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Governance and Earnings Management as Determinants of Sustainability Disclosure in the Banking Sector

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Abstract: *This study empirically investigates the nexus between Earnings Management (EM), Corporate Governance (CG), both internal and external governance, and Green Banking Disclosure (GBD) within the context of BRICS economies. EM is operationalized through indirect proxies including earnings restatements, insider trading controversies, profit warnings, and accounting irregularities. internal corporate governance is measured via a composite index reflecting board structure and characteristics, while external corporate governance is proxied by national-level gov-enhance indicators capturing institutional quality. Using a dynamic panel data approach and ap-plying the Generalized Method of Moments (GMM) to a sample of 37 commercial banks over the period 2010–2019, the findings reveal a statistically significant and positive association be-tween EM and GBD. This suggests that banks engaging in opportunistic reporting may strategi-cally deploy environmental disclosures as a legitimacy mechanism to mitigate reputational risk. Furthermore, internal governance structure exerts a positive influence on green banking disco-sure, reinforcing agency-theoretic assertions that robust internal governance can attenuate managerial discretion and enhance disclosure transparency. The effects of external corporate governance on green banking disclosure, however, appear heterogeneous, reflecting institutional divergences across national governance regimes. These findings offer important insights into how governance mechanisms shape environmental accountability in the banking sector and highlight the need for robust multi-level governance frameworks to foster sustainability-oriented disclosure practices.*

Keywords: *Green Banking Disclosure, Internal Governance Mechanism, External Governance Mechanism, Environmental Innovation, Resource Use, Greenhouse Gas Emission.*

1. INTRODUCTION

Climate change stands as the most complex and far-reaching environmental challenge in human history, driven by diverse anthropogenic activities and producing cascading global consequences. Tackling this crisis necessitates substantial behavioural shifts toward environmental sustainability. Clear indicators—such as shrinking Arctic ice, rising sea levels, and more frequent and severe heatwaves—underscore the escalating impacts of climate change (Chitre & McCarty, 2013). These developments are largely the result of unchecked technological practices, excessive resource exploitation, and the relocation of polluting industries from developed to developing nations, which has intensified the vulnerability of emerging economies (David Eck-stein, 2017). In response, the international community, through the United Nations Framework Convention on Climate Change (UNFCCC), has stressed the urgent need to align financial systems with sustainability goals—placing green finance at the core of the transition to a low-carbon economy.

Within this evolving environmental and regulatory context, the banking sector has emerged as a key player. Acting as financial intermediaries, banks allocate funds across economic agents and contribute significantly to wealth creation and overall economic development (Musa et al., 2021). Owing to their systemic influence, banks face mounting pressure to integrate environ-mental considerations into their operations through green banking practices. These efforts encompass not only internal measures to reduce institutional carbon footprints but also the development of credit and investment products that account for environmental risks (Furrer et al., 2012).

Consequently, a number of emerging economies—such as Brazil, Russia, India, China, and South Africa—have established regulatory frameworks that mandate environmental action and disclosure within the banking sector (Bose et al., 2018). These measures have not only accelerated the adoption of green financial practices but also reinforced the banking industry's responsibility in advancing environmental accountability (Bowman, 2010).

As stakeholder expectations continue to rise, banks face growing pressure to adopt transparent and comprehensive environmental disclosure practices. Green banking disclosure (GBD) refers to the reporting of a bank's environmental performance, policies, and risk management strategies. Such disclosure strengthens stakeholder confidence, guides investment decisions, and signals institutional commitment to sustainability (Chiu et al., 2020). Although many

jurisdictions have established formal reporting standards, the scope and quality of disclosures vary considerably across countries and industries. This variability highlights the need to examine the factors influencing GBD—particularly in emerging economies where regulatory frameworks and governance structures remain in transition (Volz, 2018).

Existing literature has largely explored green banking disclosure (GBD) through the lens of firm-level characteristics (e.g., size, profitability, leverage), corporate governance features (e.g., board composition, ownership structure), and broader institutional settings (Bose et al., 2018). However, empirical research on the influence of earnings management (EM) and the combined effects of internal corporate governance (ICG) and external corporate governance (ECG) on GBD remains scarce. Where these relationships have been examined, findings are often inconclusive, reflecting divergent conceptual frameworks, unidirectional analytical models, and in-consistent operationalization of governance and EM constructs (Campbell, 2007; Ganesan, 2020; Ioannou & Serafeim, 2012; Muttakin et al., 2015). Moreover, much of the existing evidence stems from single-country studies conducted within relatively uniform legal systems, which limits the generalizability of their results (Gray et al., 2001). To bridge this gap, the pre-sent study investigates the effects of EM, ICG, and ECG on GBD across the BRICS countries—an economically influential bloc marked by diverse legal, institutional, and cultural environments. To capture national governance variations systematically, we construct a composite index based on the World Governance Indicators.

The theoretical link between earnings management (EM) and green banking disclosure (GBD) remains contested. One perspective argues that firms strategically increase environmental disclosures to divert attention from opportunistic practices such as EM (Healy & Palepu, 2001; Prior et al., 2006; Zahra et al., 2005). From this standpoint, GBD operates as a form of "greenwashing," enabling firms to project a socially responsible image while concealing internal misconduct. In contrast, other scholars contend that enhanced transparency—particularly through environmental reporting—can serve as a corrective mechanism to mitigate reputational risks associated with earnings manipulation. Healy and Wahlen (1999) outline three primary drivers of EM: capital market signalling, contractual obligations, and regulatory compliance. In each case, managers may alter financial reports to influence investor perceptions, meet performance-linked compensation targets, or comply with regulatory benchmarks. However, such practices often risk regulatory intervention, investor disapproval, and reputational harm. Within this context, GBD may function as a compensatory strategy to restore stakeholder trust and rein-force organizational legitimacy.

Beyond earnings manipulation, corporate governance structures play a critical role in shaping the quality and credibility of environmental disclosures. Governance can be viewed along a continuum—from narrow models emphasizing shareholder primacy to broader frameworks that consider a wide range of stakeholders (Sternberg, 1997). Internal governance mechanisms, such as shareholder meetings, board oversight, and executive leadership, seek to align managerial actions with organizational objectives. External governance, in contrast, includes institutional, regulatory, cultural, and societal influences, encompassing legal systems, capital markets, civil society, and socio-political norms. This broader understanding aligns with stakeholder theory, which posits that firms must account for the interests of all stakeholders—not just shareholders—to maintain legitimacy (W & Triasih, 2020). Consistent with legitimacy theory, firms are motivated to engage in socially and environmentally responsible disclosure practices to mitigate reputational risks and avoid stakeholder sanctions. Such disclosures enhance stakeholder confidence, strengthen corporate identity, foster customer loyalty, ensure regulatory compliance, and cultivate strategic relationships with key external actors.

1.1. Motivations Underlying this Research

Despite the growing importance of corporate social responsibility (CSR) in both academic research and organizational practice, empirical studies examining its real-world impact—particularly in developing and emerging economies—remain limited. Debate continues regarding the extent to which CSR initiatives contribute to broader societal development in the con-temporary context (Stanca et al., 2020). Much of the research on corporate environmental dis-closure (CED) has focused on developed economies (e.g., Giannarakis, 2014; Jizi, 2017; Wang, 2015), while studies exploring these practices in emerging markets are comparatively sparse (e.g., AlHares, 2025; Bose et al., 2018; Ezhilarasi & Kabra, 2017; Fernandes et al., 2018). Importantly, no prior empirical research has investigated the joint effects of earnings management (EM), internal corporate governance (ICG), and external corporate governance (ECG) on green banking disclosure (GBD) within the BRICS context. To address this gap, the present study ex-amines these relationships across the emerging economies of Brazil, Russia, India, China, and South Africa.

The BRICS countries collectively represent some of the largest and fastest-growing economies in the world. Together, they are home to approximately 3 billion people—about 42% of the global population—and cover nearly 30% of the world's landmass (Jt. Stat. Publ.," 2016). These nations play a critical role in global economic dynamics, with a combined gross domestic product accounting for roughly 22% of the global economy and nearly 40% of global foreign exchange reserves (Lowe, 2016). In 2017 alone, the BRICS bloc contributed 5.3% to global economic growth ("Jt. Stat. Publ.," 2016). However, this rapid economic development has also led to heightened environmental pressures. BRICS countries are now among the largest contributors to global greenhouse gas emissions, with China, India, and Russia ranking first, third, and fifth, respectively (Friedrich et al., 2023). This substantial environmental footprint highlights the urgent need to promote sustainable banking practices, including greater transparency in green banking disclosures.

In response to these contextual challenges, this study investigates the impact of earnings management (EM) and corporate governance—both internal (ICG) and external (ECG)—on green banking disclosure (GBD) within BRICS economies. The study is guided by three prima-ry objectives: first, to examine the relationship between EM and GBD; second, to assess the effect of ICG on GBD; and third, to evaluate the influence of ECG on GBD. Accordingly, the re-search is framed around the following key questions:

- RQ1: What is the effect of earnings management on green banking disclosure?
- RQ2: What is the impact of internal corporate governance on green banking disclosure?
- RQ3: What is the effect of external corporate governance on green banking disclosure?

This study makes several contributions to the existing literature. First, to the best of our knowledge, it is the first empirical investigation examining the relationship between earnings management and green banking disclosure. Second, it proposes a novel measure of earnings management, using a composite index that incorporates earnings restatements, insider trading controversies, profit warnings, and accounting irregularities. Third, the study simultaneously considers both internal (firm-level) and external (national-level) dimensions of corporate governance, allowing for an assessment of their combined influence on environmental disclosure practices. Finally, by focusing on BRICS countries, the research provides valuable contextual insights into sustainability reporting in emerging markets, thereby extending prior studies that have largely concentrated on developed economies.

The remainder of the paper is organized as follows. Section 2 presents the theoretical frame-work, reviews relevant empirical literature, and develops the research hypotheses. Section 3 de-tails the research methodology, including data sources, variable construction, and the estimation strategy. Section 4 reports the empirical findings and provides a comprehensive discussion of the results. Finally, Section 5 concludes the study by summarizing key insights and outlining policy implications derived from the findings.

2. THEORETICAL BACKGROUND AND HYPOTHESES DEVELOPMENT

2.1. Theoretical Background

Agency theory, originally proposed by Jensen and Meckling (1976), addresses conflicts arising in principal–agent relationships, primarily due to information asymmetry. The theory has been widely applied to examine how managerial behavior, often driven by self-interest, can di-verge from the objectives of shareholders and other principals (Merina et al., 2018; Sun et al., 2010). A prominent manifestation of this divergence is earnings management (EM), where managers manipulate financial information to present a favorable image of the firm. Such practices mislead shareholders and undermine market trust. When exposed, EM typically results in sharp declines in the firm's market valuation, causing financial losses for shareholders. Consequently, EM is considered a harmful managerial behavior that invites scrutiny and disciplinary action from stakeholders, further eroding both the firm's legitimacy and its financial standing.

In response to these agency-related challenges, corporate objectives have gradually shifted from a narrow emphasis on shareholder wealth maximization to a broader, stakeholder-oriented approach. Modern organizations are expected to respond to a wide array of stakeholders, including investors, regulators, communities, and environmental advocates. This shift aligns with stakeholder theory, which asserts that organizational survival and legitimacy depend on meeting the expectations of diverse stakeholder groups. Consequently, incorporating social and environmental information into non-financial disclosures has become a strategic necessity, driven not only by regulatory requirements but also by stakeholder pressure and competitive dynamics (Merina et al., 2018; Sun et al., 2010). Within this context, green

banking disclosure (GBD) serves as a critical communication tool, enabling banks to demonstrate environmental account-ability and strengthen relationships with key external actors.

While stakeholder theory sheds light on internal motivations for disclosure, it does not fully account for the external institutional pressures that shape organizational behavior. Institutional theory provides a complementary perspective by emphasizing the influence of environmental, cultural, and regulatory forces on corporate practices. It identifies three primary mechanisms through which these pressures operate: coercive (regulatory and legal requirements), mimetic (imitation of industry leaders or peers), and normative (professional standards and societal expectations). Collectively, these forces drive institutional isomorphism, prompting organizations to adopt prevailing norms and practices to enhance legitimacy and maintain competitive parity (Baldini et al., 2016; Bose et al., 2018; You et al., 2018). In the context of green banking, such isomorphic pressures help explain why firms voluntarily implement standardized environmental reporting practices even in the absence of stringent enforcement.

The concept of decoupling, as framed within institutional theory, provides a nuanced explanation for the potential gap between formal environmental disclosures and actual organizational performance. Firms may engage in symbolic environmental reporting—adopting standardized disclosure frameworks and sustainability rhetoric—primarily to satisfy external stakeholders and regulatory authorities. Yet, these symbolic actions often conceal the continuation of conventional operational practices that may not reflect genuine environmental stewardship. Nevertheless, institutional pressures—particularly mimetic (imitation of industry peers) and norma-tive (professional and societal expectations) mechanisms—can facilitate the diffusion of best practices. Over time, these forces may drive a shift from symbolic compliance toward substantive environmental engagement, promoting deeper integration of green practices across the sector.

Empirical evidence from emerging economies underscores the significant role of institution-al environments in shaping the adoption of green banking disclosure (GBD) practices. Firms in these contexts often align their environmental reporting with international standards or emulate the practices of globally recognized peers. Such alignment is typically pursued to enhance organizational legitimacy, attract investment, and satisfy the expectations of international stake-holders, even when domestic regulations are relatively weak or unenforced.

In summary, integrating agency, stakeholder, and institutional theories offers a multidimensional framework for understanding the determinants of green banking disclosure (GBD). Agen-cy theory highlights the internal dynamics of managerial opportunism, particularly how earnings management (EM) may obscure environmental accountability. Stakeholder theory under-scores the need for firms to address the expectations of diverse stakeholder groups, while institutional theory emphasizes the structural and normative pressures shaping organizational behavior. Collectively, these perspectives inform the present study's examination of how EM, internal corporate governance (ICG), and external corporate governance (ECG) interact to influence GBD across the heterogeneous institutional contexts of BRICS countries. This integrated theoretical approach is particularly relevant for investigating disclosure practices in emerging markets, where formal institutional frameworks may still be developing, yet global pressures for transparency and sustainability are increasingly pronounced.

2.2. Empirical Literature

Traditionally, environmental issues were regarded as external factors with little direct relevance to banking and financial operations. Today, however, the financial sector recognizes that environmental concerns can create indirect risks. Although such changes may not produce im-mediate impacts, they can lead to substantial long-term costs for financial institutions (Sahoo & Nayak, 2015). Empirical studies have examined both the volume and content of environmental disclosures (Hackston & Milne, 1996; Meek et al., 1995), yet the findings remain inconsistent (Gray et al., 2001). These inconsistencies stem from three main sources: (1) limited distinction between voluntary and mandatory disclosures, (2) reliance on diverse theoretical frameworks, and (3) neglect of country-specific factors (Gray et al., 2001). Furthermore, differences in measurement approaches—such as extent-based versus index-based metrics—also contribute to the variability (Joseph & Taplin, 2011).

A widely used method for examining environmental disclosure is content analysis, particularly word-count techniques (Bose et al., 2018; Khan et al., 2013). However, this approach has notable limitations, as it may capture irrelevant or ambiguous information. Firms with weak environmental performance may exploit such methods to improve their public

image without making substantive changes. Therefore, the emphasis should shift from the quantity to the quali-ty of disclosures, as quality provides a more reliable indicator of a firm's environmental ac-countability (AlHares, 2025).

2.2.1. Earnings Management and Green Banking Disclosure

Earnings management (EM), first introduced by Hepworth in 1953, refers to the use of managerial discretion in financial reporting to mislead stakeholders or to achieve predetermined financial targets (Sternberg, 1997). Such practices can erode trust in management, distort market perceptions, and ultimately result in broader societal consequences (W & Triasih, 2020).

Agency theory suggests that voluntary environmental disclosure can help mitigate conflicts of interest between managers and stakeholders (Vagner et al., 2021). Firms that demonstrate greater transparency in their environmental and social reporting are typically less likely to en-gage in earnings management, largely due to the ethical orientation of their management teams (Porta et al., 2000). Empirical evidence supports this perspective, with studies showing that companies with stronger environmental disclosure practices are less prone to unethical financial reporting (Jizi, 2017; Porta et al., 2000; Prior et al., 2006).

However, some managers use environmental disclosures as a defensive tool to divert stake-holder attention away from earnings manipulation (Vagner et al., 2021). Similarly, research on the relationship between Corporate Social Responsibility (CSR) and earnings management has identified a positive correlation, indicating that CSR initiatives—including environmental dis-closures—may be strategically employed to shield management from stakeholder scrutiny and to deflect attention from opportunistic practices (Cadbury, 2000; Ganesan, 2020; Vagner et al., 2021).

Building on the above discussion, the first hypothesis is proposed as follows:

H1: Earnings management (EM) has a significant positive effect on green business disclosure (GBD).

2.2.2. The Nexus between Internal Corporate Governance and Green Banking Disclosure

Corporate governance refers to the mechanisms that enable external investors to safeguard themselves against potential exploitation by insiders—most often managers and dominant shareholders who control business operations (Porta et al., 2000). Its overarching purpose is to align the interests of individuals, corporations, and society by balancing economic and social objectives (Cadbury, 2000). Internal governance structures, such as the general assembly of shareholders, the board of directors, and executive management, play critical roles in shaping organizational decisions and practices.

In contrast, external governance mechanisms encompass factors such as legal systems, labor markets, regulatory bodies, and societal expectations, all of which influence corporate conduct. Firms that prioritize environmental sustainability often disclose their initiatives to strengthen their reputation and secure social legitimacy. However, agency theory cautions that opportunistic managers may leverage such disclosures for personal benefit rather than advancing share-holder interests, thereby raising concerns about the alignment of managerial decisions with shareholder wealth maximization.

The relationship between internal corporate governance and Green Banking Disclosure (GBD) has been examined in several studies, yielding mixed results. For example, Abubakar et al. (2017) found that only board size had a significant impact on GBD, whereas Bouten et al. (2012) reported a positive association between board size, board independence, and GBD. Similarly, Blanc et al. (2012), Ioannou and Serafeim (2011), and Musa et al. (2021) observed that strong internal governance structures are positively linked to GBD. Overall, these findings indicate that effective internal governance mechanisms can promote greater transparency in environmental reporting.

Building on the discussion above, the next hypothesis is proposed as follows:

H2: Internal corporate governance (ICG) has a significant positive effect on Green Banking Disclosure (GBD).

2.2.3. The Nexus between External Governance Mechanisms and Green Banking Disclosure

External governance mechanisms—such as national legislation, regulatory frameworks, and cultural norms—play an important role in shaping corporate environmental disclosure practices. Firms often increase disclosure to comply with legal requirements, avoid penalties, or enhance their reputation. However, the literature on the determinants of corporate environmental disclosure (CED) remains inconclusive, with findings varying across national contexts (Abubakar et al., 2017; Solikhah & Maulina, 2021). These inconsistencies are frequently attributed to differences in institutional, cultural, and political environments (Gray et al., 2001). Ioannou and Ser-afeim (2011) argue that cross-country variations in corporate social responsibility (CSR) and environmental disclosure can largely be explained by such contextual factors. Similarly, countries with diverse legal and institutional frameworks tend to display significant

disparities in the scope and quality of non-financial disclosures, including environmental performance (Bouten et al., 2012). As Kaufmann et al. (2007) emphasize, understanding the influence of external governance mechanisms is essential to evaluating a firm's true commitment to sustainability.

Research on the influence of external governance mechanisms on environmental disclosure reveals substantial variation in non-financial reporting, largely driven by institutional, cultural, and political factors (Blanc et al., 2012). These results highlight the need to account for national context when examining environmental disclosure practices across firms and countries (Baldini et al., 2016; Bouten et al., 2012; Ioannou & Serafeim, 2012).

Building on the above discussion, the third hypothesis is proposed as follows:

H3: External governance mechanisms have a significant positive effect on green banking disclosure.

Table 2.1: Dependent and Independent Variables Measurement.

Variable	Symbol	Measurement	Empirical Evidence
Dependent Variable			
Green Banking Disclosure	GBD	Total environmental score measured by total disclosure score of a bank.	(Bose et al., 2018; Haji, 2013)
Environmental Innovation	EEI	Total environmental innovation score measured by reported score of a bank.	(AlHares et al., 2023)
Resource Use	RUI	Maximum resource use score measured by reported score of a bank.	(AlHares & Elareer et al., 2024)
Greenhouse gas emissions	EMI	Maximum GHG emission score measured by reported score of a bank	(Grahn, 2018; Kuzey, 2019)
Independent Variable			
Earning Management	EM	Data of ER, IC, PW, and AC is collected from DataStream. These sub-themes are averaged and converted into a dummy index to measure EM.	1st study to measure EM through indirect method.
Internal Corporate Governance	ICG	Data of board size, board independence, number of board meetings, board attendance, and gender diversity collected from DataStream was divided into five groups through an additive index. The data was sub divided into three tercile to create governance dummy.	(AlHares, 2021)
External Corporate Governance	ECG	Average scores of PS, GE, RE, RL CC, and VA from 1996-2017, available on World Bank website are divided into five groups ranging from 1-5 by constructing an additive index of ECG.	(AlHares, 2023)
Control Variable			
Return on Equity	ROE	Total income scaled by total Equity	(Bouten et al., 2012; Galani et al., 2012; Hackston & Milne, 1996; W & Triasih, 2020)
Leverage	Lev	Total debts to total assets.	(Emre Akbas, 2014; Sun et al., 2010)
Firm Size	Fsize	Natural log of total assets	(Cormier & Magnan, 2003; Darus et al., 2014; Emre Akbas, 2014)
Firm Age	Fage	Natural log of years since inception of the firm.	(Muttakin & Khan, 2014)

3. RESEARCH METHODOLOGY

This study examines the relationship between Green Banking Disclosure (GBD), earnings man-agement (EM), and corporate governance mechanisms using panel data from banks listed on the stock exchanges of BRICS countries—Brazil, Russia, India, China, and South Africa—covering the period 2010–2019. The data were obtained from the Refinitiv Eikon DataStream database.

3.1. Sample Data

The initial sample included all banks listed on the stock exchanges of the BRICS coun-tries with data available in the Eikon DataStream database over the 10-year study period. From the original pool of 62 banks, only 37 had complete and consistent data across all variables and years. These 37 banks constitute the final sample, yielding 370 firm-year observations (37 banks × 10 years).

3.2. Measurement of Green Banking Disclosure

The dependent variable, Green Banking Disclosure (GBD), is measured using a content analysis approach. GBD is calculated as the ratio of environmental items disclosed by a bank to the total number of relevant disclosure items, expressed as a percentage. The analysis also considers key sub-themes aligned with global sustainability reporting frameworks, namely Environmental In-novation (EEI), Resource Use (RUI), and Greenhouse Gas Emissions (EMI). Each disclosure item is coded using a binary system: a score of 1 is assigned if the item appears in the bank's annual or sustainability report, and 0 otherwise.

3.3. Measurement of Earnings Management

Earnings management (EM), one of the key explanatory variables, is measured using a con-tent-based unweighted index. EM is proxied through four reputational and accounting red flags: Earnings Restatements (ER), Insider Dealing Controversies (IC), Profit Warnings (PW), and Accounting Controversies (AC). Each bank receives a binary score for each sub-indicator, where a value of 1 indicates involvement in the respective EM activity during a given year, and 0 otherwise. The EM index is calculated as the average of these four binary indicators and is subsequently converted into a dummy variable to capture the presence (1) or absence (0) of earnings management in a given year.

3.4. Measurement of Internal Corporate Governance

In this study, Internal Corporate Governance (ICG) is measured using a composite governance index based on six key board characteristics: Board Size, Board Independence, Number of Board Meetings, Board Attendance Rate, Board Gender Diversity, and Board Structure. These variables are selected in line with prior research (Uddin & Ahmmed, 2018), which highlights their role in promoting board effectiveness and transparency.

Each governance attribute is scored according to predefined performance thresholds, and the scores are aggregated to form an additive index ranging from 1 (weak governance) to 5 (strong governance). Reverse coding is applied to characteristics that negatively affect governance to maintain directional consistency, so that higher index values reflect stronger internal governance practices.

For categorical analysis, the governance index is divided into three terciles to create a binary governance quality dummy variable. Banks in the upper tercile of the index each year are classified as having strong internal governance and assigned a value of 1, while those in the middle and lower terciles are assigned a value of 0, representing moderate to weak governance quality. This index serves as a proxy to assess the role of internal corporate governance in influencing the level of Green Banking Disclosure (GBD).

3.5. External Corporate Governance

External Corporate Governance (ECG) is measured using national-level institutional indica-tors that capture the quality of a country's governance framework. Following Kaufmann et al. (2007), six governance dimensions are considered: Political Stability and Absence of Violence (PS), Government Effectiveness (GE), Regulatory Quality (RQ), Rule of Law (RL), Control of Corruption (CC), and Voice and Accountability (VA). These indicators are sourced from the Worldwide Governance Indicators (WGI) database maintained by the World Bank. To ensure consistency and reliability, the average scores for each dimension over the period 1996–2017 are used, in line with prior empirical studies.

The average score of each country across these six dimensions serves as a proxy for its external corporate governance environment, reflecting the institutional and regulatory context in which the sampled banks operate. These national-level governance indicators are essential for understanding how institutional frameworks influence corporate behavior, particularly regarding environmental disclosure.

3.6. Model Specification

A dynamic panel model is employed to examine the relationship between the dependent and independent variables. Past values of EM, ICG, and ECG influence current decisions regarding GBD. As highlighted in prior studies, earlier patterns of EM affect current levels of GBD, while previous GBD practices may, in turn, shape EM, indicating a

bidirectional relation-ship. Similarly, reverse causality may exist between GBD and other explanatory variables such as ICG, ECG, ROE, and FAGE.

Given the presence of potential endogeneity arising from reverse causality, static models are inadequate. Therefore, consistent with earlier research, this study applies a two-step Generalized Method of Moments (GMM) estimator to address endogeneity and produce efficient estimates. The GMM approach, as proposed by AlHares (2023), effectively handles endogeneity and omitted variable bias, while also providing robust estimation in the presence of heteroscedasticity and serial correlation (Hansen, 1982).

The formation of these models is given as follows.

$$GBD_{i,t} = \beta_0 + \beta_1 \mathrm{EM}_{i,t-1} + \beta_2\, ICG_{i,t-1} + \beta_3 ECG_{i,t-1} + \beta_4 ROE_{i,t-1} + \beta_5 Lev_{i,t-1} \\ \beta_6 Fsize_{i,t-1} + \beta_7 Fage_{i,t-1} + \varepsilon_{i,t}$$

$$EEI_{i,t} = \beta_0 + \beta_1 \mathrm{EM}_{i,t-1} + \beta_2\, ICG_{i,t-1} + \beta_3 ECG_{i,t-1} + \beta_4 ROE_{i,t-1} + \beta_5 Lev_{i,t-1} \\ \beta_6 Fsize_{i,t-1} + \beta_7 Fage_{i,t-1} + \varepsilon_{i,t}$$

$$RUI_{i,t} = \beta_0 + \beta_1 \mathrm{EM}_{i,t-1} + \beta_2\, ICG_{i,t-1} + \beta_3 ECG_{i,t-1} + \beta_4 ROE_{i,t-1} + \beta_5 Lev_{i,t-1} \\ \beta_6 Fsize_{i,t-1} + \beta_7 Fage_{i,t-1} + \varepsilon_{i,t}$$

$$EMI_{i,t} = \beta_0 + \beta_1 \mathrm{EM}_{i,t-1} + \beta_2\, ICG_{i,t-1} + \beta_3 ECG_{i,t-1} + \beta_4 ROE_{i,t-1} + \beta_5 Lev_{i,t-1} \\ \beta_6 Fsize_{i,t-1} + \beta_7 Fage_{i,t-1} + \varepsilon_{i,t}$$

In this model, GBD, EEI, RUI, and EMI serve as the dependent variables. β_0 represents the coefficient of regression model, β_(1-6) represents the slope intercept of the independent variable. EM_*(i,t-1)* shows the earning management of ith bank at t-1 time period. 〖ICG〗_(i,t-1) denotes the internal governance mechanism of *ith* bank at *t-1* time period. 〖ECG〗_(i,t-1) refers to the external governance mechanism of *ith* bank at t-1 time period. ROE (return on equity), Lev (leverage), Fsize (Firm size) and Fage (firm age) are the control variables of the study.

4. RESULTS

4.1. Descriptive Statistics

Table 2 reports the descriptive statistics of the study variables. The mean value of GBD is 0.356, ranging from 0.002 to 0.926, with a standard deviation of 0.253. This indicates that, on average, BRICS banks disclose about 35.6% of possible green banking information, reflecting a moderate level of disclosure. The range of values, from as low as 0.2% to as high as 92.6%, suggests a positive and growing trend in green banking reporting across these countries. Moreover, the closeness of the mean and median values implies that the data distribution is approximately symmetric, with no significant skewness.

The mean value of EM in this study is 0.465, with a standard deviation of nearly 0.50 and a range from 0 to 1. The distribution is highly skewed, as indicated by a median of 0—suggesting that many banks do not engage in earnings management, while a subset exhibits significant involvement, raising the overall mean. This characteristic makes EM a particularly important variable for analyzing the impact of earnings manipulation on GBD.

The mean value of ICG is 0.479, with a minimum of 0, a maximum of 1, and a standard deviation of 0.250, suggesting that the sampled banks are not strongly governed in terms of board-related governance attributes. In contrast, ECG shows a higher mean value of 0.863, indicating that national-level governance mechanisms exert a stronger influence on green banking disclosure compared to internal governance mechanisms. Profitability, measured by ROE, has a mean of 0.148, ranging from nearly 0 to 0.930, with a standard deviation of 0.141. Leverage (LEV), measured as the ratio of total debt to total assets, shows a relatively low mean value of 0.160, with observations ranging from 0 to 0.896.

Table 4.1: Descriptive Statistics

Variable	Obs	Mean	Median	Std. Dev.	Min	Max
GBD	370	0.356	0.352	0.253	0.002	0.926
EM	370	0.465	0.000	0.499	0.000	1.000
ICG	370	0.479	0.466	0.250	0.000	1.000
ECG	370	0.863	0.600	1.263	0.417	5.000
ROE	370	0.148	0.1324	0.141	0.009	0.930
LEV	370	0.160	0.084	0.200	0.000	0.896
FSIZE	370	10.981	11.084	1.471	1.934	12.619

Table 4.2: Comparative Analysis

Variables	GBD	EM	ICG	ECG	ROE	LEV	FSIZE	FAGE
GD	1.000							
EM	-0.206***	1.000						
ICG	0.337***	-0.202***	1.000					
ECG	0.089*	0.000	0.070	1.000				
ROE	0.141***	0.040	-0.166***	0.050	1.000			
LEV	0.079	-0.066	-0.049	-0.155***	0.015	1.000		
FSIZE	-0.124**	0.021	-0.071	-0.035	-0.021	-0.114**	1.000	
FAGE	-0.133**	0.073	-0.023	-0.131**	0.012	-0.016	-0.077	1.000
**** p<0.01, ** p<0.05, * p<0.1*								

The table presents descriptive statistics for GBD, EM, ICG, and ECG across the BRICS countries, offering a basis for meaningful cross-country comparisons.

4.2. Correlation Analysis

Table 3 presents the correlations between the dependent and independent variables to assess the potential for multicollinearity. Generally, correlations above 0.8 indicate a multicollinearity concern. In this study, all correlation coefficients are below 0.8, suggesting weak relationships and no multicollinearity issues among the variables. Additionally, the variance inflation factor (VIF) was examined for each model, with the highest mean value being 1.046. This further confirms that multicollinearity is not a concern for the GMM analysis conducted in this study.

Table 4.3: Pairwise Correlations

	Brazil		Russia		India		China		South Africa	
Variable	Mean	Sd. Dev	Mean	Sd. Dev	Mean	Sd. Dev	Mean	Sd. Dev	Mean	Sd. Dev
GBD	0.595	0.289	0.171	0.164	0.230	0.174	0.374	0.190	0.390	0.200
EM	0.000	0.000	0.475	0.506	0.600	0.492	0.520	0.520	0.530	0.470
ICG	0.590	0.312	0.406	0.226	0.43	0.247	0.466	0.150	0.460	0.280
ECG	0.317	0.52	0.600	0.196	0.47	0.379	0.290	0.457	3.300	1.331

4.3. Regression Analysis.

4.3.1. Diagnostic Tests

The Wooldridge and modified Wald tests were applied to examine serial autocorrelation and heteroscedasticity in the data. The results indicate the presence of both serial autocorrelation and heteroscedasticity in the models. Additionally, the Granger non-causality test (Dumitrescu & Hurlin, 2012) reveals evidence of reverse causality between the dependent and independent variables.

4.3.2. Results and Discussion

Table 4 presents the results of the two-step GMM analysis. Prior to estimating the model, several assumptions were checked to ensure its validity and accuracy. Specifically, coefficients of the lagged dependent variable and other explanatory variables can be biased if second-order serial correlation exists or if the instruments are correlated with the error term. Our tests indicate no second-order autocorrelation, as the AR(2) statistic is insignificant. Furthermore, the Hansen test confirms that the instruments are valid, showing no correlation with the error term and supporting the null hypothesis at the 5% significance level.

Table 4.4: Result of GMM

Variables	GBD	EEI	RUI	EMI
L.GBD/L.EEI/L.RUI/L.EMI	.886*** (.012)	.839*** (.026)	.825*** (.020)	.864*** (.014)
EM	.019*** (.006)	-.047 (.008)	.042** (.021)	-.096*** (.025)
ICG	.138*** (.012)	0.141 (.017)	.066** (.032)	.095*** (.013)

Variables	GBD	EEI	RUI	EMI
ECG	-.017***	-.019	-.029***	.014***
	(.002)	(.003)	(.005)	(.003)
ROE	.053***	.036	.082***	.086***
	(.007)	(.014)	(.017)	(.010)
LEV	-.033**	.033	-.177***	.040***
	(.016)	(.019)	(.037)	(.017)
BSIZE	-.005**	-.014	-.031***	.006*
	(.002)	(.002)	(.006)	(.003)
BAGE	-.017***	.028	-.081***	.020***
	(.005)	(.008)	(.013)	(.006)
Cons	.093***	.247	.596***	-.076*
	(.019)	(.049)	(.084)	(.038)
Observations	333	333	333	333
AR1	0.000	0.014	0.001	0.000
AR2	0.139	0.939	0.482	0.132
Sargan	0.168	0.730	0.240	0.481
Hansen	0.923	0.873	0.900	0.916

Standard errors are in parentheses *** p<.01, ** p<.05, * p<.1

The results in Table 4 show that earnings management (EM) has a significant positive impact on GBD, with a coefficient of 0.019 and a standard error of 0.006. These findings are consistent with previous studies but contradict the results of AlHares (2025). Based on these results, hypothesis H1 is supported, indicating that EM has a significant positive effect on GBD. The findings suggest that firms engaging in EM are more likely to overstate GBD, as managers may use environmental disclosure strategically to mitigate stakeholder scrutiny and enhance their public image.

The study further examined the impact of EM on the sub-categories of GBD, namely Environmental Innovation (EEI), Resource Use (RUI), and Greenhouse Gas Emissions (EMI). As shown in Table 4, EM has a significant positive effect on RUI, while its impact on EMI and EEI is negative and either significant or insignificant, respectively. These results suggest that firms with accurate GHG inventories are less likely to engage in EM practices.

The results in Table 4 also show a significant positive relationship between ICG and GBD at the 0.01 level, supporting prior studies (Fernandes et al., 2018; Mathuva et al., 2019). Accordingly, hypothesis H2 is accepted. These findings suggest that banks with strong governance structures can reduce information asymmetry between managers and stakeholders. Well-governed banks constrain managerial opportunism, thereby enhancing both the quality and quantity of green banking disclosure, consistent with Agency theory. The principle of "wealth maximization," traditionally focused on shareholders, now extends to all stakeholders who require protection to legitimize the firm's operations. When examining the sub-categories of green banking disclosure, ICG shows heterogeneous effects: it is positively and significantly associated with RUI and EMI at the 5% and 1% levels, respectively, while its association with EEI is positive but insignificant.

Table 4 presents the relationship between ECG and GBD. The results indicate a heterogeneous impact of ECG on GBD and its three sub-dimensions. Specifically, ECG is significantly negatively associated with overall GBD, EEI, and RUI, while showing a significant positive relationship with EMI. Analysis of the individual components of national-level governance indicators also produces mixed results, consistent with prior findings (Baldini et al., 2016). Consequently, hypothesis H3, which posited a positive effect of ECG on GBD, is rejected. These results also provide an answer to RQ3 regarding the effect of ECG on GBD.

The results show that profitability, included as a control variable, has an insignificant effect on EEI, consistent with prior studies (Lu & Abeysekera, 2014). Leverage (LEV) exhibits a significant negative association with GBD, in line with earlier findings (Muttakin & Khan, 2014). This suggests that highly leveraged banks may limit corporate spending, including environmental disclosure, due to financial constraints and the pressure to meet creditor obligations. Board size (BSIZE) is negatively and significantly related to GBD, RUI, and EMI, supporting previous research (Bouten et al., 2012). Similarly, board age (BAGE) has a significant negative effect on GBD and RUI, consistent with earlier findings (Bose et al., 2018).

This study makes several notable contributions to the existing literature. First, it introduces a novel approach to measuring earnings management (EM) using an indirect method that incorporates sub-dimensions of ethical reporting, including earnings restatements, insider dealing controversies, profit warnings, and accounting controversies. Second, it advances the literature on green banking disclosure (GBD) by analyzing the combined effect of multiple board attributes on environmental reporting practices. Third, the study employs an additive index to capture the cumulative influence of six dimensions of national-level governance, providing a comprehensive measure of the external governance environment.

To the best of our knowledge, this is the first study to examine the relationship between earnings management (EM) and corporate governance (both ICG and ECG) within the BRICS countries. The findings indicate a significant link between high levels of environmental disclosure and unethical earnings management practices, suggesting the potential for greenwashing in the financial sector.

Based on these results, the study recommends that investors exercise caution when relying on firms' social and environmental disclosures, as high disclosure levels may not necessarily reflect a genuine commitment to sustainability. Moreover, the research underscores the need for stronger regulatory frameworks and corporate governance mechanisms to enforce ethical standards and compliance, which are critical for achieving meaningful green transformation in the banking sector.

5. CONCLUSIONS

This study examines the relationship between Earnings Management (EM), Corporate Governance (CG)—including Internal Corporate Governance (ICG) and External Corporate Governance (ECG)—and Green Banking Disclosure (GBD) in the BRICS economies. The findings offer important insights into how governance structures and managerial practices shape environmental reporting in emerging markets.

First, the study finds a significant positive relationship between EM and GBD, suggesting that managers may use extensive environmental disclosures strategically to divert stakeholder attention from aggressive financial practices. This supports Hypothesis H1, indicating that firms engaging in earnings management are more likely to overstate their environmental disclosures. Second, the results show that ICG has a significant positive effect on GBD, highlighting the role of strong internal governance in enhancing transparency and promoting responsible environ-mental reporting, thereby supporting Hypothesis H2.

However, the relationship between External Corporate Governance (ECG) and GBD is more complex. Contrary to expectations, the study finds a significant negative association between ECG and GBD, indicating that external institutional factors do not always lead to higher environmental disclosure as anticipated. Consequently, Hypothesis H3 is rejected, highlighting the need for a deeper understanding of the nuanced interactions between national governance frameworks and corporate behavior in emerging economies.

While this study makes a meaningful contribution to the literature on environmental disclosure and corporate governance in BRICS countries, it has certain limitations. The relatively small panel, consisting of only five BRICS nations, may limit the generalizability of the findings. Future research could investigate the impact of EM on GBD in environmentally sensitive industries, particularly in resource-rich countries such as those with substantial hydrocarbon re-serves, to further validate and extend these results. Moreover, given the heterogeneous effects observed for national-level governance mechanisms, additional studies are needed to explore the broader influence of external governance structures on corporate sustainability practices.

In conclusion, this study offers a nuanced perspective on how governance frameworks and managerial practices shape environmental disclosures in emerging markets, providing valuable insights for academics and policymakers alike. As environmental issues gain greater im-portance, further research in this area will be essential to deepen our understanding of the role of corporate governance in promoting sustainable business practices worldwide.

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