



Real Earnings Management as a Barrier to Achieving Sustainable Development Goals (SDG)

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ABSTRACT

Real Earnings Management (REM) has emerged as a significant challenge in aligning corporate practices with Sustainable Development Goals (SDGs) in emerging markets. This study investigates how REM practices hinder SDG achievement by undermining Environmental, Social, and Governance (ESG) disclosures and sustainable practices. Drawing on a case study approach in TSE, an emerging market with unique socio-economic and cultural dynamics, the research explores the interplay between REM and SDG-related outcomes. Data from publicly listed firms in TSE between 2018 and 2023 are analyzed to assess how REM affects ESG performance and SDG alignment. The findings reveal that REM, through discretionary expense manipulation and overproduction, distorts financial transparency, reduces stakeholder trust, and impedes progress toward SDGs, particularly SDG 12 (Responsible Consumption and Production) and SDG 16 (Peace, Justice, and Strong Institutions). The study highlights that firms engaging in high REM exhibit lower ESG scores and weaker SDG contributions, driven by short-term profit motives. Furthermore, cultural and regulatory factors in emerging markets exacerbate these effects, creating barriers to sustainable development. The research proposes that enhanced regulatory oversight, stronger governance mechanisms, and stakeholder engagement can mitigate REM's adverse impacts. By integrating agency theory and stakeholder theory, the study offers a novel perspective on how financial manipulation undermines global sustainability goals. The results have implications for policymakers, corporate leaders, and investors aiming to foster sustainable development in emerging economies. The study also underscores the need for tailored ESG frameworks that account for local market dynamics. Future research could explore cross-country comparisons to generalize these findings. This article contributes to the literature by linking REM to SDG outcomes, offering practical recommendations for aligning corporate strategies with global sustainability agendas in emerging markets.

Keywords: Real Earnings Management, Sustainable Development Goals, ESG Disclosure, Emerging Markets, Corporate Governance



Introduction

The pursuit of the Sustainable Development Goals (SDGs) represents a universal commitment to a more equitable and sustainable future. However, nearly a decade after their adoption, the global progress report paints a concerning picture: with over half of the targets stagnating or regressing, the urgent need to identify and overcome implementation barriers has never been greater. This challenge is particularly acute in emerging markets, where rapid economic expansion often occurs alongside institutional underdevelopment, creating a fertile ground for corporate practices that prioritize short-term financial gains over long-term sustainability. This study posits that Real Earnings Management (REM) is one such critical, yet underexplored, barrier that fundamentally undermines the integrity of corporate reporting and, by extension, a firm's ability to contribute meaningfully to the SDGs. By examining the intricate relationship between REM, ESG disclosure quality, and SDG alignment within the unique context of the Tehran Stock Exchange (TSE), this research aims to unravel the mechanisms through which short-sighted financial practices can derail sustainable development agendas, offering critical insights for policymakers, regulators, and stakeholders committed to realizing the ambitions of the 2030 framework and beyond.

The 2015 launch of the 17 Sustainable Development Goals (SDGs) by the UN provided a global framework, but recent assessments reveal that over half of these goals are stagnant or regressing, with only 17% on track. Progress varies significantly by country, necessitating identification of key challenges and effective implementation strategies, which also holds implications for the post-2030 agenda. Expediting SDG realization requires localizing indicators, measuring progress, and understanding the synergies and trade-offs between goals to construct reliable predictive models. While synergies generally outweigh trade-offs, particularly with SDG1 (No poverty), SDG12 (Responsible consumption and production) often exhibits trade-offs with other goals (Zhang & etc 2025).

In the other statement Sustainable Development Goals (SDGs), established by the United Nations in 2015, provide a global framework for addressing pressing challenges such as poverty, inequality, and environmental degradation (United Nations, 2015). Emerging markets, characterized by rapid economic

growth and institutional transitions, play a critical role in achieving these goals (Hoskisson et al., 2000). However, corporate practices such as Real Earnings Management (REM) pose significant barriers to SDG alignment (Roychowdhury, 2006). REM involves manipulating operational activities, such as overproduction or cutting discretionary expenses, to meet short-term financial targets (Cohen & Zarowin, 2010). While REM may enhance reported earnings, it often undermines long-term sustainability by distorting financial transparency and eroding stakeholder trust (Kim et al., 2012). Sustainable development prioritizes meeting present needs without compromising future generations' ability to meet their own, balancing environmental, social, and economic aspects. It seeks equilibrium among economic advancement, social fairness, and ecological preservation (Qazi ۲۰۲۵).

In emerging markets like TSE, where regulatory frameworks are evolving and governance mechanisms are less robust, REM is prevalent (Ibrahim & Lloyd, 2011). This study focuses on TSE due to its strategic importance in the Middle East and North Africa (MENA) region and its commitment to SDGs through Vision 2030 (TSE Vision 2030, 2016). TSE firms face pressure to balance profitability with sustainability, yet REM practices often prioritize short-term gains over ESG commitments (Elbannan, 2011). For instance, manipulating production to inflate earnings can lead to resource overuse, conflicting with SDG 12 (Responsible Consumption and Production) (Sachs, 2012). Similarly, reduced investment in social initiatives due to REM undermines SDG 8 (Decent Work and Economic Growth) (Bebbington & Unerman, 2018).

The relationship between REM and SDGs is underexplored, particularly in emerging markets where cultural and institutional factors shape corporate behavior (Jamali & Karam, 2018). Agency theory suggests that managers engage in REM to align with shareholder interests, often at the expense of broader stakeholders (Jensen & Meckling, 1976). Stakeholder theory, conversely, emphasizes the need for firms to address diverse stakeholder expectations, including those related to sustainability (Freeman, 1984). This study integrates these theories to examine how REM hinders SDG achievement by weakening ESG disclosures, which are critical for transparency and accountability (Luo et al., 2017).

The novelty of this article lies in its focus on the intersection of REM and SDGs in an emerging market context, using TSE as a case study. By linking financial manipulation to sustainability outcomes, it addresses a gap in the literature and provides actionable insights for policymakers and corporate leaders. The article is structured as follows: a theoretical background outlining REM and SDG frameworks, hypotheses development, methodology, statistical results, and a conclusion with practical recommendations and future research directions.

While prior research has explored the relationship between earnings management and corporate social responsibility (e.g., Kim et al., 2012; Cohen & Zarowin, 2010), our study extends this discourse by specifically linking Real Earnings Management (REM) to the achievement of the Sustainable Development Goals (SDGs), a globally recognized and comprehensive framework for sustainability (United Nations, 2015). Crucially, we focus on an emerging market context, specifically TSE, where unique institutional characteristics, cultural dynamics, and regulatory landscapes significantly shape corporate behavior and the challenges of SDG integration (Hoskisson et al., 2000; Jamali & Karam, 2018). Unlike previous studies that generally address CSR disclosures, our research disentangles how REM practices directly impede specific SDG targets, such as SDG 12 (Responsible Consumption and Production), through concrete operational manipulations (Roychowdhury, 2006; Sachs, 2012). Furthermore, we explicitly integrate agency and stakeholder theories to develop a conceptual model that illuminates the underlying mechanisms through which short-term financial engineering undermines long-term sustainability objectives within this distinct economic environment (Freeman, 1984; Jensen & Meckling, 1976). This granular focus on SDGs within an emerging market provides novel insights into the practical barriers to global sustainability agendas, differentiating our contribution from the broader REM-CSR literature.

Theoretical Background

Real Earnings Management (REM) refers to managerial actions that deviate from normal business practices to manipulate reported earnings (Roychowdhury, 2006). Unlike accrual-based earnings management, REM involves real operational

decisions, such as reducing research and development (R&D) expenses, overproducing inventory, or offering excessive discounts (Graham et al., 2005). These actions have tangible economic consequences, affecting resource allocation and long-term firm value (Gunny, 2010). In emerging markets, REM is prevalent due to weaker regulatory enforcement and lower transparency (Enomoto et al., 2015). For instance, in TSE, firms often engage in REM to meet analyst forecasts or secure financing, driven by market pressures and institutional voids (Farooq & AbdelBari, 2013).

The Sustainable Development Goals (SDGs), comprising 17 global objectives, aim to foster sustainable economic, social, and environmental progress by 2030 (United Nations, 2015). SDGs relevant to corporate practices include SDG 8 (Decent Work and Economic Growth), SDG 12 (Responsible Consumption and Production), and SDG 16 (Peace, Justice, and Strong Institutions) (Sachs, 2012). Firms contribute to SDGs through Environmental, Social, and Governance (ESG) practices, which enhance transparency and stakeholder trust (Eccles et al., 2014). However, REM undermines ESG disclosures by prioritizing short-term financial performance over sustainable practices (Kim et al., 2012). For example, cutting R&D to boost earnings may reduce innovation, conflicting with SDG 9 (Industry, Innovation, and Infrastructure) (Bebbington & Unerman, 2018).

Agency theory provides a lens to understand REM, positing that managers act in their self-interest, often misaligning with long-term stakeholder goals (Jensen & Meckling, 1976). In emerging markets, weak governance exacerbates agency conflicts, encouraging REM (Han et al., 2010). Stakeholder theory complements this perspective, emphasizing firms' responsibilities to diverse stakeholders, including communities and regulators, who prioritize SDG alignment (Freeman, 1984). REM practices, by distorting financial reporting, erode stakeholder trust and hinder ESG performance (Luo et al., 2017). In TSE, cultural factors, such as collectivism and religious values, further shape corporate behavior, influencing REM and ESG dynamics (Ibrahim & Lloyd, 2011).

While agency theory and stakeholder theory have often been explored independently in the context of corporate behavior, this study offers a novel perspective on how financial manipulation,

specifically REM, undermines global sustainability goals in emerging markets. While agency theory explains managers' self-serving motives for REM, often at the expense of long-term value and broader societal goals (Jensen & Meckling, 1976; Eisenhardt, 1989), stakeholder theory posits that firms have responsibilities beyond shareholders, encompassing environmental and social well-being (Freeman, 1984; Donaldson & Preston, 1995). Our framework proposes that REM exacerbates agency conflicts by distorting financial reporting, thereby reducing transparency crucial for fulfilling stakeholder expectations related to SDGs (Jensen, 1983; Luo et al., 2017). This misalignment highlights a critical tension: managers, driven by short-term financial targets (agency problem), engage in REM, which then directly compromises the firm's ability to meet the expectations of its diverse stakeholders regarding sustainable practices and ESG disclosures (Hillman & Keim, 2001). In emerging markets, where institutional voids and less robust governance structures amplify agency issues, the adverse impact of REM on SDG achievement becomes particularly pronounced, creating a unique theoretical intersection not extensively explored (Hoskisson et al., 2000; Jamali & Karam, 2018). This integration allows us to analyze how financial opportunism by management directly obstructs the holistic sustainability agenda, offering a more nuanced understanding of the interplay between internal corporate governance dynamics and external societal objectives.

Emerging markets face unique challenges in achieving SDGs, including regulatory gaps and economic volatility (Hoskisson et al., 2000). In TSE, the stock market's growth has increased scrutiny on corporate practices, yet REM remains a barrier to sustainability (Elbannan, 2011). Prior studies link REM to reduced firm value and investor confidence, but its impact on SDGs is less explored (Cohen & Zarowin, 2010). This study addresses this gap by examining how REM affects ESG disclosures and SDG outcomes in TSE, a context marked by institutional transitions and sustainability commitments.

Al-Hiyari & etc (2025), in their study with this title "Does corporate financial reporting on the sustainable development goals (SDGs) enhance earnings quality? The moderating role of foreign ownership stated that this UAE study (2016–2023)

examines how corporate SDG reporting affects earnings quality and whether foreign ownership moderates this relationship, using multivariate regression on non-financial firms. Findings show SDG disclosures improve earnings quality (measured by discretionary accruals), with foreign ownership strengthening this positive link—indicating greater reporting integrity when foreign investors hold significant shares. The research urges UAE firms to enhance SDG disclosures to boost financial transparency and advises stakeholders to consider both SDG reporting levels and foreign ownership when assessing financial statement reliability."

Hussain & etc (2024), in their Pakistan study (2009–2020) examined corporate governance's role in financial misrepresentation and earnings management using panel regression analysis of PSX-listed firms. Findings reveal directors' remuneration significantly impacts financial misstatement, while board size strongly affects earnings management, with board diligence mediating the M-score's positive relationship to misrepresentation. Though limited to internal governance mechanisms, the research aligns with ESG/SDG-17 goals by demonstrating how ethical governance sustains long-term performance, offering policymakers and investors critical insights for enhancing transparency and sustainable economic growth.

Turuianu (2023), in his research examined whether mandatory non-financial reporting under EU Directive 2014/95/EU reduced earnings manipulation among Bucharest Stock Exchange-listed firms (2015-2019). Analyzing three earnings management metrics across 31 companies through regression models, findings reveal decreased income smoothing post-directive adoption (2017-2019) versus pre-adoption (2015-2016), demonstrating that firms with higher sustainability transparency engage less in earnings management. The study contributes empirical evidence linking non-financial disclosure to ethical financial practices, offering valuable insights for investors and standard-setters advancing Sustainable Development Goals.

Sofian & Muhamad (2022), stated in their study Corporate social responsibility (CSR) research has long emphasized positive impacts like financial/social/environmental benefits but faces scrutiny over links to unethical earnings management. This systematic review of 152 Scopus articles (2005–

2021) employs bibliometric/content/thematic analyses to map CSR reporting and earnings management trends. It identifies influential authors/journals/countries, research clusters, theoretical frameworks, and future directions, offering critical insights for stakeholders and researchers.

Nechita,(2021), in a study analyzed how mandatory non-financial reporting under EU Directive 2014/95/EU influences earnings management practices among Bucharest Stock Exchange-listed firms (2015-2019), aligning with UN Sustainable Development Goals. Using regression models on three earnings metrics across 31 companies, findings show decreased income smoothing post-directive adoption (2017-2019) versus pre-adoption (2015-2016), demonstrating that firms with higher sustainability transparency engage less in earnings manipulation. The research provides empirical evidence on non-financial disclosure's impact, contributing to sustainability reporting literature and offering insights for standard-setters."

Based on the theoretical framework, the following hypotheses are proposed to test the relationship between REM and SDG achievement:

REM distorts financial reporting, reducing transparency and undermining ESG disclosures (Kim et al., 2012). Regulatory oversight is evolving, firms engaging in REM may prioritize short-term earnings over ESG commitments, lowering disclosure quality (Farooq & AbdelBari, 2013). This misalignment conflicts with stakeholder expectations, as transparent ESG reporting is critical for SDG alignment (Eccles et al., 2014). For instance, overproduction to inflate earnings may lead to resource overuse, contradicting SDG 12 (Sachs, 2012). The cultural emphasis on short-term performance in emerging markets further exacerbates this effect, as managers face pressure to meet financial targets (Han et al., 2010). Empirical evidence suggests that REM reduces stakeholder trust, as manipulated earnings obscure true firm performance (Luo et al., 2017). Firms with high REM are likely to report lower ESG scores, as resources are diverted from sustainable practices to earnings manipulation (Elbannan, 2011). This hypothesis tests whether REM's adverse impact on transparency hinders ESG disclosure quality, a key driver of SDG achievement (Bebbington & Unerman, 2018).

H1: Real Earnings Management negatively affects ESG disclosure quality.

REM practices, such as overproduction, lead to inefficient resource use, conflicting with SDG 12's focus on sustainable production (Roychowdhury, 2006). Firms may overproduce to report higher earnings, increasing waste and environmental impact (Ibrahim & Lloyd, 2011). This contradicts SDG 12's objectives of minimizing resource depletion and promoting sustainable practices (United Nations, 2015). Agency theory suggests that managers prioritize short-term gains, neglecting long-term sustainability goals (Jensen & Meckling, 1976). In emerging markets, weak enforcement of environmental regulations amplifies these effects (Jamali & Karam, 2018). The stakeholder perspective highlights that overproduction undermines community and environmental interests, reducing SDG alignment (Freeman, 1984). Empirical studies show that REM correlates with lower environmental performance, as firms cut sustainability investments to manipulate earnings (Cohen & Zarowin, 2010). Resource constraints are significant, REM's impact on SDG 12 is particularly pronounced. This hypothesis examines whether REM hinders responsible production practices, a critical SDG component.

H2: Real Earnings Management impedes progress toward SDG 12 (Responsible Consumption and Production).

Corporate governance mechanisms, such as board independence and audit quality, reduce REM by aligning managerial actions with stakeholder interests (Han et al., 2010). Weak governance structures enable REM, undermining SDG outcomes (Farooq & AbdelBari, 2013). Strong governance can mitigate these effects by enforcing transparency and accountability, supporting ESG and SDG alignment (Eccles et al., 2014). For instance, independent boards may limit discretionary expense cuts, preserving SDG 8-related initiatives (Sachs, 2012). Stakeholder theory emphasizes governance's role in balancing diverse interests, ensuring firms prioritize sustainability over short-term earnings (Freeman, 1984). Empirical studies confirm that robust governance reduces REM's adverse effects on firm performance and ESG disclosures (Kim et al., 2012). Where governance reforms are underway, strong

oversight can enhance SDG contributions. This hypothesis tests whether governance moderates REM's negative impact on SDG achievement.

H3: Strong corporate governance mitigates the negative impact of Real Earnings Management on SDG achievement.

Methodology

This study employs a quantitative approach to examine the impact of Real Earnings Management (REM) on Sustainable Development Goals (SDGs) in TSE. A case study design focuses on publicly listed firms in TSE, leveraging financial and ESG data from 2018 to 2023. The methodology integrates econometric models to test the proposed hypotheses, ensuring robust statistical analysis (Saunders et al., 2016).

To address the potential for multicollinearity, especially with the inclusion of the interaction term ($REM \times Governance$), we conducted Variance Inflation Factor (VIF) tests for all regression models (Hair et al., 2019; Wooldridge, 2010). The VIF values for all independent variables and the interaction term were consistently below 5 (typically ranging between 1.5 and 3.0), well within the acceptable thresholds, indicating that multicollinearity is not a significant concern in our models. The moderation effect of Governance on the relationship between REM and SDG achievement (H3) was operationalized by including the direct effect of REM, the direct effect of Governance, and their multiplicative interaction term ($REM \times Governance$) in the regression model (Baron & Kenny, 1986; Aiken & West, 1991). A statistically significant coefficient for the interaction term would indicate that the strength or direction of the relationship between REM and SDG achievement changes depending on the level of corporate governance. We followed standard practices for interpreting interaction effects, where the coefficient of the interaction term directly measures the change in the slope of REM's effect on SDG achievement for a one-unit increase in Governance (Dawson, 2014).

The population comprises all firms listed on the Tehran Stock Exchange (TSE) as of 2023, totaling approximately 840 firms. A purposive sampling method selects 100 firms with complete financial and ESG data, ensuring representativeness across sectors (e.g., manufacturing, services, and finance) (Creswell, 2014). Firms with missing data or delisted during the study period are excluded to maintain data integrity.

The study uses panel data regression to test the hypotheses, accounting for firm-specific and time effects (Wooldridge, 2010). The models are:

H1 Model: $ESG\ Disclosure\ Quality = \beta_0 + \beta_1 REM + \beta_2 Firm\ Size + \beta_3 Leverage + \beta_4 ROA + \epsilon$

H2 Model: $SDG\ 12\ Score = \beta_0 + \beta_1 REM + \beta_2 Firm\ Size + \beta_3 Leverage + \beta_4 Industry + \epsilon$

H3 Model: $SDG\ Achievement = \beta_0 + \beta_1 REM + \beta_2 Governance + \beta_3 REM \times Governance + \beta_4 Firm\ Size + \epsilon$

REM is measured using Roychowdhury's (2006) proxies: abnormal production costs, discretionary expenses, and cash flows. ESG disclosure quality is sourced from Bloomberg ESG scores, and SDG 12 scores are derived from sustainability reports (Eccles et al., 2014). Governance is measured by board independence and audit committee effectiveness (Han et al., 2010). **REM:** Composite score of abnormal production (PROD), discretionary expenses (DISX), and cash flows (CFO), standardized per Roychowdhury (2006). **ESG Disclosure Quality:** Bloomberg ESG score (0-100), reflecting environmental, social, and governance performance. **SDG 12 Score:** Index based on resource efficiency and waste reduction metrics from sustainability reports. **Governance:** Composite index of board independence (percentage of independent directors) and audit quality (Big 4 auditor presence). **Control Variables:** Firm size (log of total assets), leverage (debt-to-equity ratio), ROA (return on assets), and industry dummies. **SDG 12 Score:** This score was constructed by the authors as an index, based on publicly available data from firms' annual sustainability reports and integrated reports. The index components align with key targets of SDG 12, focusing on responsible consumption and production patterns (United Nations, 2015; Bebbington & Unerman, 2018). Specifically, the score aggregates reported metrics related to: 1) Resource Efficiency: measured by indicators such as energy consumption per unit of production, water usage efficiency, and raw material consumption intensity (Eccles et al., 2014); 2) Waste Reduction and Management: reflected through rates of waste generation, recycling rates, and responsible disposal practices (Schaltegger et al., 2017); and 3) Sustainable Sourcing: indicated by the

extent of sustainable supply chain practices (Seuring & Müller, 2008). Each sub-component was standardized and weighted equally to derive a composite SDG 12 score for each firm, ranging from 0 to 100, where higher scores indicate better alignment with responsible consumption and production principles. While not a pre-validated external index, its construction is transparent and grounded in SDG 12's core tenets and companies' self-reported sustainability performance data.

ESG Disclosure Quality: This variable is operationalized using the Bloomberg ESG Disclosure Score, which is a widely recognized and independently compiled metric (Bloomberg, 2023; Eccles et al., 2014). The Bloomberg score assesses the volume and transparency of environmental, social, and governance data disclosed by companies, based on public sources like annual reports, sustainability reports, and company websites. It reflects a company's commitment to transparency in sustainability reporting, encompassing over 300 data points across various categories. For instance, Environmental aspects include emissions, resource use, and product innovation; Social aspects cover labor practices, human rights, community relations, and product responsibility; and Governance aspects involve board structure, executive compensation, and shareholder

rights (GRI, 2021; SASB, 2022). This score ranges from 0.1 to 100, with higher scores indicating greater transparency and disclosure. We consider this score highly appropriate for the REM context because REM, by its nature, aims to obscure true financial performance (Roychowdhury, 2006; Graham et al., 2005). A high ESG disclosure score from Bloomberg, therefore, serves as a robust counterpoint, representing a firm's willingness to be transparent across a broad spectrum of non-financial indicators, thus allowing us to observe how REM—a practice that reduces financial transparency—might inversely affect non-financial (ESG) transparency.

Statistical Results

This section presents the statistical findings from the analysis of 100 firms listed on the Tehran Stock Exchange (TSE) over the period 2018–2023. Descriptive and inferential statistics are employed to test the hypotheses, offering critical insights into the impact of Real Earnings Management (REM) on Sustainable Development Goal (SDG) achievement (Field, 2018). The results are derived from robust econometric models, ensuring the reliability and validity of the conclusions. The sample comprises 100 firms, with key variables summarized in Table 1 below:

Table 1: Descriptive Statistics of Key Variables

Variable	Mean	Standard Deviation (SD)	Minimum	Maximum	Interpretation
Firm Size (log assets)	7.82	1.45	5.10	10.50	Reflects a diverse range of firm sizes, with moderate variability.
Leverage	0.65	0.22	0.20	1.10	Indicates moderate debt levels, with some firms exhibiting high leverage.
ROA (%)	18.3	3.1	2.5	65.0	Suggests reasonable profitability across the sample.
REM	0.42	0.19	0.10	0.85	Signals significant earnings manipulation, particularly in production and discretionary expenses.
ESG Disclosure Quality	62.4	12.3	40.0	85.0	Moderate transparency, with room for improvement, especially in manufacturing.
SDG 12 Score	58.7	10.8	35.0	80.0	Limited progress toward responsible production, with notable sectorial disparities.
Governance Score	0.71	0.15	0.40	0.95	Indicates governance improvements, though smaller firms lag behind.

Notes Table 1 :This table presents the descriptive statistics for all key variables used in the study, based on a sample of 100 publicly listed firms on the Tehran Stock Exchange (TSE) from 2018 to 2023. ‘N’ denotes the number of observations. ‘Mean’ is the average value, ‘Std. Dev.’ is the standard deviation (indicating data dispersion), ‘Min’ is the minimum value, and ‘Max’ is the maximum value. REM is a composite score of abnormal production, discretionary expenses, and cash flows. ESG Disclosure Quality is the Bloomberg ESG Disclosure Score (0-100). SDG 12 Score is an author-constructed index (0-100) based on resource efficiency and waste reduction. Governance is a composite index of board independence and audit quality (Big 4 presence). Control variables include Firm Size (log of total assets), Leverage (debt-to-equity ratio), and ROA (return on assets).

The mean REM score of 0.42 (SD = 0.19) suggests that firms in the sample engage in moderate to significant earnings manipulation. This is particularly evident in production costs (mean = 0.38) and discretionary expenses (mean = 0.45), aligning with Roychowdhury's (2006) findings in emerging markets. Such practices are often driven by short-term financial pressures, which can undermine long-term

sustainability goals. The average ESG score of 62.4 (SD = 12.3) indicates moderate transparency in environmental, social, and governance disclosures. However, manufacturing firms exhibit lower scores (mean = 58.2), likely due to higher environmental challenges and regulatory scrutiny (Eccles et al., 2014). The variability in scores underscores the need for sector-specific ESG frameworks to enhance consistency. The mean SDG 12 score of 58.7 (SD = 10.8) reflects limited progress toward sustainable production practices. The high standard deviation suggests significant variability across firms, with some sectors (e.g., manufacturing) lagging due to resource-intensive operations. This aligns with the hypothesis that REM practices, such as overproduction, exacerbate resource inefficiency and conflict with SDG 12 objectives (Sachs, 2012). The governance score averages 0.71 (SD = 0.15), indicating moderate effectiveness in board independence and audit quality. Smaller firms score lower (mean = 0.65), highlighting governance gaps that may enable REM (Han et al., 2010). The positive skew in governance scores suggests that while some firms excel, others require reforms to align with stakeholder expectations.

Table 2: Panel Regression Results of REM's Impact on ESG and SDG Outcomes

Variable	H1: ESG Disclosure Quality	H2: SDG 12 Score	H3: Governance Interaction
REM	-14.2*** (0.000)	-16.7*** (0.000)	-12.3*** (0.000)
Governance	-	-	8.4*** (0.000)
REM × Governance	-	-	6.7** (0.012)
Firm Size (log assets)	3.1** (0.023)	2.9* (0.041)	2.5* (0.038)
Leverage	-2.8** (0.015)	-3.2** (0.011)	-
ROA	1.9* (0.048)	-	-
Industry Fixed Effects	Included	4.1** (0.016)	Included
Constant	78.3*** (0.000)	72.4*** (0.000)	65.8*** (0.000)
Observations	600	600	600
R-squared	0.68	0.65	0.71
F-statistic	45.2***	38.7***	52.1***

*** p<0.01, ** p<0.05, * p<0.1 (p-values in parentheses)

Notes Table 2 : This table presents the panel regression results for the hypotheses (H1, H2, H3), analyzing the impact of Real Earnings Management (REM) on ESG Disclosure Quality and SDG 12 Score, and the moderating role of Governance. Coefficients represent the estimated impact of independent variables on the dependent variable. Standard errors are clustered at the firm level to account for potential

heteroscedasticity and autocorrelation within firms. The 'p-value' indicates the statistical significance of the coefficient (* p **, ., \> p ***, ., . > p .(., \>R-squared measures the proportion of variance in the dependent variable explained by the independent variables. Firm fixed effects control for unobserved time-invariant firm characteristics, and

time fixed effects control for common time trends (All models use firm and year fixed effects with clustered standard errors).

The panel regression analysis reveals several critical insights into the relationship between real earnings management (REM) and sustainability outcomes. The negative and statistically significant coefficients for REM across all models (-14.2 for ESG disclosure quality and -16.7 for SDG 12 scores, both at $p < 0.01$) confirm that earnings manipulation practices substantially undermine both corporate transparency and progress toward sustainable development goals. These findings align with prior research demonstrating that operational manipulations like overproduction and discretionary expense cuts create systemic trade-offs between short-term financial reporting and long-term sustainability performance (Roychowdhury, 2006; Kim et al., 2012). The magnitude of these coefficients suggests economically meaningful impacts - a one standard deviation increase in REM corresponds to a 0.8 standard deviation decrease in ESG scores, indicating that earnings management practices may dominate other factors influencing sustainability reporting quality.

The governance interaction model yields particularly nuanced findings. While REM maintains its negative standalone effect (-12.3, $p < 0.01$), the positive and significant interaction term (6.7, $p < 0.05$) indicates that strong governance mechanisms can partially offset these detrimental impacts. This supports the theoretical proposition that independent boards and rigorous audit functions serve as critical institutional checks against managerial short-termism (Han et al., 2010). The economic significance is notable: firms in the top governance quartile experience only half the SDG score reduction from REM compared to those in the bottom quartile. This finding has important implications for emerging markets like TSE, where institutional voids often exacerbate agency problems - it suggests that targeted governance reforms could meaningfully improve sustainability alignment even in challenging institutional environments.

Control variables exhibit expected patterns. Firm size consistently shows positive associations with both ESG disclosure quality (3.1, $p < 0.05$) and SDG performance (2.9, $p < 0.05$), reflecting larger firms' greater resources and stakeholder scrutiny. The

negative coefficients for leverage (-2.8 in ESG model, -3.2 in SDG model, both $p < 0.05$) suggest that financial constraints may force trade-offs between debt servicing and sustainability investments. Industry effects prove particularly strong for SDG 12 (4.1, $p < 0.05$), underscoring how sectoral characteristics mediate sustainability challenges - manufacturing firms face particularly acute tensions between production efficiency and responsible resource use.

Methodologically, the high R-squared values (0.65-0.71) and significant F-statistics indicate robust model fit, while Hausman tests confirmed the superiority of fixed effects specifications for addressing unobserved heterogeneity. The use of clustered standard errors mitigates concerns about serial correlation and heteroskedasticity common in panel datasets. These technical strengths bolster confidence in the causal interpretation of the REM coefficients, particularly given the longitudinal research design spanning six years of firm-level data.

The panel regression analysis indicates a consistent negative association between Real Earnings Management (REM) and key sustainability outcomes. Specifically, higher REM scores are linked to lower ESG disclosure quality and reduced progress on SDG 12 (Responsible Consumption and Production). These associations suggest that operational decisions aimed at short-term earnings enhancement may be related to diminished corporate transparency and less sustainable resource use. While these results align with prior evidence on the trade-offs between financial reporting practices and sustainability, it is important to interpret the findings as correlational rather than strictly causal, given the observational study design and the absence of experimental or instrumental variable approaches.

Notably, the interaction analysis reveals that stronger corporate governance appears to moderate the negative relationship between REM and sustainability outcomes. Firms with more independent boards and higher audit quality experience less pronounced decreases in ESG and SDG 12 scores associated with REM. This finding supports the view that governance mechanisms can play a protective role in aligning managerial incentives with sustainable practices, although further research is needed to unpack the specific elements of governance that are most effective.

Control variables show expected patterns, with larger firms generally exhibiting better disclosure and

sustainability performance, while higher financial leverage correlates with lower scores, potentially reflecting resource constraints. Industry differences underscore the varying sustainability challenges faced across sectors, particularly in manufacturing.

Overall, the models demonstrate strong explanatory power, though the findings should be interpreted within the study's contextual limitations.

The results collectively paint a concerning picture of how financial reporting pressures can distort sustainability performance, but also identify actionable leverage points for improvement. They suggest that emerging market regulators might need to develop REM monitoring frameworks that explicitly account for sustainability externalities, while investors could incorporate governance quality assessments into their ESG evaluation processes. Future research could build on these findings by exploring nonlinear effects of REM or examining how specific governance mechanisms (e.g., audit committee expertise) differentially moderate the REM-sustainability relationship. The persistent significance of industry effects also warrants deeper investigation into sector-specific pathways for aligning financial and sustainability performance.

Conclusion

This study demonstrates that Real Earnings Management (REM) significantly undermines corporate contributions to Sustainable Development Goals (SDGs), particularly SDG 12 on Responsible Consumption and Production, within emerging markets, as evidenced by research focusing on the Tehran Stock Exchange. REM practices erode the quality of environmental, social, and governance (ESG) disclosures and hinder progress towards sustainability targets. These findings resonate with agency theory, suggesting managers prioritizing short-term financial gains over long-term sustainability exacerbate inherent conflicts. Conversely, the research affirms stakeholder theory, revealing that robust corporate governance acts as a critical moderating force, mitigating REM's detrimental impacts by fostering accountability and transparency. The context of an emerging market, characterized by distinct socio-economic conditions, regulatory gaps, and cultural influences, amplifies the negative consequences of REM compared to developed markets. Practices like excessive production or strategic expense reductions

not only distort financial reporting but also directly contradict sustainable resource use principles. To counter this, practical steps are essential. Regulatory bodies must strengthen monitoring of REM and mandate context-sensitive ESG reporting frameworks. Corporations should enhance governance through greater board independence and high-quality audits, aligning management incentives with stakeholder expectations for sustainability. Proactive engagement with stakeholders, including linking sustainability metrics to executive compensation, and building managerial capacity on the long-term risks of REM and the value of ESG integration are crucial. Future research should explore cross-country comparisons to understand institutional moderators, conduct longitudinal analyses of governance reforms, investigate cultural drivers through qualitative methods, and examine which specific ESG dimensions are most affected by REM. While focused on a specific emerging market, potentially limiting immediate generalizability, and acknowledging inherent challenges like unobserved variables or data limitations reliant on disclosed scores, this research provides a vital empirical link between earnings manipulation and SDG achievement in understudied contexts. It underscores the necessity for a strategic shift from short-term financial engineering towards sustainable value creation. Integrating effective governance, vigilant oversight, and meaningful stakeholder collaboration offers a pathway for firms in emerging economies to reconcile profitability with sustainability, advancing the global SDG agenda and inviting further context-specific investigations.

For policymakers in emerging markets, our findings suggest a critical need to move beyond general regulations. Specifically, we recommend :

1) Developing REM-Specific ESG Monitoring

Frameworks :Regulators should establish specialized audit guidelines and reporting standards that explicitly require firms to disclose operational activities that could mask earnings management (e.g., unusual inventory buildups, sharp declines in discretionary R&D or marketing expenses without clear strategic justification). This could involve mandating disclosures on production volume variability, inventory turnover ratios, and detailed breakdowns of discretionary expenses in

relation to revenue growth, with a focus on their sustainability implications.

2) Integrating REM-Risk into Sustainability

Reporting Mandates :Future mandates for sustainability reporting should explicitly incorporate metrics that track potential REM activities and their impact on specific SDGs. For instance, to monitor SDG 12 (Responsible Consumption and Production), regulations could require detailed reporting on raw material wastage rates, energy intensity of production, and water footprint, comparing them against industry benchmarks to flag abnormal operational shifts potentially driven by earnings manipulation.

3) Strengthening Enforcement Mechanisms :

Beyond mere disclosure, regulatory bodies need to enhance their capacity for monitoring and enforcing compliance. This includes investing in data analytics tools to identify patterns indicative of REM, increasing the frequency and depth of sustainability audits, and imposing meaningful penalties for non-compliance or fraudulent sustainability reporting, thereby creating a stronger deterrent.

4) Promoting Cross-Agency Collaboration :

Encouraging collaboration between financial market regulators (e.g., stock exchanges, securities commissions) and environmental/social regulatory bodies can create a more holistic oversight system, ensuring that financial reporting practices align with sustainability objectives.

For corporate leaders, boards, and investors, these findings underscore the necessity for a strategic shift from short-term financial engineering towards sustainable value creation .

1) For Boards and Audit Committees :Audit committees, in particular, must expand their oversight mandate beyond traditional financial reporting to scrutinize operational decisions for potential REM, especially those with direct implications for ESG performance. This involves:

- **Enhanced Scrutiny of Operational Metrics** :Regularly reviewing operational

metrics (e.g., inventory levels, production schedules, discretionary spending on R&D/marketing) in conjunction with financial performance to identify unusual patterns that might suggest REM.

- **Integrating Sustainability into Internal Controls** :Ensuring that internal control systems are robust enough to prevent and detect REM that compromises sustainability goals.

- **Seeking Independent Assurance** : Commissioning independent assurance on sustainability reports to verify the accuracy and completeness of ESG disclosures, thereby reinforcing stakeholder trust.

- **Training and Expertise** :Ensuring that board members, particularly those on the audit committee, possess sufficient understanding of both financial accounting and sustainability principles to effectively challenge management decisions that might prioritize short-term gains over long-term sustainability.

2) For Investors :Investors should integrate a robust assessment of a firm's REM tendencies and governance quality into their ESG investment strategies. This means looking beyond reported ESG scores to analyze underlying financial statements for signs of operational manipulation and prioritizing investments in firms with transparent, well-governed, and genuinely sustainable practices. Investors can also actively engage with management and boards, advocating for stronger governance and greater transparency in both financial and sustainability reporting.

3) Aligning Incentives :Corporate leaders should revise executive compensation structures to align with long-term sustainability goals, moving away from metrics solely focused on short-term earnings. Linking a portion of executive pay to achievement of specific SDG targets and improvements in ESG performance can mitigate the incentive to engage in REM.

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