social role theory reinforces this view by highlighting women's tendency toward greater prudence and ethical judgement, attributes that align with more transparent financial reporting. Finally, groupthink theory cautions that these benefits may be limited in environments where female representation is symbolic or where entrenched board dynamics restrict dissent, conditions that are not uncommon in emerging markets. Together, these theories suggest that the impact of gender-diverse boards on earnings management depends not only on the presence of women but also on the organizational environment that enables or constrains their effectiveness. This perspective underpins our expectation that the influence of BGD may be strengthened in firms with authentic ESG engagement and weakened where such engagement is superficial.

Beyond gender diversity alone, Environmental, Social, and Governance (ESG) performance has become a defining feature of modern corporate governance, reflecting a firm's ethical commitment, stakeholder orientation, and long-term strategic vision (Eccles *et al*., 2014; Kolk, 2016). Yet, limited empirical evidence examines how ESG practices interact with board gender diversity to influence earnings management. We argue that ESG can serve as a contextual enabler, strengthening the effectiveness of female directors by embedding their ethical and stakeholder-oriented values within a supportive corporate culture. Conversely, in firms where ESG is superficial or symbolic, the benefits of board diversity may be diluted or even reversed, a phenomenon often associated with "greenwashing" or "governance washing." Additionally, the growing emphasis on ESG practices has heightened interest in how sustainability-oriented mechanisms function in developing Asian economies, where governance systems and enforcement remain uneven. Recent evidence suggests that ESG engagement in these contexts is often driven by legitimacy pressures and evolving regulatory expectations, resulting in a combination of substantive initiatives and symbolic disclosure (Abu Afifa *et al*., 2024a, b). This institutional reality makes ASEAN a particularly relevant setting for examining ESG not merely as a governance outcome, but as a contextual factor that conditions how board gender diversity influences financial reporting behaviour.

Using a dataset of listed firms domiciled in Southeast Asian countries, our main findings show that board gender diversity is generally associated with lower earnings management, particularly for accrual-based manipulation. This suggests that female directors are more effective in strengthening financial reporting oversight than in constraining operational decisions. However, the moderating role of ESG engagement is highly context-dependent. Rather than uniformly reinforcing the governance role of gender-diverse boards, stronger ESG engagement often weakens the marginal monitoring effect of female directors, suggesting a substitution effect between ESG mechanisms and board-level oversight. Country-level evidence further reveals substantial heterogeneity: ESG engagement substitutes for board monitoring in Malaysia and Indonesia, has limited incremental influence in Singapore's strong governance environment, and exhibits mixed or symbolic effects in Thailand, where female board representation remains relatively low. Collectively, these results highlight that the

effectiveness of board gender diversity in mitigating earnings management is contingent on institutional quality and the authenticity of ESG practices, rather than their mere presence.

This study makes significant incremental contributions to the literature in several ways. First, unlike prior studies which focus on a single country (Primacintya and Kusuma, 2025), our paper provides one of the few cross-country examinations of the BGD–EM relationship across four major Southeast Asian economies, i.e. Malaysia, Indonesia, Singapore, and Thailand, offering comparative insights into how institutional environments moderate governance effectiveness. Second, it extends prior research by examining ESG performance as a contextual moderator, showing that the influence of gender-diverse boards on earnings management depends on the authenticity of firms' sustainability engagement. This perspective clarifies that ESG is not merely a parallel governance mechanism but a condition that can strengthen or weaken the effectiveness of board diversity. Third, while prior studies (Akter *et al*., 2024) focus on REM, our research, by distinguishing between accrual-based and real earnings management, uncovers which forms of managerial discretion are more effectively constrained by female directors. Finally, it contributes to theory by integrating resource dependence, social role, and groupthink perspectives to explain why board diversity may yield divergent effects depending on institutional quality and ESG practices. Overall, this research provides new evidence from a region that remains underrepresented in the global governance literature, offering practical implications for regulators, investors, and firms seeking to promote genuine gender inclusivity and sustainable governance reforms in emerging markets.

The remainder of this paper is structured as follows: Section 2 provides an overview of Southeast Asia's institutional setting. Section 3 reviews relevant literature and develops our framework. Section 4 details data, sample, variables, and methodology. Section 5 shows multivariate results, including effects and robustness checks. Section 5 discusses findings, implications, and significance. Section 6 concludes with a summary and recommendations for policymakers, firms, and investors.

2. Institutional setting

The institutional settings of Asian markets particularly Thailand, Malaysia, Singapore, and Indonesia are distinctive and heterogeneous, often characterized by weaker, less uniform governance infrastructures than those found in Western economies (Oehmichen, 2018). In these contexts, ESG engagement is shaped less by mature internal governance systems and more by external institutional pressures related to legitimacy, regulatory signalling, and stakeholder expectations. Recent evidence from developing Asian economies shows that ESG practices often emerge in response to external scrutiny rather than internal governance maturity, leading to a hybrid pattern that combines substantive sustainability efforts with symbolic disclosure (Abu Afifa *et al*., 2024a, b). This institutional environment is especially relevant for ASEAN economies, where variations in ownership concentration, regulatory quality, and enforcement intensity condition the effectiveness of governance mechanisms.

Building on this perspective, ESG engagement is conceptualized in this study not as a direct substitute for board governance but as an institutionally embedded mechanism that shapes how board attributes influence firm behaviour. In particular, ESG may either reinforce or constrain the effectiveness of board gender diversity in limiting earnings management. This approach aligns with recent evidence showing that ESG is not a monolithic governance construct but a multidimensional mechanism whose effects depend on mediating and moderating conditions (Nguyen *et al*., 2025). Treating ESG as an interactional force, therefore, provides a stronger theoretical foundation for examining its role in conditioning the governance impact of female board representation in developing Asian contexts.

The governance landscape across Southeast Asia further underscores the importance of contextual analysis. Malaysia has actively promoted board gender diversity, targeting at least 30% female representation (Alahdal *et al*., 2024), while Thailand and Indonesia are characterized by family-dominated and oligarchic ownership structures, respectively (Oehmichen, 2018). Singapore, by contrast, operates within a more advanced regulatory and market environment (Hardiningsih *et al*., 2024; Hermawan *et al*., 2025). These institutional differences imply that the governance benefits of board gender diversity and ESG engagement are unlikely to be uniform across countries. Furthermore, across ASEAN markets, female board representation is increasingly associated with stronger oversight, higher ethical standards, and more conservative financial decision-making, all of which are linked to lower earnings management (Alves, 2023; Srinidhi *et al*., 2011). At the same time, board gender diversity is recognized as a key driver of ESG adoption in Asian firms, with ESG performance influencing how diversity translates into governance and reporting outcomes (Alahdal *et al*., 2024; Hermawan *et al*., 2025). Given the central role of high-quality financial reporting in mitigating agency conflicts and supporting informed investment decisions (Assad *et al*., 2023a, b), this study argues that ESG engagement conditions rather than replace the governance role of female directors in enhancing financial reporting quality.

3. Literature review and hypothesis development

Prior research attributes gender differences in business behaviour to variations in ethical orientation and risk preferences, which influence managerial judgement and governance outcomes (Croson and Gneezy, 2009; Palvia *et al*., 2014; Abbott *et al*., 2012). From a resource dependence perspective, female directors represent valuable board resources, contributing diverse expertise, external linkages, and enhanced monitoring, thereby improving decision-making and financial reporting transparency (Hillman *et al*., 2000; Brahma *et al*., 2021; Dobija *et al*., 2022). Social role theory further suggests that women's stronger ethical sensitivity and stakeholder orientation promote integrity, prudence, and accountability in financial reporting (Eagly and Karau, 2002; Boulouta, 2013a). However, groupthink theory cautions that these benefits may be weakened when female representation is symbolic or constrained by institutional and cultural barriers, limiting their influence on board deliberations (Janis, 1972). Accordingly, the governance impact of board gender diversity depends not only on representation but also on meaningful inclusion and supportive institutional conditions.

3.1 Board gender diversity and earnings management

The relationship between board gender diversity (BGD) and earnings management (EM) has garnered significant attention in corporate governance research, yet remains both theoretically and empirically debated. From a resource dependence perspective, female directors improve board effectiveness by offering diverse expertise, external connections, and independent viewpoints that enhance monitoring and limit managerial discretion in financial reporting (Hillman *et al*., 2000). This improved oversight is expected to restrict opportunistic accounting choices and mitigate earnings management. Complementing this view, social role theory suggests that women tend to demonstrate stronger ethical sensitivity, risk aversion, and stakeholder focus, traits that encourage transparency and conservative financial reporting (Eagly and Karau, 2002). Together, these theories imply that gender-diverse boards are better equipped to challenge managerial opportunism and curb earnings management. Empirical evidence largely backs this reasoning. Studies such as Srinidhi *et al*. (2011), Arun *et al*. (2015), and García Lara *et al*. (2017) show that firms with higher female board representation have better accrual quality and lower earnings manipulation, attributing these results to improved monitoring and ethical oversight. However, these positive effects are not universal and may depend on the institutional and cultural contexts in which boards operate. In emerging markets, particularly in Southeast Asia, boards often operate within concentrated ownership

structures, patriarchal norms, and informal governance systems, which can either facilitate or hinder the effectiveness of female directors. When institutional support for inclusion is strong and board roles are substantive, the monitoring and ethical advantages predicted by resource dependence and social role theories are more likely to materialize. Accordingly, and consistent with this dominant theoretical perspective, we propose the following hypothesis:

H1a. Board gender diversity has a positive impact on mitigating the level of earnings management.

Despite the arguments advanced by resource dependence and social role theories, an alternative perspective suggests that board gender diversity may not necessarily constrain earnings management in all settings. Drawing on groupthink theory (Janis, 2008), diversity can lose its governance value when board processes are dominated by consensus-seeking behaviour, hierarchical power structures, or the influence of entrenched controlling shareholders. In such environments, the monitoring advantages associated with diverse expertise and ethical orientation may be overridden by pressures to preserve harmony and avoid conflict, limiting effective scrutiny of managerial decisions. Minority board members, particularly women, may experience restricted voice, informal exclusion from key discussions, or subtle pressure to conform to dominant norms, thereby weakening their capacity to challenge managerial discretion or opportunistic financial reporting (Loh and Nguyen, 2018; Wu *et al.*, 2024).

This perspective directly challenges the assumptions underlying H1a, which presumes that the presence of female directors translates into substantive oversight and ethical influence. Under groupthink conditions, however, gender diversity may be largely symbolic rather than functional. When appointments are driven by compliance or reputational motives rather than genuine empowerment, female directors may lack the authority or institutional support necessary to change their reporting behaviour. In such cases, diversity does not enhance monitoring but may instead coexist with, or even mask, weak governance practices. Consequently, the expected negative relationship between board gender diversity and earnings management may be attenuated, insignificant, or reversed, particularly in institutional settings where board independence and open dissent are limited. This concern is especially salient in Southeast Asian institutional environments, where corporate governance is often characterized by concentrated ownership, family control, relational ties, and culturally embedded norms regarding authority and gender roles. In these settings, female directors may be appointed to satisfy regulatory expectations or symbolic diversity objectives rather than to exercise substantive monitoring power. When gender diversity is largely tokenistic, the presence of women on boards may have little effect on earnings management or, in some cases, may even exacerbate coordination problems and reduce effective oversight. Prior empirical evidence from emerging markets, which documents insignificant or adverse effects of board gender diversity, lends support to this view (Sun *et al.*, 2011; Gull *et al.*, 2018; Orazalin, 2020). Accordingly, where institutional constraints limit meaningful board participation and dissent, the governance benefits of gender diversity may fail to materialize. This leads to the following competing hypothesis:

H1b. Board gender diversity does not significantly improve, and may, in some cases, increase the level of earnings management.

3.2 The moderating role of ESG

Environmental, Social, and Governance (ESG) performance has become an integral dimension of corporate governance and financial transparency, reflecting a firm's ethical culture and stakeholder orientation (Eccles *et al.*, 2014; Kolk, 2016). Building on the discussion of board gender diversity (BGD) and earnings management (EM), this study posits that ESG performance moderates the relationship between BGD and EM by shaping the

organizational context in which female directors operate. In organizations with relatively strong and substantive ESG engagement, the ethical and stakeholder-oriented values often associated with female directors may be reinforced by a more supportive corporate culture. This alignment can potentially enhance the capacity of gender-diverse boards to constrain earnings management by strengthening monitoring processes and encouraging greater transparency and more conservative financial reporting practices (Galbreath, 2018; Post *et al*., 2011).

However, this moderating role of ESG may not be uniform across institutional settings. In firms operating within weak governance environments**,** ESG engagement may be largely symbolic, driven by reputational considerations rather than genuine commitment to ethical conduct. In such cases, high ESG scores may reflect *greenwashing* or *governance washing* rather than substantive improvements in oversight, offering limited support for female directors when challenging managerial discretion. Consequently, ESG practices may fail to strengthen and may even weaken the governance benefits of board gender diversity, particularly where institutional enforcement and board empowerment are limited (Harjoto *et al*., 2015; Jizi *et al*., 2014). Taken together, these arguments suggest that ESG performance acts as a contextual moderator whose effect depends on the authenticity of sustainability engagement and the surrounding institutional environment. Accordingly, we propose the following hypothesis:

H2. ESG performance moderates the relationship between board gender diversity and earnings management, enhancing the mitigating impact of gender-diverse boards when ESG engagement is meaningful but reducing or eliminating it when ESG practices are mostly symbolic.

The conceptual framework summarizing the link between BGD, ESG and EM is given in Figure 1 below:

4. Research design

4.1 Data

This study employs an empirical approach to investigate the intricate relationship between board gender diversity (BGD), earnings management (EM), and the moderating effect of Environmental, Social, and Governance (ESG) performance in the Southeast Asian context. The dataset comprises publicly listed non-financial firms from four major Southeast Asian economies, i.e. Malaysia, Indonesia, Singapore, and Thailand, selected purposively for the period 2012 to 2022 [2]. These countries were chosen due to their distinct institutional

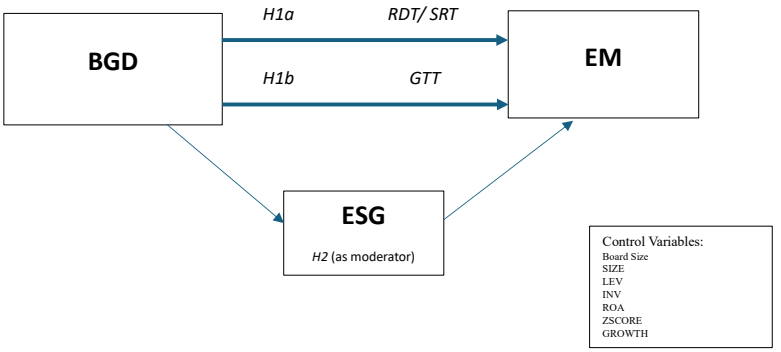

Figure 1. Conceptual framework

contexts, divergent corporate governance structures, and varying levels of board gender diversity. This selection enables a nuanced, cross-country analysis that captures contextual variations often overlooked in single-country studies. The sample period is particularly significant, as it coincides with heightened global emphasis on corporate governance reforms, sustainability efforts, and the promotion of gender diversity in leadership, making it an ideal period for empirical investigation in emerging markets. Financial and ESG data were sourced from Refinitiv DataStream, a financial database known for its comprehensive and reliable coverage of corporate and sustainability metrics. The initial sample included all non-financial firms listed on the stock exchanges of the selected countries. Financial institutions were excluded due to their distinct regulatory frameworks, disclosure requirements, and capital structures, which could distort comparative analysis. Further, firm-year observations with missing data on key variables were also excluded. Following this data filtering process, our final panel dataset consisted of 1,643 firm-year observations.

4.2 Dependent variables

4.2.1 Accruals earnings management. Accruals earnings management was estimated using discretionary working capital accruals (DisWCA), serving as a proxy for managerial manipulation of reported earnings. This proxy focuses on short-term earnings management through the manipulation of working capital. DisWCA is derived from the Modified Jones Model (Jones, 1991), a widely accepted measure for separating the discretionary and nondiscretionary components of accruals. The model for working capital accruals is expressed as follows:

$$\frac{DisWCA_{i,t}}{A_{i,t-1}} = \alpha_0 \left(\frac{1}{A_{i,t-1}}\right) + \alpha_1 \left(\frac{\Delta REV_{i,t}}{A_{i,t-1}}\right) + \alpha_2 \left(\frac{PPE_{i,t}}{A_{i,t-1}}\right) + \varepsilon_{i,t} \quad (1)$$

where $DisWCA_{i,t}$ is the total working capital accruals for firm i in year t, calculated as the change in non-cash current assets less the change in current liabilities (excluding short-term debt and taxes payable). $\Delta REV_{i,t}$ is the change in revenues, and $PPE_{i,t}$ is the gross property, plant, and equipment. All variables are scaled by lagged total assets ($A_{i,t-1}$). α0, α1, α2 are the Regression coefficients to be estimated by the model. The discretionary portion of working capital accruals ($DisWCA$) is represented by the residuals ($\varepsilon_{i,t}$) from this regression. The absolute value of these residuals is used as the proxy, where a higher value of $|\ DisWCA\ |$ indicates a greater level of discretionary manipulation of working capital and, consequently, higher earnings management.

While the Modified Jones Model and its variants have been extensively used in prior research (Dechow *et al*., 1995; DeFond and Subramanyam, 1998; Kothari *et al*., 2005; Mouselli *et al*., 2012), their advantages and limitations are well-documented (Guy *et al*., 1996; Young, 1999; Thomas and Zhang, 2000; Lo, 2008; Dechow *et al*., 2010; DeFond, 2010). Despite some acknowledged shortcomings, these models remain the most prevalent and accepted approaches for estimating discretionary accruals in the absence of a universally superior alternative (Botsari and Meeks, 2008). The focus on working capital accruals is explicitly justified by their susceptibility to short-term manipulation and their relevance in capturing earnings management practices that are more likely to be influenced by board composition and oversight (McNichols and Stubben, 2018).

The key to the Modified Jones Model lies in its adjustment to the revenue variable, which accounts for managerial discretion. The discretionary portion is not just the residual of the above regression. Instead, it is calculated by first predicting the non-discretionary accruals using the coefficients from the regression, but with a crucial modification: the change in revenue is adjusted by the change in accounts receivable. The formula for predicted non-discretionary accruals is:

$$NDA_{i,t} = \widehat{\alpha}_0 \left(\frac{1}{A_{i,t-1}}\right) + \widehat{\alpha}_1 \left(\frac{\Delta REV_{i,t} - \Delta REC_{i,t}}{A_{i,t-1}}\right) + \widehat{\alpha}_2 \left(\frac{PPE_{i,t}}{A_{i,t-1}}\right) \quad (2)$$

Where α^0, α^1, α^2: The estimated coefficients from the initial regression. $\Delta REC_{i,t}$: The change in accounts receivable for firm i in year t. This adjustment is the "modification" that makes the model more robust by preventing managers' manipulation of revenue from being incorrectly classified as non-discretionary. The Discretionary Working Capital Accruals (*DisWCA*) are calculated as the difference between a firm's actual total accruals and its predicted non-discretionary accruals:

$$DisWCA_{i,t} = TCA_{i,t} - NDA_{i,t} \quad (3)$$

The absolute value of this number, $|\ DisWCA_{i,t}|$, is often used as the final measure of the magnitude of earnings management.

4.2.2 Real earnings management (REM). To measure real earnings management (REM), we employ three proxies based on the seminal work of Roychowdhury (2006), which captures managerial manipulation of real business activities to meet earnings targets. Unlike accrual-based earnings management, REM involves actual changes in the timing or structuring of real transactions, making it more difficult to detect but potentially more costly to the firm's long-term value.

The first measure of REM captures abnormal production costs, built on the premise that managers may overproduce to spread fixed costs over a larger number of units, thereby reducing the cost of goods sold and increasing reported earnings. We estimate the normal level of production costs using the following regression model:

$$\frac{PROD_{it}}{Assets_{i,t-1}} = \alpha_0 + \alpha_1 \left(\frac{1}{Assets_{i,t-1}}\right) + \beta_1 \left(\frac{Sales_{i,t}}{Assets_{i,t-1}}\right) + \beta_2 \left(\frac{\Delta\ Sales_{i,t}}{Assets_{i,t-1}}\right) + \beta_3 \left(\frac{\Delta\ Sales_{i,t-1}}{Assets_{i,t-1}}\right) + \varepsilon_{i,t} \quad (4)$$

where $PROD_{it} = COGS_{i,t} + \Delta INV_{i,t}$, representing the sum of the cost of goods sold and the change in inventory from period $t-1$ to t. $Sales_{i,t}$ represents annual sales, $\Delta\ Sales_{i,t}$ denotes the change in sales from period $t-1$ to t, and $\Delta\ Sales_{i,t-1}$ is the change in sales from $t-2$ to $t-1$. $Assets_{i,t-1}$ represents lagged total assets. The residuals from this regression represent abnormal production costs (APROD). Higher values of APROD indicate overproduction relative to normal levels, suggesting upward earnings management through increased production to reduce per-unit fixed costs and improve reported profit margins.

The second proxy measures abnormal discretionary expenses, based on the premise that managers may reduce discretionary spending on research and development, advertising, and selling, general, and administrative expenses to boost short-term earnings. We estimate normal discretionary expenses using:

$$\frac{DISX_{i,t}}{Assets_{i,t-1}} = \alpha_0 + \alpha_1 \left(\frac{1}{Assets_{i,t-1}}\right) + \beta_1 \left(\frac{Sales_{i,t-1}}{Assets_{i,t-1}}\right) + \varepsilon_{i,t} \quad (5)$$

where $DISX_{i,t}$ represents the sum of research and development expenses, advertising expenses, and selling, general, and administrative expenses. $Sales_{i,t-1}$ represents lagged annual sales, and $Assets_{i,t-1}$ represents lagged total assets. The residuals from this regression, multiplied by -1, represent abnormal discretionary expenses (ADISX). Higher values of ADISX indicate lower than normal discretionary spending, suggesting upward earnings management through the reduction of discretionary expenses that may harm long-term firm value.

The third measure captures abnormal cash flow from operations, recognizing that managers may manipulate the timing of sales through aggressive credit terms, price discounts, or channel stuffing to accelerate revenue recognition. We estimate normal cash flow from operations using:

$$\frac{CFO_{it}}{Assets_{i,t-1}} = \alpha_0 + \alpha_1\left(\frac{1}{Assets_{i,t-1}}\right) + \beta_1\left(\frac{Sales_{i,t}}{Assets_{i,t-1}}\right) + \beta_2\left(\frac{\Delta\, Sales_{i,t}}{Assets_{i,t-1}}\right) + \varepsilon_{i,t} \quad (6)$$

where CFO_{it} represents cash flow from operations, $Sales_{i,t}$ represents annual sales, and $\Delta\, Sales_{i,t}$ denotes the change in sales from period $t-1$ to t. The residuals from this regression, multiplied by -1, represent abnormal cash flow from operations (ACFO). Higher values of ACFO indicate lower-than-normal cash flows relative to sales, suggesting potential manipulation of sales timing or terms to inflate current-period revenues.

Following prior literature (Cohen *et al*., 2008; Zing, 2012), we construct an aggregate measure of real earnings management by combining the three individual proxies:

$$REM\_agg = \text{APROD} + \text{ADISX} + \text{ACFO} \quad (7)$$

This aggregate measure captures the overall extent of real earnings management activities, with higher values indicating greater manipulation of real business activities to manage earnings upward. The use of an aggregate measure is particularly important as managers may employ multiple REM techniques simultaneously, and the combined effect provides a more comprehensive assessment of real earnings management intensity.

All REM measures are industry-year adjusted to control for industry-specific and time-varying factors that may affect normal levels of production costs, discretionary expenses, and cash flows. This approach ensures that our measures capture firm-specific deviations from expected levels rather than industry or temporal patterns.

4.2.3 Independent variables. Board gender diversity (BGD) is measured as the proportion of female directors on the board (FemaleonBoard).This continuous measure is consistent with established practices in corporate governance research (Arun *et al*., 2015; Orazalin, 2020), providing a direct representation of female representation in the boardroom. The moderating variable, ESG engagement, is measured using the firm's aggregate ESG score sourced from Refinitiv DataStream. This score combines the environmental, social, and governance engagement indicators, providing a comprehensive assessment of a company's commitment to sustainability and ethical business conduct. Higher ESG scores reflect stronger sustainability performance. Following prior literature (e.g. Assad *et al*., 2023a, b; Hemmings *et al*., 2022), we control for omitted variable bias and capture firm-specific factors that may influence earnings management, several control variables were included in the analysis, each grounded in theoretical and empirical literature. Firm size (*SIZE*), measured as the natural logarithm of total assets, accounts for the complexity and resources of larger firms, which can impact financial reporting practices. Leverage (*LEV*), calculated as total debt over total assets, reflects financial pressure that may incentivize earnings manipulation. Investment intensity (*INV*), measured by capital expenditures relative to total assets, captures the potential for discretionary accruals linked to capital investments. Profitability (*ROA*), defined as net income divided by total assets, can affect managerial incentives for earnings management. Altman's Z-score (*ZSCORE*) is used to assess financial stability, with lower scores indicating higher bankruptcy risk and a greater likelihood of earnings manipulation. Growth (*GROWTH*), measured as the annual percentage change in total assets, reflects different earnings management incentives between high-growth and mature firms. Lastly, Board size, measured by the total number of directors, is included to account for the board's monitoring capacity and its influence on earnings management. Table 1 below provides the details of all the variables.

Table 1. Summary of key variables definitions

Variable	Definition
Dependent variables	
DisWCA	Discretionary working capital accruals measuring accrual-based earnings management, calculated using the modified Jones model. Higher values indicate greater accrual-based earnings management
APROD	Abnormal production costs measuring real earnings management through overproduction. Higher values indicate greater manipulation via increased production to reduce per unit fixed costs
ADISX	Abnormal discretionary expenses measuring real earnings management through reduction of R&D, advertising, and SG&A expenses. Higher values indicate greater manipulation via cutting discretionary
ACFO	Abnormal cash flow from operations measuring real earnings management through sales manipulation. Higher values indicate greater manipulation via accelerated sales recognition or aggressive credit terms
REM_agg	Aggregate real earnings management measure combining APROD, ADISX, and ACFO. Higher values indicate greater overall real earnings management activities
Independent variables	
FemaleonBoard	Proportion (%) of women on the board of directors, measuring board gender diversity
ESGScore	Firm's Environmental, Social, and Governance performance score from Refinitiv, ranging from 0 to 100. Higher score indicate better ESG performance
ESG_ENV	Environmental pillar score from Refinitiv ESG database, measuring firm's environmental performance and impact
ESG_SOC	Social pillar score from Refinitiv ESG database, measuring firm's social responsibility and stakeholder relations
ESG_GOV	Governance pillar score from Refinitiv ESG database, measuring firm's corporate governance practices and board effectiveness
Control variables	
BoardSize	Total number of directors serving on the board of directors
SIZE	Firm size measured as the natural logarithm of total assets (in millions USD)
LEV	Financial leverage ratio calculated as total debt divided by total assets
INV	Inventory intensity measured as the proportion of total assets represented by inventory
ROA	Return on assets calculated as net income divided by total assets. Measuring firm profitability
ZSCORE	Taffler (1983) Z-score measuring firm's financial health and bankruptcy risk. Higher scores indicate better financial health
GROWTH	Asset growth rate calculated as the proportional change in total assets from the previous year

4.3 Model Specifications

To examine the direct relationship between board gender diversity and earnings management (H1a), the baseline regression model is specified as follows:

$$EM_{it} = \beta_0 + \beta_1\ FemaleonBoard_{it} + \sum_{t=1}^{i} FirmControls + \sum_{t=1}^{i} CountryFixed + \sum_{t=1}^{t} Year + \sum_{t=1}^{i} IndustryFixed + \varepsilon_{it} \quad (8)$$

Where: EM_{it} represents (i) the accrual earnings management measure (DisWCA) and (ii) real earnings management (*REM_agg*) for firm i in $year_t$. $FemaleonBoard_{it}$ is the percentage of female directors on the board for firm i in $year_t$. $\sum_{t=1}^{i} FirmControls$ represents the vector of control variables (*SIZE, LEV, INV, ROA, ZSCORE, GROWTH, BoardSize*) for firm *i* in $year_t$. *

IndustryFixed, *Year*, and *CountryFixed* are dummy variables for industry, year, and country fixed effects, respectively, accounting for unobserved time-invariant and country-specific characteristics. * ε_{it} is the error term.

To assess the moderating effect of ESG performance on the relationship between BGD and EM (H2), an interaction term ($FemaleonBoard_{it}$*$ESGScore_{it}$) is included in the model:

$$EM_{it} = \beta_0 + \beta_1\, FemaleonBoard_{it} + \beta_2 ESGScore_{it} + \beta_3 (FemaleonBoard_{it} * ESGScore_{it}) + \sum_{t=1}^{i} FirmControls + \sum_{t=1}^{i} CountryFixed + \sum_{t=1}^{t} Year + \sum_{t=1}^{i} IndustryFixed + \varepsilon_{it} \quad (9)$$

Where: * $ESGScore_{it}$ is the ESG performance score for firm i in year t. * FemaleonBoard_it × ESGScore_it is the interaction term capturing the moderating effect of ESG performance. * All other variables are as defined in the baseline model.

We employ a fixed effects panel regression model with firm fixed effects to control for unobserved time-invariant firm characteristics and country characteristics. In addition, this approach addresses potential issues of heteroscedasticity and serial correlation within firms, ensuring more reliable inference. The inclusion of fixed effects for industry, year, and country is crucial for controlling unobserved heterogeneity and isolating the specific effects of the variables of interest. Descriptive statistics and correlation matrices for all variables are presented in Table 2 and Table 3, respectively, in the Results section. Multicollinearity was assessed using the Variance Inflation Factor (VIF), with all values well below the conventional threshold of 10, indicating no serious concerns regarding multicollinearity. Furthermore, we centred the BGD and ESG variables before creating the interaction term to reduce multicollinearity and enhance the interpretability of the results. All VIF values are below 5 (well under the threshold of 10), indicating no multicollinearity issues. We also tested uncentred variables, and the results remain consistent, confirming that the conclusions are not affected by the choice of centring.

5. Results and discussion

5.1 Descriptive statistics

Table 2 Panel A provides a descriptive overview of the main variables. The mean absolute discretionary accruals (|DisWCA| = 0.031) and aggregate real earnings management (*REM_agg* = 0.204) indicate moderate levels of earnings manipulation, consistent with prior studies in emerging markets such as Orazalin (2020). The average board gender diversity (*FemaleonBoard* = 15.12%) indicates that women's representation remains relatively low, echoing findings by Srinidhi *et al*. (2011) and Brahma *et al*. (2021) that gender imbalance persists despite growing awareness. The mean *ESG* score (45.09) reflects moderate sustainability engagement, comparable to Hermawan *et al*. (2025), who reported similar ESG performance levels among emerging markets firms. Table 2 Panel B shows clear cross-country differences. Earnings management is higher in Malaysia and Indonesia than in Singapore and Thailand, reflecting weaker governance environments (Kyaw *et al*., 2015). Female board representation is highest in Singapore (19.8%) and lowest in Malaysia (8.8%), consistent with Hermawan *et al*. (2025), who link gender diversity to stronger institutions. Thailand's higher ESG score (54.4) compared to Singapore's lower score (42.1) suggests a varying commitment to sustainability. These patterns align with Orazalin (2020), highlighting how institutional and cultural contexts shape board diversity, ESG engagement, and earnings management across Southeast Asia. Table 2, Panel C, shows weak correlations and VIF among the variables, indicating no concerns about multicollinearity. ESGScore's positive association with firm size and board size suggests that larger firms are more engaged in ESG activities.

Table 2. Descriptive statistics

Panel A: Full sample descriptive statistics

Variables	(1) *N*	(2) Mean	(3) sd	(4) min	(5) p25	(6) p50	(7) p75	(8) max
|DisWCA|	1,643	0.031	0.033	0.001	0.010	0.021	0.040	0.244
|ACFO|	1,643	0.079	0.084	0.001	0.022	0.053	0.101	0.531
|ADISEXP|	1,643	0.065	0.068	0.001	0.020	0.043	0.087	0.446
|APROD|	1,643	0.105	0.114	0.001	0.031	0.071	0.136	0.684
|REM_agg|	1,643	0.204	0.218	0.002	0.061	0.140	0.262	1.298
FemaleonBoard	1,643	15.121	12.865	0.001	0.000	14.290	25.000	50.000
ESGScore	1,643	45.092	19.424	6.930	29.250	43.290	60.370	86.730
BoardSize	1,643	8.760	2.938	3.000	7.000	8.000	10.000	18.000
SIZE	1,643	14.210	1.405	10.012	13.185	14.472	15.387	15.927
LEV	1,643	0.246	0.171	0.001	0.103	0.243	0.363	0.717
INV	1,643	0.134	0.131	0.001	0.034	0.102	0.193	0.687
ROA	1,643	0.065	0.080	−0.355	0.022	0.051	0.093	0.325
ZSCORE	1,643	15.435	13.224	−38.232	8.962	12.938	18.622	78.221
GROWTH	1,643	0.075	0.225	−0.389	−0.037	0.037	0.126	1.594

Panel B: Descriptive statistics for individual country

Variables	ID *N*	ID Mean	MY *N*	MY Mean	SG *N*	SG Mean	TH *N*	TH Mean
|DisWCA|	336	0.034	770	0.032	281	0.028	256	0.028
|ACFO|	336	0.105	770	0.077	281	0.066	256	0.065
|ADISEXP|	336	0.071	770	0.058	281	0.081	256	0.062
|APROD|	336	0.133	770	0.099	281	0.093	256	0.097
|REM_agg|	336	0.258	770	0.191	281	0.191	256	0.188
FemaleonBoard	336	8.803	770	19.842	281	11.263	256	13.450
ESGScore	336	46.366	770	42.149	281	43.126	256	54.428
BoardSize	336	6.315	770	8.401	281	9.189	256	12.578

(*continued*)

Table 2. Continued

Panel B: Descriptive statistics for individual country

Variables	ID		MY		SG		TH	
	N	Mean	*N*	Mean	*N*	Mean	*N*	Mean
SIZE	336	14.675	770	13.675	281	14.780	256	14.582
LEV	336	0.221	770	0.229	281	0.238	256	0.341
INV	336	0.145	770	0.123	281	0.126	256	0.166
ROA	336	0.089	770	0.062	281	0.051	256	0.056
ZSCORE	336	15.826	770	16.386	281	16.964	256	10.383
GROWTH	336	0.098	770	0.062	281	0.069	256	0.090

Panel C: Correlation and VIF

Variables	VIF	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) |DisWCA|		1.000												
(2) |ACFO|		0.404*	1.000											
(3) |ADISEXP|		0.120*	0.167*	1.000										
(4) |APROD|		0.216*	0.398*	0.573*	1.000									
(5) |REM_agg|		0.241*	0.562*	0.618*	0.887*	1.000								
(6) FemaleonBoard	1.34	−0.011	−0.004	−0.014	0.030	0.025	1.000							
(7 ESGScore	3.26	−0.063*	0.051*	0.027	0.093*	0.102*	0.088*	1.000						
(8) SIZE	1.83	−0.210*	−0.169*	−0.188*	−0.142*	−0.154*	−0.225*	0.289*	1.000					
(9) LEV	1.58	0.027*	−0.045*	−0.134*	−0.072*	−0.067*	0.004	0.120*	0.319*	1.000				
(10) INV	1.17	0.042*	0.013	0.034*	0.120*	0.094*	−0.002	−0.088*	−0.029*	0.086*	1.000			
(11) ROA	1.60	−0.187*	0.081*	0.061*	0.194*	0.166*	−0.006	0.053*	0.083*	−0.302*	0.056*	1.000		
(12) ZSCORE	1.58	−0.047*	0.082*	0.037*	0.077*	0.070*	−0.021	−0.090*	−0.094*	−0.428*	−0.096*	0.458*	1.000	
(13) GROWTH	1.14	0.169*	0.311*	0.139*	0.274*	0.257*	−0.046	−0.076*	0.015	0.012	−0.011	0.241*	0.107*	1.000

Note(s): This table presents the summary statistics of the variables in individual countries. ID refer to Indonesia, MY refer to Malaysia, SG refer to Singapore, and TH refer to Thailand. Panel B presents country-specific descriptive statistics. FemaleonBoard is the percentage of female directors on the board. ESGScore is the firm's environmental, social, and governance engagement score (0–100). |DisWCA| is the absolute value of discretionary working capital accruals, where higher values indicate lower earnings quality. REM_agg is the aggregate real earnings management measure, where higher values indicate greater earnings manipulation through operational decisions. All continuous variables are winsorized at the 1st and 99th percentiles

Table 3. The impact of FemaleonBoard on EM

Variables	Full sample	MY	ID	SG	TH
Panel A. The impact of Female on Board on AEM					
FemaleonBoard	−0.001**	−0.001*	−0.001***	−0.001***	0.001
	(−2.20)	(−1.91)	(−2.71)	(−2.71)	(0.32)
SIZE	−0.006***	−0.005***	−0.010***	−0.010***	−0.003
	(−6.81)	(−4.40)	(−3.07)	(−3.07)	(−1.24)
LEV	0.013*	0.022**	0.019	0.019	−0.002
	(1.94)	(2.01)	(1.23)	(1.23)	(−0.12)
INV	0.024***	0.041***	0.037**	0.037**	0.022
	(2.99)	(2.71)	(2.17)	(2.17)	(1.46)
ROA	0.030	0.015	0.077	0.077	−0.002
	(1.22)	(0.38)	(1.37)	(1.37)	(−0.05)
ZSCORE	−0.001	0.001	−0.001	−0.001	0.001
	(−0.09)	(0.47)	(−1.12)	(−1.12)	(0.72)
GROWTH	0.033***	0.040***	0.016*	0.016*	0.049***
	(5.05)	(3.79)	(1.73)	(1.73)	(3.60)
Constant	0.105***	0.085***	0.179***	0.179***	0.058
	(6.76)	(4.20)	(2.96)	(2.96)	(1.59)
Panel B. The impact of Female on Board on REM					
FemaleonBoard	0.001	0.001	−0.003***	−0.001	0.006***
	(0.23)	(0.45)	(−3.95)	(−0.01)	(4.88)
SIZE	−0.031***	−0.021***	−0.077***	−0.028***	−0.002
	(−6.62)	(−3.31)	(−3.87)	(−3.17)	(−0.14)
LEV	0.067*	0.053	0.084	0.225***	−0.195*
	(1.89)	(1.04)	(1.04)	(2.95)	(−1.97)
INV	0.145***	0.171**	0.241***	0.138*	0.039
	(3.73)	(2.22)	(4.09)	(1.88)	(0.46)
ROA	1.234***	0.875***	1.990***	0.606**	0.332
	(9.10)	(4.63)	(6.93)	(2.57)	(0.86)
ZSCORE	−0.002***	−0.002**	−0.002**	0.001	−0.001
	(−3.57)	(−2.46)	(−2.05)	(0.52)	(−0.27)
GROWTH	0.072**	0.116**	0.009	−0.012	0.190**
	(2.43)	(2.46)	(0.15)	(−0.28)	(2.44)
Constant	0.540***	0.414***	1.092***	0.494***	0.113
	(6.61)	(3.70)	(3.49)	(3.62)	(0.49)
Observations	1,643	770	336	281	256
R-squared	0.165	0.261	0.734	0.415	0.309
Industry FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Country FE	Yes				

Note(s): Variable definitions are provided in Table 1. T-statistics (shown in parentheses) are heteroskedasticity-robust. Statistical significance is denoted by *, **, and *** for the 10%, 5%, and 1% levels, respectively. All models include control variables and fixed effects for industry, country, and year. The definition of the variables is given in Table 1

5.1.1 Multivariate results. Table 3 Panel A shows that board gender diversity (*FemaleonBoard*) is negatively and significantly associated with accrual-based earnings management (AEM) for the full sample and for Malaysia, Indonesia, and Singapore, supporting H1a that greater female representation mitigates the propensity of earnings management. This finding aligns with social role theory (Eagly and Karau, 2002), which posits that women's ethical orientation and risk aversion promote more transparent reporting, and resource dependence theory (Hillman *et al*., 2000), which suggests that gender-diverse boards bring broader perspectives and stronger monitoring capabilities. The insignificant result for Thailand, however, supports H1b and may reflect the influence of groupthink theory

(Janis, 1972), which suggests that token female presence or cultural barriers limit their effectiveness. These results are consistent with prior studies, such as those by Srinidhi *et al.* (2011) and Arun *et al.* (2015), which have found that female directors improve accrual quality. Table 4, Panel B, shows that board gender diversity has a mixed effect on real earnings management (REM), contrasting with the consistent negative relationship observed for accrual-based manipulation [3]. For Indonesia, the negative and significant coefficient supports H1a and aligns with social role theory and resource dependence theory, suggesting that female directors' ethical orientation and monitoring skills curb REM (Srinidhi *et al.*, 2011; Arun *et al.*, 2015). In Thailand, however, the positive association supports H1b and reflects groupthink theory (Janis, 1972), implying limited influence of women in less supportive institutional settings (Orazalin, 2020; Gull *et al.*, 2018). Overall, female directors appear more effective at constraining accrual-based than real earnings management, indicating stronger oversight of accounting judgements than of operational decisions.

Table 4 reports the moderating effect of ESG engagement on the relationship between board gender diversity (BGD) and earnings management. For the full sample (Column 1), the interaction term between female board representation and ESG performance is positive and statistically significant for REM. Given that lower REM values indicate higher earnings quality and that BGD is expected to mitigate earnings management, this result suggests that stronger ESG engagement weakens the negative effect of gender-diverse boards on earnings management. In other words, higher ESG performance flattens the BGD–REM relationship, implying that the incremental monitoring role of female directors diminishes in ESG-intensive firms. This finding is consistent with a substitution view of governance mechanisms. While resource dependence and social role theories suggest that female directors enhance oversight through ethical orientation and stakeholder sensitivity, their marginal contribution is more pronounced when alternative controls are weak. In firms with strong ESG engagement, formal sustainability frameworks, enhanced disclosure, and reputational monitoring, transparency may already be institutionalized, thereby reducing reliance on board-level monitoring.

Table 4. The moderating role of ESG on the relationship between FemaleonBoard and EM

Variables	Full sample	MY	ID	SG	TH
Panel A. The moderating role of ESG on the relationship between Female on Board and AEM					
FemaleonBoard	−0.001*	−0.001**	−0.001	0.001	0.001
	(−1.91)	(−2.40)	(−0.57)	(1.47)	(0.21)
ESGScore	−0.001	−0.001	0.001	−0.001	−0.001
	(−0.39)	(−0.66)	(0.48)	(−0.37)	(−0.72)
FemaleonBoardXESG	0.001	0.001**	−0.001	−0.001	−0.001
	(1.22)	(1.97)	(−0.82)	(−1.60)	(−0.33)
Panel B. The moderating role of ESG on the relationship between Female on Board and REM					
FemaleonBoard	−0.002**	−0.002*	−0.006***	−0.004	0.005
	(−2.21)	(−1.66)	(−3.46)	(−1.45)	(1.55)
ESGScore	0.001**	0.001	0.001	0.001	0.001
	(2.34)	(0.51)	(0.77)	(1.34)	(0.27)
FemaleonBoardXESG	0.001**	0.001*	0.001*	0.001	0.001
	(2.41)	(1.83)	(1.92)	(1.44)	(0.69)

Note(s): This table presents fixed effects regression results examining whether ESG engagement moderates the relationship between board gender diversity and accrual-based earnings management, where higher values indicate lower earnings quality (greater earnings manipulation). FemaleonBoard is the percentage of female directors on the board. ESGScore is the firm's environmental, social, and governance engagement score (0–100). The interaction term (FemaleonBoard × ESGScore) tests whether ESG engagement moderates the BGD-EM relationship. All models include industry and year fixed effects. Standard errors are clustered at the firm level. *t*-statistics are reported in parentheses. ***$p < 0.01$, **$p < 0.05$, *$p < 0.10$

Alternatively, the result aligns with symbolic governance and groupthink arguments, particularly in emerging markets, where ESG performance may be driven by disclosure intensity rather than substantive governance improvements. In such contexts, ESG engagement and board gender diversity may coexist as legitimacy-enhancing mechanisms without reinforcing effective oversight, leading to a weaker observed impact of BGD on earnings management.

Table 4 (Columns 2–5) reports country-specific results on the moderating role of ESG engagement in the relationship between board gender diversity (BGD) and earnings management, revealing notable cross-country heterogeneity. Consistent with the aggregate results, the interaction term is positive and statistically significant in Malaysia and Indonesia, indicating that higher ESG engagement weakens, rather than strengthens, the marginal monitoring effect of female directors. In these contexts, ESG appears to serve as a substitute governance mechanism, enabling formal sustainability frameworks and disclosure practices to reduce reliance on board-level oversight. This interpretation remains consistent with social role and resource dependence theories once alternative governance controls are recognized (Eagly and Karau, 2002; Hillman *et al*., 2000). In Singapore, the interaction term is insignificant, suggesting that strong institutional governance limits the incremental effects of both ESG engagement and board gender diversity on earnings management, consistent with prior evidence from high-governance settings (Arun *et al*., 2015). The interaction is also insignificant in Thailand, which may reflect the relatively low representation of women on boards, constraining their ability to influence monitoring outcomes. This finding aligns with arguments about groupthink and tokenism, whereby limited female representation weakens the effectiveness of board diversity. Overall, the country-level evidence indicates that ESG's moderating role is highly context-dependent. ESG substitutes for gender-based monitoring in Malaysia and Indonesia, has limited incremental relevance in Singapore, and yields weak or potentially symbolic effects in Thailand. These results support a nuanced interpretation of H2, showing that ESG engagement conditions, rather than uniformly enhancing, the governance role of gender-diverse boards across Southeast Asian institutional settings.

5.1.2 Additional analysis. Table 5 collectively analyzes the moderating effects of the Environmental, Social, and Governance (ESG) pillars on the relationship between board gender diversity and earnings management. For the full sample, Malaysia, and Indonesia, the interaction terms between female board representation and the ESG pillars are generally positive and significant, indicating that stronger ESG engagement enhances the ability of female directors to constrain earnings management, thereby supporting H2 and aligning with social role and resource dependence theories (Eagly and Karau, 2002; Hillman *et al*., 2000). In contrast, interactions are largely insignificant in Singapore, consistent with a strong institutional environment that limits incremental governance effects, whereas results in Thailand are weak or mixed, particularly for the environmental and governance pillars, suggesting selective or symbolic ESG adoption. Overall, the evidence shows that ESG pillars reinforce the governance role of gender-diverse boards only where sustainability and governance practices are substantive, underscoring the context-dependent nature of ESG as a complementary, rather than uniformly effective, governance mechanism across Southeast Asian markets.

To mitigate potential common method bias and simultaneity concerns, this study adopts a temporal separation design by lagging all explanatory variables by one year. Board gender diversity, ESG engagement, and control variables are measured at *t–1*, while earnings management is measured at *t*. This approach strengthens causal inference by reducing contemporaneous alignment between governance characteristics and reporting outcomes. The models are estimated using firm fixed effects with year dummies to control for unobserved firm heterogeneity and common macroeconomic shocks. As reported in Table 6, the results from the temporal separation model are qualitatively consistent with the baseline findings.

Table 5. Additional analyses

Variables	Full sample	MY	ID	SG	TH
Panel A. The moderating role of EnvPillar on the relationship between Female on Board and AEM					
FemaleonBoardXEnvPillar	0.001*	0.001**	−0.001	−0.001	−0.001
	(1.92)	(2.02)	(−0.47)	(−0.90)	(−0.78)
Panel B. The moderating role of EnvPillar on the relationship between Female on Board and REM					
FemaleonBoardXEnvPillar	0.001	0.001	0.001**	0.001	−0.001
	(1.29)	(0.42)	(2.05)	(0.47)	(−0.46)
Panel C. The moderating role of SocPillar on the relationship between Female on Board and AEM					
FemaleonBoardXSocPillar	0.001	0.001**	−0.001	−0.001*	0.001
	(1.13)	(2.05)	(−0.89)	(−1.87)	(0.49)
Panel D. The moderating role of SocPillar on the relationship between Female on Board and REM					
FemaleonBoardXSocPillar	0.001**	0.001	0.001	0.001	0.001
	(2.00)	(1.30)	(1.51)	(1.33)	(1.57)
Panel E. The moderating role of GovPillar on the relationship between Female on Board and AEM					
FemaleonBoardXGovPillar	0.001	0.001*	−0.001	−0.001	−0.001
	(0.72)	(1.92)	(−0.64)	(−0.78)	(−0.74)
Panel F. The moderating role of GovPillar on the relationship between Female on Board and REM					
FemaleonBoardXGovPillar	0.001***	0.001***	0.001**	0.001	−0.001
	(2.94)	(3.47)	(2.08)	(0.98)	(−0.31)

Note(s): This table presents fixed effects regression results examining whether the pillars of ESG engagement moderates the relationship between board gender diversity and accrual-based earnings management. The dependent variable is the absolute value of discretionary working capital accruals (|DisWCA|), where higher values indicate lower earnings quality (greater earnings manipulation). FemaleonBoard is the percentage of female directors on the board. Pillars are the firm's environment, social, or governance engagement score (0–100). The interaction terms test whether this commitment moderates the BGD-EM relationship. All models include industry and year fixed effects. Standard errors are clustered at the firm level. t-statistics are reported in parentheses. ***$p < 0.01$, **$p < 0.05$, *$p < 0.10$

Table 6. The impact of FemaleonBoard on EM using the temporal separation model

Variables	Full sample	MY	ID	SG	TH
Panel A. The impact of FemaleonBoard on AEM					
Lag_FemaleonBoard	−0.002*	−0.001	−0.004***	−0.001***	0.001
	(−1.84)	(−0.44)	(−2.49)	(−2.71)	(0.06)
Panel B. The impact of FemaleonBoard on REM					
Lag_FemaleonBoard	−0.004	−0.013	−0.026**	−0.001	0.073
	(0.85)	(1.99)	(−−2.31)	(−−0.42)	(5.28)
Observations	1,253	519	289	242	203
R-squared	0.123	0.143	0.151	0.245	0.053
Controls	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Country FE	Yes				

Note(s): This table presents temporal separation regression results examining the relationship between board gender diversity and accrual-based earnings management. The dependent variable is the absolute value of discretionary working capital accruals (|DisWCA|), where higher values indicate lower earnings quality (greater earnings manipulation). The *lag FemaleonBoard* is the percentage of female directors on the board in $t-1$. All models include industry and year fixed effects. Standard errors are clustered at the firm level. t-statistics are reported in parentheses. ***$p < 0.01$, **$p < 0.05$, *$p < 0.10$

6. Conclusion

This study examines the relationship between board gender diversity (BGD) and earnings management, and the moderating role of ESG engagement, in four major Southeast Asian economies. Consistent with prior governance arguments, board gender diversity is generally associated with lower earnings management, supporting the view that female directors enhance monitoring and ethical oversight. However, the moderating analysis reveals that ESG engagement does not uniformly reinforce this effect. Instead, the positive interaction between BGD and ESG performance indicates a substitution effect, whereby strong ESG frameworks weaken the marginal governance contribution of female directors. In Malaysia and Indonesia, ESG appears to function as an alternative governance mechanism, reducing reliance on board-level monitoring, while in Singapore, where institutional governance is already strong, neither ESG nor BGD exerts significant incremental effects. In Thailand, the mixed results suggest either limited complementarities or symbolic ESG adoption, raising concerns about governance washing in weaker institutional settings.

By integrating resource dependence, social role, and groupthink perspectives, this study reconciles mixed evidence in the BGD–earnings management literature and demonstrates that ESG engagement can both condition and constrain the effectiveness of gender-diverse boards. The findings caution against assuming that governance mechanisms are inherently complementary and underscore the importance of institutional context in shaping their interaction. For policymakers, the results suggest that gender quotas alone are insufficient without institutional frameworks that enable substantive participation and influence. For investors, the findings highlight the need to critically assess ESG scores, which may reflect symbolic compliance rather than genuine governance quality. For firms, integrating ESG and board diversity as mutually reinforcing rather than independent governance tools is essential for strengthening transparency and long-term value creation.

This study has limitations. Its focus on four Southeast Asian economies limits generalizability, and reliance on ESG scores and established earnings management proxies may not fully capture the depth of sustainability practices or reporting quality. Moreover, the analysis focuses solely on gender diversity, excluding other board attributes that may interact with ESG engagement. Future research could adopt a broader view of board diversity, explore institutional and cultural mechanisms through comparative or mixed-methods approaches, and incorporate qualitative evidence from female directors. Overall, this study shows that the governance benefits of board gender diversity are context-dependent and contingent on the authenticity of ESG engagement, emphasizing the need to move beyond symbolic compliance toward substantive governance reform in emerging markets.

Notes

1. Earnings management (EM) refers to the deliberate manipulation of financial reports through accounting choices or operational decisions to achieve specific reporting objectives (Healy and Wahlen, 1999), encompassing both accrual-based and real earnings management (Roychowdhury, 2006). Earnings quality (EQ), in contrast, represents the degree to which reported earnings faithfully reflect a firm's underlying economic performance and provide relevant information for stakeholders' decision-making (Dechow *et al.*, 2010). While EM represents managerial actions aimed at manipulating earnings, EQ reflects the impact of such actions on information reliability. These constructs are inversely related: higher EM typically results in lower EQ. In this paper, we use both terminologies interchangeably.
2. The 2012–2022 period was chosen because ESG reporting frameworks and board diversity guidelines in Asian countries had matured, data availability is most complete and reliable, the pre-COVID years provide economic stability for analysis, and the timeframe captures meaningful variation in both gender diversity and ESG engagement.
3. For the sake of brevity, we tabulate and report for aggregate REM only as the results for ACFO, ADISEXP and APROD are qualitatively similar.

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Corresponding author
Ahlam Mohamed AlKhayyal can be contacted at: U19106228@sharjah.ac.ae