Capital Structure and Sustainability Performance: Leverage Modification through Equity Disaggregation

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Abstract

This study investigates the impact of capital structure on sustainability performance, with operating performance and earnings management acting as moderating variables. Capital structure is measured using the debt-to-equity ratio, considering total equity and equity attributable to each owner. The analysis is based on financial statement data and ESG scores from 921 companies across 11 Asian countries, covering 2,763 firm-year observations between 2020 and 2024. Moderated regression analysis was applied to test the hypotheses. The findings show that capital structure positively affects sustainability performance, with operating performance strengthening this relationship and earnings management weakening it. These patterns remain consistent during and after the COVID-19 pandemic and are confirmed when alternative measures are used. The theoretical implications highlight the importance of equity disaggregation, supporting the presentation of attributable equity in leverage calculations when assessing its effect on sustainability performance, alongside the moderating roles of operating performance and earnings management. The originality of this research lies in modifying the leverage calculation by disaggregating equity according to the attributable equity policy and examining its influence on sustainability performance, while also testing the moderating effects of operating performance and earnings management.

Article History
Received:
June 14, 2025
Revised:
July 17, 2025
August 5, 2025
Accepted:
August 16, 2025

Keywords

Capital structure, sustainability performance, operating performance, earnings management

Introduction

Sustainability performance is the basis for investment and credit decisions, as it reflects the security of investing against government and social sanctions, concern for environmental and social sustainability, and guarantees the implementation of transparent and fair governance principles for the interests of all stakeholders (Liu et al., 2025; Aydoğmuş et al., 2022). Companies with high sustainability performance, well-managed and professional, tend to be less likely to engage in tax avoidance (Sadjiarto et al., 2024). From a customer perspective, product quality is not only based on comfort, lifespan, or competitive prices. However, it is also expanded to whether the product is environmentally friendly and produced by a company that cares about environmental and social issues (Sklenarz et al., 2024). Environmentally friendly products are becoming the choice and basis for purchasing decisions. Companies with good sustainability performance experience a significant increase in product sales volume and impact profitability (Kalia & Aggarwal, 2023). The company seeks to maximize potential consumers' positive perceptions of the company's sustainability performance through Environmental, Social, and Governance (ESG) branding and green marketing strategies to maximize sales turnover from the target

market, namely, consumers who care about environmental and social issues. Zahroh and Hersugondo (2021) proved that marketing activities positively affect profitability and sustainability performance, which is supported by Gabriela et al. (2024). Sustainability performance positively impacts company value. Funders (shareholders, potential investors, and creditors) are interested in investment returns and company survival, which are determined by consistent sales volume and guaranteed freedom from legal and social sanctions. Companies with good sustainability performance will have stable sales volume and profitability, as customers who care about environmentally friendly products will remain loyal to their products. Companies with good sustainability performance will not be subject to government sanctions for failing to comply with sustainability regulations. With stable profitability and guaranteed company survival, future cash flow prospects will be smooth, and investment return expectations will be met.

The theories underpinning this research include stakeholder theory (Freeman, 1984), legitimacy theory (Dowling & Pfeffer, 1975), pecking order theory (Myers & Majluf, 1984), and trade-off theory (Modigliani & Miller, 1963). Companies that address stakeholder interests in a balanced, transparent, and fair manner can better minimize conflicts of interest that may hinder organizational objectives. Enhancing sustainability performance, as reflected in ESG scores, represents a way of fulfilling stakeholder expectations and building trust among fund providers who influence capital structure. Although numerous studies have explored the relationship between ESG and capital structure, their findings remain inconsistent. Malik and Kashiramka (2025), examining firms in 16 developing countries, found that higher ESG scores are associated with higher leverage ratios. They argue that ESG performance provides creditors with valuable additional information and strengthens their confidence in a company's corporate governance practices, including funding governance that reflects expectations of future credit returns and reduces information asymmetry. Similarly, Bhattacherjee and Mishra (2025) reported that companies with high ESG scores in India have better access to credit, as creditors place greater trust in their fund management abilities, resilience to external shocks, and capacity to meet future repayment obligations. In contrast, Fiorillo and Santilli (2024) reported that ESG performance negatively affects the cost of debt in the primary corporate bond market across an international sample, where companies with higher ESG scores deliver lower returns than those with lower ESG scores. Csapi et al. (2024) found that companies with strong ESG performance in Europe tend to be more cautious when using debt-based capital structures. They act more responsibly when utilizing borrowed funds, as they are mindful of debt costs, making the trade-off between debt and equity financing an important consideration. When studying the Chinese capital market, Shi et al. (2024) provided evidence that ESG scores significantly affect bank debt leverage but do not significantly influence bond debt leverage.

The purpose of this study is twofold. First, it examines the effect of capital structure on sustainability performance, where capital structure is measured using different DER formulations: DER with aggregate equity, DER with equity attributed to owners of the parent entity, and DER with equity attributed to NCI. Second, it examines the moderating role of operating performance and earnings management in the effect of capital structure on sustainability performance.

Research so far, in examining capital structure towards sustainability performance, still uses capital structure measurements with conventional formulations, namely debt to equity ratio (DER) and debt to assets ratio (DAR) (Csapi et al., 2024; Shi et al., 2024; Malik & Kashiramka, 2025; Bhattacherjee & Mishra, 2025; Fiorillo & Santilli, 2024), where the concept of equity still uses equity in aggregate. In fact, since the financial accounting standards use entity theory as the theoretical basis for the preparation and presentation of consolidated financial statements, and the commitment to the realization of transparency and fairness of information in minimizing agency conflicts, the meaning of equity has changed, and ultimately impacts the presentation of equity in the statement of financial position. According to entity theory, owners with non-controlling interests (NCI) in a group entity that presents consolidated financial statements, NCI is clearly recognized as the company's owner, even though it does not have control rights. The number of shares owned is small, so in the presentation of consolidated financial statements, especially the statement of financial position on the equity side and the statement of changes in equity,

there is an information note specifically presenting how much NCI's rights to the entity's net assets. In the statement of financial position on the equity side and the statement of changes in equity, total equity is not only presented in total aggregate equity. However, it is disaggregated in the presentation of the allocation of rights between: 1) majority shareholders with full control rights in the group entity, namely equity attributed to the owners of the parent entity, and 2) minority shareholders with no control rights in subsidiaries within a group, namely equity attributed to NCI. This policy change underlies the development of capital structure formulation by disaggregating equity, namely DER, by separating equity according to the type of company owner.

The originality of this research lies in the measurement of capital structure, namely disaggregating equity in the debt to equity ratio formula with equity attributed to owners of the parent entity (DER PE), and equity attributed to owners with non-controlling interests (DER NCI). The second novelty lies in testing the effect of capital structure on sustainability performance with the moderating role of operating performance and earnings management, both measuring capital structure with the conventional DER formulation using aggregate equity, and the modified DER formulation by disaggregating equity (DER PE and DER NCI). The urgency of this research is that using the new formulation of DER measurement will specifically see the composition structure of the balance of funding sources from debt with equity funding sources, according to the proportion of share ownership in a group entity. The group equity structure is still mixed between the parent entity and its subsidiaries. Not all shares in the subsidiaries may be owned by the parent; there are rights of other parties outside the parent in the composition of the subsidiaries' shares, so the role of equity ownership composition in the effect of ownership structure on sustainability performance has not been detected. Therefore, it is easy to identify the relationship between capital structure composition and its impact on sustainability performance by disaggregating equity between parent ownership and other parties' ownership. We can determine whether leverage with equity specific to parent ownership or specific to NCI positively impacts sustainability performance.

The rationale for testing operational performance as a moderator in the relationship between capital structure and sustainability performance is to provide empirical evidence for the pecking order theory (Myers & Majluf, 1984). This approach examines whether companies with strong operational performance tend to rely less on debt financing, including expenses and investments related to environmental and social initiatives, and developing good governance systems. Using internal funds, such as cash flows from operating activities, carries lower risk, minimizes potential agency conflicts and external intervention, and avoids incurring debt costs and capital charges. Similarly, testing earnings management as a moderating variable in the relationship between capital structure and sustainability performance aims to validate the fraud triangle theory (Cressey, 1953) and agency theory (Jensen & Meckling, 1976). Companies with high leverage may face intense pressure that drives them to engage in earnings management to mask low profitability from stakeholders. As a result, cash that should support environmental, social, and governance-related expenditures and investments may instead be diverted to meet substantial debt obligations, reducing the company's ability to optimize sustainability-related funding.

This research contributes to academics by addressing the gap in the literature on modified leverage ratio formulations that disaggregate equity by entity ownership type and demonstrating its impact on sustainability performance, with the moderating effects of operating performance and earnings management. This research benefits fund providers, namely potential investors and creditors, by providing additional input for decision-making in predicting future investment and credit returns based on current-period leverage ratio information. It involves using a new debt-to-equity ratio measurement formulation disaggregated by entity ownership type. This is more relevant because it uses this formulation to eliminate the rights of other owners beyond the owner's capacity. Suppose the user is a potential owner of the parent entity due to significant investment and control interests. In that case, using a leverage ratio net of NCI interests is more relevant.

Building upon the preceding discussion, this study aims to investigate the effect of capital structure on sustainability performance, with the moderating effects of operating performance and earnings management. Capital structure is measured by the debt-to-equity ratio, which is the aggregate equity and equity attributable to each owner. The data for this study are the financial statements and ESG scores of 921 companies in 11 Asian countries, totaling 2,763 firm-years, from 2020 to 2024. The hypotheses were tested using moderated regression analysis. The results indicate that capital structure positively affects sustainability performance, with operating performance strengthening and earnings management weakening this effect. This result is consistent during and after the COVID-19 pandemic and when the variables are measured with other proxies. The theoretical implications of this study are proof of the value relevance of applying entity theory, which underlies the attributable equity presentation policy in measuring leverage ratios and examining the moderating role of operating performance and earnings management on sustainability performance.

This paper is organized into five sections. The first provides the introduction, followed by a literature review in the second section. The third section outlines the research methodology, while the fourth presents the results and discusses them. The final section offers the conclusion.

Literature Review

Theoretical Background

Several theoretical frameworks can be employed to elucidate the interrelationship between capital structure, sustainability, operating performance, and earnings management. Relevant theories are stakeholder theory, legitimacy theory, trade-off theory, pecking order theory, fraud triangle theory, and agency theory.

Stakeholder theory (Freeman, 1984) asserts that companies will strive to safeguard the interests of all stakeholders. To maintain creditors' trust, management fulfills its obligations regarding the responsible use of debt financing. It is therefore driven to enhance profitability by optimizing sales and other operational cash inflows while maintaining efficiency in operating expenses and minimizing non-operating losses. Management also seeks to preserve investor confidence so that, even under high leverage, the stock price remains stable and dividends can still be paid. To support profitability and reputation, management strengthens internal governance systems, improves professionalism, enhances employee welfare, and develops high-quality products along with broad marketing and distribution networks to meet the expectations of all stakeholders (Athori et al., 2025).

Legitimacy theory (Dowling & Pfeffer, 1975) suggests that a company gains legitimacy from the community, including creditors as debt financing providers, by complying with rules, requirements, and obligations in its operating environment. Achieving profitability and strong sustainability performance fosters legitimacy and trust among stakeholders, including creditors who supply external funds (Fan et al., 2021). Corporate funding generally derives from two primary sources: internal funding from equity and operational cash flows, such as product sales, and external funding from debt or the issuance of new shares involving public ownership. Companies with strong operational performance, reflected in high sales turnover and efficient operating expenses, generate substantial cash flows from product sales, repayments on credit sales, and prudent cash expense management. However, operational cash inflows may not always be sufficient as businesses expand, face intense competition, encounter environmental fluctuations, and respond to changing market preferences. Companies pursuing higher sales and profitability must also commit significant resources to achieve these goals. Consequently, increasing production capacity, securing additional resources, and seeking alternative external financing become necessary solutions (Bhama et al., 2018).

Trade-off theory (Modigliani & Miller, 1963) states that every capital structure decision involves a cost and benefit trade-off, and management must adopt policies that balance the costs and benefits of funding through creditors and shareholders. Debt financing can reduce agency conflicts but creates obligations for periodic interest payments and principal repayment. Equity financing does not involve

these payments but may introduce greater agency problems. The extent of agency problems can influence strategic management decisions, including ESG-related policies. Agency conflicts may also lead to earnings management, while ESG, particularly the governance component, can help reduce such practices.

Pecking order theory (Myers & Majluf, 1984) suggests that internal funding from operating activities should be prioritized because it carries minimal risk and agency problems. When internal funds are insufficient, companies should seek external financing through debt or the issuance of new shares, including for ESG-related activities and investments. If operational performance is strong, ESG spending can be supported by profitability with minimal dependence on external funding.

Fraud triangle theory proposes that fraud occurs due to three factors: pressure or stimulus, opportunity, and rationalization (Cressey, 1953). Earnings management, which involves manipulating reported earnings through accounting policies that may mislead users, represents a form of financial reporting fraud (Kusuma, 2023). Such practices can arise when management faces pressure to meet profitability targets and the burden of debt costs under high leverage (Wahyudi et al., 2024).

Agency theory (Jensen & Meckling, 1976) states that separating principals and agents in public companies creates agency conflicts resulting from information asymmetry and divergent interests. These conflicts can provide opportunities for management to engage in earnings management to serve their objectives. Finally, signaling theory (Spence, 1973) suggests that management conveys signals to stakeholders through financial reporting to support decision-making. By manipulating earnings, management may obscure weak performance so that published financial statements present a positive signal to stakeholders.

Capital Structure and Sustainability Performance

Company funding comes from two sources, namely internal sources from own capital consisting of product sales and owner's capital deposits, including the issuance of shares, and external sources originating from debt, both bank debt, other long-term debt, and the issuance of bonds (Kusuma, 2021). Each funding source has advantages and disadvantages; therefore, the trade-off theory states that companies are faced with choosing the appropriate capital structure ratio between debt and equity funding. The advantages of debt funding are the disadvantages of equity funding, and vice versa. The advantage of stock issuance funding is that there is no obligation to pay interest on debt each period and principal when the debt matures, and dividend payments do not have to be made every period; the amount is not fixed. However, the disadvantage is that it increases the number of owners, which can potentially exacerbate agency conflicts and information asymmetry (Kusuma & Kusumaningarti, 2023). On the other hand, the advantage of debt funding sources is that it does not increase the number of owners, so the potential for agency conflicts is lower, and the weakness is the obligation to pay periodic interest and principal debt (Yıldırım & Çelik, 2021).

Capital structure is the composition of a company's funding sources from liabilities and equity, measured by the debt-to-asset ratio (DAR), which reflects how much total assets are funded by liabilities, and the debt-to-equity ratio (DER), which shows the comparison of total debt to total equity (Azizah & Arisyahidin, 2021). Along with the use of entity theory as the theoretical basis of Financial Accounting Standards (SAK), particularly in the presentation of consolidated financial statements, there are changes in the presentation of equity both in the statement of financial position and in the statement of changes in equity. In previous accounting standards, which used the parent theory, NCI was not clearly recognized as part of the company's ownership because the shareholders owned a small amount and did not have control rights, so there was no NCI presentation in the equity component (Kusuma & Agustin, 2024). In the statement of financial position, NCIs are presented between liabilities and equity, and in the income statement, they are considered expenses. In the current SAK, because it uses the entity theory, NCIs are fully recognized as part of the entity's owners, presenting the consolidated financial statements. NCIs with small shareholdings and no controlling rights are still fully recognized as owners, so that in the

statement of financial position, there is an equity allocation post for them. Total equity is then disaggregated into equity attributable to owners of the parent entity and equity attributable to NCI (Kusuma & Athori, 2023). This disaggregation presentation, in addition to being in line with entity theory, fully acknowledges the existence of NCI as the owner, demonstrates transparency and fairness of information to all owners, and attempts to minimize agency conflicts, especially type 2 agency conflicts between majority and minority shareholders. With this equity disaggregation policy, a new measurement is formed in formulating capital structure, especially formulating the debt to equity ratio (DER) (Kusuma, Assih, et al., 2021). DER PE more measures explicitly the composition of debt to equity attributed to the owners of the parent entity, without involving equity that is not the right of the owners of the parent entity, likewise DER NCI more measures explicitly the composition of debt to equity attributed to NCI, without involving equity that is not the right of the owners of NCI (Kusuma, 2021).

Corporate sustainability performance has a positive effect on capital structure, and when disaggregated into three ESG items, social performance has the largest coefficient on capital structure among other items (Triyani et al., 2023). Madyan & Widuri (2023) In their study, they added that the role of an independent board of commissioners strengthens the positive influence of sustainability performance on capital structure. Cash receipts from operational activities, plus cash receipts from debt and share issuance, are used by companies to fund operational expenses, productive asset investments, and fixed asset investments to increase output capacity, including funding expenses and investments related to ESG performance indicators, such as maintenance costs for non-polluting equipment, waste processing equipment, environmental R&D, reforestation, environmentally friendly raw materials, environmental workforce training, carbon emissions, green marketing, environmentally friendly product output, social assistance, disaster relief donations, scholarships, life skills training for local communities, recruitment of local workers, business capital assistance, construction of public infrastructure, investment in governance systems, digitalization, information and funding transparency, internal control, audit quality, supervisory efficiency, optimization of the board of commissioners, and so on. The higher the cash receipts, both from internal and external sources, especially from sources of operational activities with minimal risk and intervention, the more able the company is to fund activities related to ESG performance indicators (Andriana et al., 2025).

Capital structure is crucial for sustainability performance because it influences a company's ability to fund activities and investments to achieve optimal sustainability performance. Highly leveraged companies, when operating profit declines, will prioritize paying interest and principal payments over funding environmental, social, and governance-related activities and investments (Saygili et al., 2022). Capital structure influences the degree of agency problems, which impact the direction of management's focus in fulfilling stakeholder interests. In companies with high leverage, agency problems arise not only between management and shareholders, or between majority and minority shareholders, but also between management and creditors and even between shareholders and creditors. This agency conflict will determine the degree of implementation of environmental and social governance, strategies, and implementations that affect the achievement of sustainable performance (Masyitoh & Indrabudiman, 2024). However, on the other hand, companies with a capital structure with a high leverage ratio reflect that the company has received high trust from creditors, so that this additional external funding can be used to fund ESG activities and investments that boost sustainability performance achievements (Hwang et al., 2021).

H1. Capital structure has a positive effect on sustainability performance.

Capital Structure and Sustainability Performance: The Moderating Effect of Operating Performance

Pecking order theory (Myers & Majluf, 1984) states that companies prioritize internal funding from operational activities over external funding sources in debt and new share issuance. Companies with high net profits tend to use less debt and equity in financing operational expenses and asset investments.

Likewise, in funding to support sustainable performance, to fund expenses and investments related to environmental and social activities, and the development of good governance systems, companies will prioritize funding sources from internal sources, namely product sales and non-operational profits, over debt or new share issuance (Kusuma & Agustin, 2023). Optimal operational performance drives profitability, enabling management to meet consumer demand for environmentally friendly products and address social issues by donating a percentage of product sales to donations and other charitable causes. Management maintains investor confidence in investing, free from the risk of social and legal sanctions, by focusing on sustainability performance. A portion of the funding from leverage and sales is used for environmental and social expenses and investments, and to build a sound governance system to achieve optimal sustainability performance scores (Andriana et al., 2025). Funding from internal sources, especially sales or net profit, does not contain the risk of agency conflict, the risk of cost of debt or cost of capital, the risk of intervention and supervision of fund providers, and other major risks.
H2. Operating performance strengthens the effect of capital structure on sustainability performance.

Capital Structure and Sustainability Performance: The Moderating Effect of Earnings Management

Fraud Triangle Theory (Cressey, 1953) states that fraud occurs due to stimulus, opportunity, and rationalization factors. A form of fraud in financial reporting is earnings management, which presents earnings information resulting from accounting policies that have the potential to mislead users in decision-making (Kusuma, 2023). Earnings management can occur because it is stimulated by management being pressured by profitability targets and the cost of debt burden from high leverage (Wahyudi et al., 2024). Wan et al. (2024) In his research in Egypt, he proved that sustainability performance had a negative impact on earnings management. Companies that have good governance management, have optimal sustainability performance, tend to be healthier, and avoid profit management practices (Sutejo et al., 2024). In contrast, companies with poor governance management have low sustainability performance and engage in earnings management (Su et al., 2024) Due to financial difficulties (Sun et al., 2025) and profitability problems (Khoury et al., 2023), so that earnings management can be carried out to build a positive image for creditors and investors, so that they are willing to invest (Kusuma et al., 2022). Companies with high debt burdens tend to be more aggressive in carrying out profit management (Agustina & Malau, 2023) to cover up his inability to manage his finances to the point of having high debts (Kusuma, 2024). Companies with high debt burdens and low profitability are more economical in cash expenditures (Kusuma, Zuhroh, et al., 2021), prioritize interest expense obligations and principal debt repayment installments, rather than spending cash on environmental, social expenses, investments, and developing managerial governance (Kusuma & Rahayu, 2022).
H3. Earnings management weakens the effect of capital structure on sustainability performance

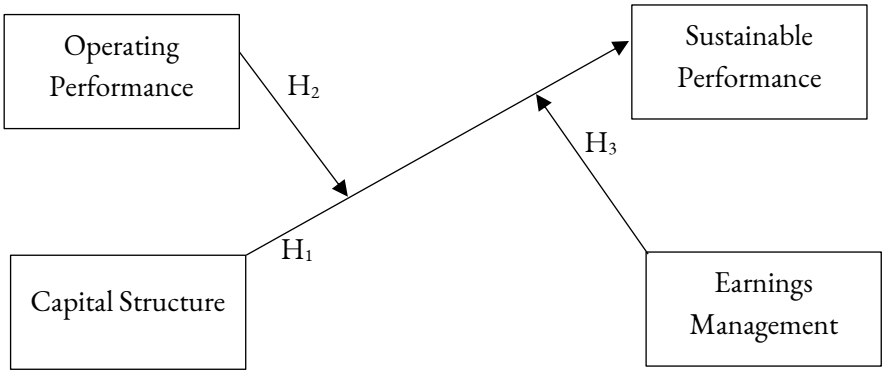

Figure 1. Research Model

Research Method

This research uses a quantitative paradigm approach, namely hypothesis testing based on a conceptual framework based on stakeholder and capital structure theories. The data for this study are the financial reports and ESG scores of 921 companies in 11 Asian countries during the 2020-2024 period, with 2,763 observations obtained from the Thomson Reuters & Eikon Databases (TRED). The eleven countries are Japan, South Korea, Thailand, Singapore, Malaysia, Turkey, China, Indonesia, India, the Philippines, and Pakistan. The data were sourced from companies in these 11 countries because these countries have the highest average ESG scores in the Asian region over the past three years. The dependent variable for this study is corporate sustainability performance, with capital structure as a variable, operational performance, and earnings management as moderating variables. The measurement of each variable is described in Table 1.

Table 1. Research Variables and their Measurements

Variables	Measurement
Dependent Variable	
Corporate Sustainable Performance (CSP)	ESG Score
Independent Variable: Capital Structure	
Debt to Equity Ratio (DER)	Debt / Total Equity
Debt to Assets Ratio (DAR)	Debt / Total Assets
DER with Equity Atrributable to Parent Entity (DER PE)	Debt / Equity Attributable to Parent Entity
DER with Equity Atrributable to Non-Controlling Interest (DER NCI)	Debt / Equity Attributable to NCI
Moderating Variables	
Operating Performance (OP)	Operating Profit / Total Assets
Earnings Management (EM)	Discressioner Accrual Jones Modified Model (Decow, 1995)
Control Variables	
Return on Assets (ROA)	Net Income / Total Assets
Company Size (SIZE)	Log Total Assets
Inflation (INF)	Average inflation per year
Type of Industry Sector (IND)	Multiple dummy nine sectors
Year of Research Data (YEAR)	Multiple dummy 5-year

Data analysis was conducted sequentially through descriptive statistics, correlation analysis using Pearson correlation, prerequisite analysis testing, and hypothesis testing using moderated regression analysis. The model was built based on capital structure theories such as pecking order theory, agency theory, entity theory, and stakeholder theory, which explain the relationship between capital structure, attributable equity, earnings management, and sustainability performance. The models were classified into two types: the first type for DER with aggregate equity before and after moderation by operating performance and earnings management, and the second type for DER with equity disaggregated by corporate owner type before and after moderation by operating performance and earnings management. Conventional DER formulations are commonly used (Rahayu, 2019):

$$DER = \frac{Total\ Debt}{Total\ Equity} \quad (1)$$

Modified DER formulation with disaggregated equity (Kusuma, Assih, et al., 2021):

$$DER\ PE = \frac{Total\ Debt}{Equity\ Attributable\ to\ Parent\ Entity} \quad (2)$$

$$DER\ NCI = \frac{Total\ Debt}{Equity\ Attributable\ to\ Non-Cotrolling\ Interest} \quad (3)$$

Aggregate equity in the leverage formulation (DER):

$$CSP_{i,t} = \alpha_0 + \beta_1 DER_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 INF + IND + YEAR + \varepsilon_{i,t} \quad (4)$$

$$CSP_{i,t} = \alpha_0 + \beta_1 DER_{i,t} + \beta_2 OP_{i,t} + \beta_3 (DER * OP)_{i,t} + \beta_4 SIZE_{i,t} + \beta_4 INF + IND + YEAR + \varepsilon_{i,t} \quad (5)$$

$$CSP_{i,t} = \alpha_0 + \beta_1 DER\ PE_{i,t} + \beta_2 DER\ NCI_{i,t} + \beta_3 EM_{i,t} + \beta_4 (DER\ PE * EM)_{i,t} + \beta_5 (DER\ NCI * EM)_{i,t} + \beta_6 INF + \beta_6 SIZE_{i,t} + IND + YEAR + \varepsilon_{i,t} \quad (6)$$

Disaggregated equity in the leverage formulation (DER) is equity attributable to owners of the parent entity (DER PE) and equity attributable to NCI (DER NCI):

$$CSP_{i,t} = \alpha_0 + \beta_1 DER\ PE_{i,t} + \beta_2 DER\ NCI_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 INF + IND + YEAR + \varepsilon_{i,t} \quad (7)$$

$$CSP_{i,t} = \alpha_0 + \beta_1 DER\ PE_{i,t} + \beta_2 DER\ NCI_{i,t} + \beta_3 OP_{i,t} + \beta_4 (DER\ PE * OP)_{i,t} + \beta_5 (DER\ NCI * OP)_{i,t} + \beta_6 INF + \beta_6 SIZE_{i,t} + IND + YEAR + \varepsilon_{i,t} \quad (8)$$

$$CSP_{i,t} = \alpha_0 + \beta_1 DER\ PE_{i,t} + \beta_2 DER\ NCI_{i,t} + \beta_3 EM_{i,t} + \beta_4 (DER\ PE * EM)_{i,t} + \beta_5 (DER\ NCI * EM)_{i,t} + \beta_6 INF + \beta_6 SIZE_{i,t} + IND + YEAR + \varepsilon_{i,t} \quad (9)$$

Where α_0 is a constant; β_1–β_6 are coefficients; $CSP_{i,t}$ is corporate sustainability performance, measured by the ESG score of company *i* in period *t*; $DER_{i,t}$ is the debt-to-equity ratio of company *i* in period *t*; $DER\ PE_{i,t}$ is the debt-to-equity ratio using equity attributable to the parent entity (PE) of company *i* in period *t*; $DER\ NCI_{i,t}$ is the debt-to-equity ratio using equity attributable to non-controlling interests (NCI) of company *i* in period *t*; $OP_{i,t}$ is operating performance, measured by operating profit divided by total assets of company *i* in period *t*; $EM_{i,t}$ is earnings management, measured by discretionary accruals using the Modified Jones Model (Dechow, 1995) for company *i* in period *t*; INF is the average annual inflation rate; $SIZE_{i,t}$ is company size, measured by the natural logarithm of total assets of company *i* in period *t*; IND represents industry type in the sample, measured using multiple dummy variables; YEAR represents the research period, measured using multiple dummy variables; and $\varepsilon_{i,t}$ is the error term.

The hypothesis acceptance criteria are as follows. H1, which states that capital structure has a positive effect on sustainability performance, is supported if the coefficient β_1DER (using aggregate equity) in Equation 4 is positive and significant at the 5% level. To evaluate the effect of DER after equity disaggregation, the coefficients in Equations 7 and 8 are compared. Capital structure measured with equity attributable to the owners of the parent entity (DER_PE) and equity attributable to non-controlling interests (DER_NCI) has a positive effect on sustainability performance if the coefficients β_1DER_PE and β_2DER_NCI in Equation 7 are positive and significant at the 5% level. H2, which states that operating performance strengthens the effect of capital structure on sustainability performance, is supported if the interaction coefficient β_3(DER × OP) in Equation 5 is positive and significant at the 5% level. Similarly, operating performance strengthens the effect of capital structure measured with DER_PE and DER_NCI on sustainability performance if the interaction coefficients β_4(DER_PE × OP) and β_5(DER_NCI × OP) in Equation 8 are positive and significant at the 5% level. H3, which states that earnings management weakens the effect of capital structure on sustainability performance, is supported if the coefficient β_3(DER × EM) in Equation 6 is positive and significant at the 5% level. Likewise, earnings management weakens the effect of capital structure measured with DER_PE and DER_NCI on sustainability performance if the interaction coefficients β_4(DER_PE × EM) and β_5(DER_NCI × EM) in Equation 9 are positive and significant at the 5% level.

Robustness testing was conducted to assess the model's ability to maintain the hypothesis test results when data is disaggregated between the COVID-19 and post-pandemic periods. Additional testing was conducted by replacing the capital structure measure with the debt-to-asset ratio and the operating

performance measure with return on assets. The goal was to test the consistency of the hypothesis using different proxy variables. The models used for additional testing are as follows.

$$CSP_{i,t} = \alpha_0 + \beta_1 DAR_{i,t} + \beta_2 SIZE_{i,t} + INF + IND + YEAR + \varepsilon_{i,t} \quad (10)$$

$$CSP_{i,t} = \alpha_0 + \beta_1 DAR_{i,t} + \beta_2 ROA_{i,t} + \beta_3 (DAR * ROA)_{i,t} + \beta_4 SIZE_{i,t} + INF + IND + YEAR + \varepsilon_{i,t} \quad (11)$$

$$CSP_{i,t} = \alpha_0 + \beta_1 DAR_{i,t} + \beta_2 EM_{i,t} + \beta_3 (DAR * EM)_{i,t} + \beta_4 SIZE_{i,t} + INF + IND + YEAR + \varepsilon_{i,t} \quad (12)$$

Where: $DAR_{i,t}$is the debt-to-assets ratio of company i in period t, and $ROA_{i,t}$ is the return on assets of company i in period t.

Results and Discussion

Table 2 presents the average ESG scores for 11 countries from 2020 to 2024, broken down by nine industry types for the sample companies. According to Table 2, the companies with the highest average ESG scores were in Japan at 76.41, followed by South Korea at 73.92.

Table 2. Average ESG Scores in 11 Asian Countries, 2020–2024

No	Country	N	Firm-Year	Mean ESG Score	Sector	Firm-Year	%
1.	Japan	282	1410	76.41	Industry	1339	25%
2.	SouthKorea	195	975	73.92	Consumer Discretionary	1073	20%
3.	Thailand	113	565	68.39	Information Technology	943	18%
4.	Singaore	82	410	67.19	Material	539	10%
5.	Malaysia	105	525	66.53	Health	487	9%
6.	Turkey	83	415	65.73	Consumer Staples	379	7%
7.	China	35	175	63.62	Energy	270	5%
8.	Indonesia	62	310	57.81	Communication	218	4%
9.	India	44	220	53.29	Real Estate	107	2%
10.	Philiphines	43	215	52.48			
11.	Pakistan	27	135	51.45			
	Total	1071	5355		Total	5355	100%

Source: Thomson Reuters & Eikon Databases (TRED)

Table 3 presents the descriptive statistics results. The mean CSP, proxied by the ESG score, is 63.34; the mean DER is 0.218; and the mean EM is 0.231. DER shows a positive correlation with CSP (r = 0.581**), indicating that higher leverage encourages management to enhance sustainability performance to build creditor confidence in governance, including responsibility in debt financing. OP is also positively correlated with CSP (r = 0.748***), suggesting that stronger operating performance provides greater capacity to fund sustainability-related activities. In contrast, EM negatively correlates with CSP (r = –0.613**), implying that earnings management reflects weaker governance and ineffective internal oversight, which may harm sustainability performance. EM is positively correlated with DER (r = 0.815***), meaning that higher leverage and debt costs may prompt management to engage in earnings management to attract investors. DER positively correlates with ROA (r = 0.718***), suggesting that increased debt motivates management to improve financial performance to maintain creditor trust and meet periodic interest obligations. Finally, DER PE is negatively correlated with DER NCI (r = –0.581**), indicating that greater equity attributable to the parent entity corresponds to lower equity attributable to non-controlling interests.

Table 4 presents the results of hypothesis testing using Moderated Regression Analysis (MRA). Based on the table, H1 is supported, indicating that capital structure positively affects sustainability performance. This is evidenced by the coefficient β_1DER (with aggregate equity) in Equation 4, which is positive at 0.062 (t = 4.817)** with a 5% significance level. Furthermore, capital structure disaggregated by equity shows similar results: equity attributable to owners of the parent entity (DER PE) and equity attributable to non-controlling interests (DER NCI) both positively affect sustainability performance.

The coefficients β_1DER PE and β_2DER NCI in Equation 7 are 0.057 (t = 4.815)** and 0.051 (t = 4.115)**, respectively, both significant at the 5% level.

Table 3. Result of Descriptive Statistics and Pearson Correlation

Variable	Mean	Min	Max	SD	Variable	Mean	Min	Max	SD
Panel A. Result of Descriptive Statistics Test									
CSP	63.34	42.48	71.36	10.518	EM	0.231	0.025	0.289	6.103
DER	0.218	0.345	0.681	11.902	SIZE	11.424	6.351	21.366	5.387
DER PE	0.220	0.319	0.679	11.894	DAR	0.215	0.314	0.673	11.824
DER NCI	0.212	0.316	0.673	11.835	ROA	0.038	−0.047	0.067	8.255
OP	0.040	−0.045	0.087	9.225	INF	9.241	4.011	14.011	7.902
Panel B. Result of Pearson Correlation Test									
Variable	CSP	DER	DER PE	DERNCI	OP	EM	SIZE	DAR	ROA
CSP	1								
DER	0.581**	1							
DER PE	0.492**	0.704***	1						
DER NCI	0.418**	0.625**	−0.581**	1					
OP	0.748***	0.683**	0.609**	0.508**	1				
EM	− 0.613**	0.815***	0.617**	0.434**	− 0.541**	1			
SIZE	0.021	0.504**	0.544***	0.511**	0.532**	0.361**	1		
DAR	0.503**	0.671***	0.532**	0.416**	0.482**	0.399*	0.532**	1	
ROA	0.652**	0.718***	0.405**	0.635**	0.606**	0.617**	0.481**	0.723***	1

Note: Correlation Significant Level in 1%, 5% and 10% at ***, **, and *, respectively.

Source: Secondary data processed (2025)

H2 is supported, that operating performance strengthens the effect of capital structure on sustainability performance, because the coefficient β_3(DER*OP) in equation 5 is positive 0.074 (6.011)*** with a significance level of 1%. The results of the equity disaggregation test show that operating performance strengthens the positive influence of capital structure with equity attributed to owners of the parent entity (DER PE) and equity attributed to NCI (DER NCI) on sustainability performance, because the interaction coefficient (DER PE*OP) is 0.081 (6.403)*** and (DER NCI*OP) is 0.075 (6.029)***.

Table 4. Results of Hypotheses Testing

Panel A. Aggregate equity on leverage formulation			
	Model (4)	Model (5)	Model (6)
Constant	0.041	0.045	0.038
	(3.112)*	(3.851)**	(3.029)*
DER	0.062	0.085	0.047
	(4.817)**	(6.275)***	(4.014)*
OP		0.078	
		(5.813)***	
DER*OP		0.074	
		(6.011)***	
EM			−0.069
			(5.432)***
DER*EM			0.031
			(4.615)*
SIZE	0.033	0.029	0.034
	(2.341)*	(2.517)*	(2.682)*
INF	−0.014	−0.012	−0.018
	(2.811)	(2.051)	(2.192)
IND	YES	YES	YES
YEAR	YES	YES	YES
F-Statistics	5.117***	6.403***	5.025***
Adjusted R^2	0.4446	0.5082	0.4051

Table 4. Results of Hypotheses Testing (Cont.)

Panel B. Disaggregated equity: Equity attributable to owners of the parent entity and NCI			
	Model (7)	Model (8)	Model (9)
Constant	0.047	0.051	0.040
	(3.681)*	(4.027)**	(3.115)*
DER PE	0.057	0.073	0.041
	(4.815)**	(7.143)***	(4.172)*
DER NCI	0.051	0.064	0.039
	(4.115)**	(6.163)***	(3.912)*
OP		0.084	
		(7.332)***	
DER PE*OP		0.081	
		(6.403)***	
DER NCI*OP		0.075	
		(6.029)***	
EM			−0.071
			(5.432)***
DER PE*EM			0.038
			(4.014)*
DER NCI*EM			−0.035
			(5.092***
INF	−0.012	−0.014	−0.016
	(2.823)	(2.761)	(2.812)
SIZE	0.033	0.029	0.034
	(2.341)*	(2.517)*	(2.682)*
IND	YES	YES	YES
YEAR	YES	YES	YES
F-Statistics	6.325***	8.114***	6.104***
Adjusted R^2	0.4517	0.5381	0.4052

Note: The value before the parentheses is the regression coefficient, with a positive or negative sign indicating the direction of the effect. The value in parentheses is the t-statistic, and the asterisk indicates the significance of the t-statistic, where *** indicates significance <1%, ** <5%, and * indicates 10%.

Source: Secondary data processed (2025)

Table 4 shows that H3 is also supported, that earnings management weakens the effect of capital structure on sustainability performance, because the coefficient β_3(DER*EM) in equation 6 is positive 0.031 (4.615)* with a significance level of 10%. Earnings management weakens the capital structure, with equity attributable to owners of the parent entity (DER PE) and equity attributable to NCI (DER NCI) positively influencing sustainability performance, as the interaction coefficient (DER PE*EM) is 0.038 (4.014)* and the interaction coefficient (DER NCI*EM) is -0.035 (5.092)***.

Robustness Test Results

The robustness test results in Table 5 indicate that the developed model can maintain the hypothesis testing results when data is disaggregated based on the COVID-19 and post-pandemic periods. Consistent with the hypothesis testing, capital structure, both conventional leverage and modified leverage with equity disaggregation, positively influences sustainability performance during and after the pandemic. Likewise, operating performance strengthens this influence, and earnings management weakens the effect of capital structure on sustainability performance during and after COVID-19.

Table 5. Result of Robustness Test

Panel A. Data for the period during the COVID-19 pandemic			
	(4)	(5)	(6)
Constant	0.049	0.042	0.033
	(3.078)*	(3.291)**	(3.435)*
DER	0.061	0.080	0.043
	(4.234)**	(6.930)***	(4.246)*
OP		0.078	
		(5.871)***	
DER*OP		0.076	
		(6.058)***	
EM			−0.017
			(5.408)***
DER*EM			0.039
			(4.968)*
SIZE	0.034	0.024	0.037
	(2.355)*	(2.573)*	(2.606)*
INF	−0.011	−0.004	−0.009
	(2.322)	(2.791)	(2.089)
IND	YES	YES	YES
YEAR	YES	YES	YES
F-Statistics	5.167***	6.462***	5.051***
Adjusted R^2	0.486	0.515	0.442
Panel B. Data on the period after the COVID-19 pandemic			
	(4)	(5)	(6)
Constant	0.048	0.044	0.031
	(3.596)*	(3.515)**	(3.262)*
DER	0.064	0.086	0.043
	(4.237)**	(6.734)***	(4.437)*
OP		0.078	
		(5.892)***	
DER*OP		0.070	
		(6.012)***	
EM			−0.056
			(5.474)***
DER*EM			0.038
			(4.695)*
SIZE	0.031	0.023	0.030
	(2.390)*	(2.541)*	(2.616)*
INF	−0.014	−0.018	−0.012
	(2.542)	(2.221)	(2.349)
IND	YES	YES	YES
YEAR	YES	YES	YES
F-Statistics	5.188***	6.450***	5.027***
Adjusted R^2	0.479	0.569	0.438

Note: The value before the parentheses is the regression coefficient, with a positive or negative sign indicating the direction of the effect. The value in parentheses is the t-statistic, and the asterisk indicates the significance of the t-statistic, where *** indicates significance <1%, ** <5%, and * indicates 10%.

Source: Secondary data processed (2025)

Additional Test Results

The additional test results in Table 6 show that replacing the capital structure measure with the debt-to-asset ratio and replacing the operating performance measure with return on assets yield results consistent

with the hypothesis, using different proxy variables. Capital structure, measured by debt-to-asset ratio (DAR), positively affects sustainability performance, as the β1DAR coefficient in equation 10 is positive at 0.072 (5.115)** at a 5% significance level. Financial performance, measured by ROA, weakens the effect of capital structure on sustainability performance, as the β3(DAR*ROA) coefficient in equation 11 is positive at 0.076 (7.342)*** at a 1% significance level. The β1DAR coefficient in equation 11 (after moderation) is 0.089 (6.504)***, which is greater than the β1DAR coefficient in equation 10 (before moderation) at 0.072 (5.115)**. Earnings management weakens the effect of DAR capital structure on sustainability performance, because the coefficient β3(DAR*EM) in equation 12 is positive 0.048 (3.937)* with a significance level of 1% and the coefficient β1DAR in equation 12 (after moderation) 0.062 (4.331)* is lower than the coefficient β1DAR in equation 10 (before moderation) 0.072 (5.115)**.

Table 6. Result of Additional Test

	Model (10)	Model (11)	Model (12)
Constant	0.051 (4.234)*	0.068 (6.495)**	0.048 (4.162)*
DAR	0.072 (5.115)**	0.089 (6.504)***	0.062 (4.331)*
ROA	–	0.082 (6.123)***	–
DAR*ROA	–	0.076 (7.342)***	–
EM	–	–	–0.050 (5.195)***
DAR*EM	–	–	0.048 (3.937)*
SIZE	0.030 (2.196)*	0.035 (2.161)*	0.046 (2.254)*
INF	–0.017 (2.014)	–0.013 (2.190)	–0.015 (2.422)
IND	YES	YES	YES
YEAR	YES	YES	YES
F-Statistics	5.878***	7.708***	5.011***
Adjusted R^2	0.457	0.549	0.349

Note: The value before the parentheses is the regression coefficient, with a positive or negative sign indicating the direction of the effect. The value in parentheses is the t-statistic, and the asterisk indicates the significance of the t-statistic, where *** indicates significance <1%, ** <5%, and * indicates 10%.

Source: Secondary data processed (2025)

The Effect of Capital Structure on Sustainability Performance

Capital structure has a positive effect on sustainability performance. This is because achieving sustainable performance requires significant funding. External funding sources are required if internal funding from net profit is deemed insufficient. In line with the Pecking Order Theory, companies prioritize internal funding from profitability. When this is deemed insufficient, they will use alternative external funding sources, namely long-term debt, and then the issuance of new shares. External stakeholders' demands on a company's sustainability performance are increasingly high. Investment decisions by investors, credit decisions by creditors, product purchasing decisions by consumers, capital market management requirements, government regulations, and public demands from environmentalists and social stakeholders are all now inextricably linked to a company's sustainability performance, supported by internal awareness from management and shareholders to build and develop internal systems related to the continuous achievement of sustainability performance indicators. To realize this, of course, large funding is needed, how companies must routinely spend cash for operational expenses related to

environmental activities, starting from the selection of high-quality environmentally friendly raw materials, production processes that are zero pollution, waste, carbon emissions and other negative externalities, output of high-quality environmentally friendly finished products, green marketing and ESG branding in marketing activities and distribution channels, maintenance and maintenance costs for assets to consistently perform at their best without outputs that have the potential to damage the environment, human resource investment, fixed asset investment, R&D investment, software investment and information system networks, special posts for education and training scholarships, working capital assistance and SME business mentoring for the community, social and educational assistance, training and empowerment, life skills, priority employment absorption, natural disaster relief, reforestation, physical construction of public infrastructure, equipment assistance, optimization of internal supervisory functions, internal audits, environmental audits, board of commissioners, percentage of managerial share ownership, and so on related to sustainability performance indicators.

The use of external funding sources from debt impacts the supervision, intervention, and fulfillment of requirements from creditors, all of which are related to the achievement of sustainability performance. Creditors expect optimal sustainability performance for a company, as it reflects its well-managed performance, including the management of creditor funds, the fulfillment of good corporate governance indicators, and the company's concern for environmental and social issues. Sustainability performance also reflects the company's ability to manage finances from creditor funds, including meeting creditor expectations regarding periodic interest payments, repayment of maturing debt, and installment principal. Along with changes in financial accounting standards policies, namely the emergence of equity items attributed to owners of the parent entity and equity items attributed to non-controlling interests in consolidated financial statements, especially the statement of financial position and statement of changes in equity, the formulation of leverage has also evolved. While previously leverage, specifically the debt-to-equity ratio, only involved total equity in aggregate, following developments in financial accounting standards, the formulation of leverage has been modified, particularly the disaggregation of equity in the debt-to-equity ratio formulation. The results of the hypothesis testing in this study demonstrate that not only capital structure measured by aggregate equity DER, but also modified DER measurements with equity disaggregation, namely DER PE and DER NCI, also provide consistent results. Three proxies for measuring capital structure—conventional DER with aggregate equity, DER PE, and DER NCI—partially positively influence sustainability performance.

Capital structure with equity attributable to owners of the parent entity (DER PE) positively influences sustainability performance. This is because the majority of share ownership in group entities, both parent and subsidiaries, is held by the parent. The characteristics inherent in the majority shareholder are carried over to the group entity, including the value reflected in the leverage ratio. Suppose the majority shareholder's awareness of environmental, social, and governance issues is deeply embedded in the thinking. In that case, it is passed on to the board of directors, supported by the board of commissioners, and implemented in the company's strategic policies, budget, and operations. Sustainability performance indicators will be easily and quickly achieved. Conversely, if the majority shareholder lacks a strong awareness of environmental, social, and governance issues, sustainability performance indicators will be difficult to achieve. The majority shareholder is the full controller of the group entity. Strategic policies, including ESG issues, cannot be implemented properly if the majority of shareholders do not approve. The GMS will hinder the directors and commissioners, who are extensions of the majority shareholders, from supporting and implementing them wholeheartedly.

Capital structure with equity attributable to owners with non-controlling interests (DER NCI) positively affects sustainability performance. This is because NCI's existence manifests in implementing good corporate governance, which is one of the items in the ESG dimension. Although NCI owns a small share of a subsidiary, it contributes to strategic policies in the subsidiary, which are an integral part of one group entity, including policies related to ESG implementation. NCI itself also has an interest in ESG

performance, which is related to the expected future investment returns from NCI's existence. The better ESG performance, the higher the company's value, profitability, and stock price will impact NCI's investment return expectations. The results of this study support the findings of Masyitoh and Indrabudiman (2024), which prove that leverage has a positive effect on ESG.

Moderating Role of Operating Performance in the Effect of Capital Structure on Sustainability Performance

Operating performance strengthens the effect of capital structure on sustainability performance, as successfully demonstrated in this study. This is because operating performance reflects a company's ability to optimize cash receipts from revenue, which is the company's core business, and the efficiency of operating expenses. Higher operating profits indicate greater cash receipts from product sales, which is the company's primary cash inflow, and is in line with its business activities. As its name suggests, leverage, the purpose of using debt financing is to leverage or spur increased operating performance by obtaining additional external funding. Leverage encourages and forces management to optimize, manage, and distribute debt funds optimally to improve operational performance, as it faces the obligation to pay interest and repay principal. High operating profits represent management's ability to pay interest and repay principal, thereby fostering creditor confidence in management's responsibility in debt management. In the long term, stable operating performance and meeting creditor return expectations can build creditor confidence, eventually leading to greater debt financing assistance at a lower cost of debt. Optimal cash receipts from operational activities can support using cash from debt financing sources to channel expenses and investment funding to activities related to the company's sustainability performance assessment indicators.

In line with legitimacy theory (Dowling & Pfeffer, 1975) that the support is in the form of additional cash and smooth payment of cost of debt that builds legitimacy and creditor trust, thus maintaining cash stability for expense and investment activities, including in funding greening activities, testing environmentally friendly raw materials, selection of environmentally friendly material suppliers, investment in production assets that are low carbon emissions and do not produce pollution, waste and environmental damage, recruitment and development of skilled and environmentally concerned workforce, quality output of environmentally friendly and recyclable products and packaging, environmentally friendly marketing activities and distribution channels. In addition, it can also be used to fund corporate social activities, build physical facilities for public use that the wider community can use, provide scholarship assistance, natural disaster assistance, business capital assistance, organize skills training and community empowerment, and build an accountable, transparent, and professional managerial governance system. By obtaining a high sustainability performance assessment score, it increasingly makes creditors believe in the company's managerial capabilities in managing debt funding sources, representing that the company's internal has a good governance system, the creation of effective supervisory functions, effective internal controls, transparency and fairness, and all of this can satisfy the interests of all stakeholders, including creditors as providers of debt funds. This finding aligns with evidence provided by Hwang et al. (2021) in their studies in China and Saygili et al. (2022) in their study in Türkiye, that profitability with maximum operating profit composition positively affects sustainability performance.

Moderating Role of Earnings Management in the Effect of Capital Structure on Sustainability Performance

Earnings management weakens the effect of capital structure on sustainable performance, as successfully proven by hypothesis testing in this study. This is because earnings management actions disappoint creditors with managerial performance in managing the company, including in managing debt funds, resulting in an inability to generate optimal real profits. Creditors feel deceived by the profits reported in publicly published financial reports or specifically provided to creditors when applying for debt

financing, as the reported profits result from accounting creation in earnings management. It aligns with the triangle fraud theory (Cressey, 1953). Earnings management occurs due to incentives from stakeholders, including creditors, to meet profit targets, and the opportunity and rationalization for doing so due to ineffective internal oversight and oversight by creditors as fund providers. After the credit was granted, management could not meet creditors' return expectations for a long period thereafter. The company experienced financial difficulties, preventing it from achieving optimal financial performance and sustainability.

Earnings management arises from information asymmetry and conflicts of interest, motivated by optimizing external funding and self-image, which contradict stakeholder and legitimacy theories. The company's goal of meeting all stakeholders' balanced interests to gain legitimacy and trust can be undermined by earnings management activities that are merely superficial, short-term, and can undermine the trust built through achieving tangible profitability and sustainable performance. The goal of sustainability activities and achieving optimal sustainability performance is to fulfill the interests of all stakeholders. Management consistently meets the interests of shareholders and creditors in achieving maximum economic performance to ensure smooth investment returns, without neglecting the interests of other stakeholders, such as the government, consumers, and the general public, regarding a company capable of positively impacting environmental and social issues. However, these goals can be undermined by unilateral management interests motivated by short-term interests through earnings management.

In line with legitimacy theory (Dowling & Pfeffer, 1975) While optimal sustainability and financial performance are achieved to fully and continuously gain legitimacy from stakeholders, earnings management practices undermine the trust and legitimacy of creditors. Creditors will no longer provide funding in subsequent periods. It further exacerbates the company's financial situation as management attempts to remedy financial difficulties with the expected injection of funds from creditors. Financial difficulties ultimately impact the company's ability to fund environmental activities, social activities, and the development of sound managerial governance systems. In line with the findings of Panjaitan and Suranta (2024), financial distress negatively affects sustainability performance. These factors are interconnected, as declining sustainability performance can lead to deteriorating corporate governance quality and drive companies to engage in aggressive earnings management to compensate. This is consistent with Borralho et al. (2022), who found in their study of Spain and France that companies used earnings management to mislead investors and creditors about their financial difficulties, thereby worsening their sustainability performance (Almubarak et al., 2023).

Conclusion

This study examines the effect of capital structure on sustainability performance and the moderating role of operating performance and earnings management in this influence. The originality of this study, in addition to examining the moderating role of operating performance and earnings management in the effect of capital structure on sustainability performance, is the use of total equity disaggregation to measure capital structure variables using the leverage formula, namely the debt-to-equity ratio. The total equity disaggregation refers to the equity item attributable to owners of the parent entity and the equity item attributable to non-controlling interests. The results of the hypothesis testing indicate that capital structure, both the conventional measurement using the debt-to-equity ratio with aggregated equity and the modified measurement using the debt-to-equity ratio with disaggregated equity in equity attributed to each type of owner, all have a positive effect on sustainability performance. Operating performance strengthens the effect of the three proxies measuring capital structure on sustainability performance, and earnings management weakens the effect of the three proxies measuring capital structure on sustainability performance. The results of the model robustness test indicate that the model can maintain the results of the hypothesis testing on data disaggregation based on the COVID-19 and post-pandemic periods. Additional testing results also demonstrated consistency despite changing the capital structure

measurement from the debt-to-equity ratio to the debt-to-asset ratio and replacing the operating performance measurement with return on assets.

Capital structure positively affects sustainability performance because it requires substantial funding to fund ESG activities and investments. If internal funding is insufficient, companies will resort to debt financing. It aligns with the Pecking Order Theory, which suggests that companies will resort to debt financing when internal funding is insufficient. The greater the use of debt financing, the greater the scrutiny and expectations of creditors regarding sustainability performance. Operating performance strengthens the effect of capital structure on sustainability performance because the inherent cost of debt demands from debt financing motivates management to improve operating performance, as do creditors' expectations of meeting sustainability performance targets. Earnings management weakens the effect of capital structure on sustainability performance because it undermines creditors' trust in the fair presentation of earnings. Earnings management indicates a company's financial difficulties, which are masked by accounting-generated earnings presentations.

The theoretical significance of this research result is the proof of the relevance of applying entity theory underlying the policy of presenting attributed equity in measuring the leverage ratio in testing the effect on sustainability performance, with the moderating role of operating performance and earnings management. Total equity disaggregation aligns with the entity theory underlying the financial accounting standard policy on presenting both items in the consolidated statement of financial position on the equity side and the consolidated statement of changes in equity. Total equity disaggregation is more appropriate in measuring the composition of total debt with the net asset rights of each entity owner. The advantage of using equity disaggregation in measuring capital structure, especially the debt to equity ratio formulation, is that it is more capable of representing the comparison of debt funding sources with the net asset rights of each type of owner, how much equity capacity for each type of group entity owner to be used in paying its debt obligations to creditors, compared to conventional measurements that use aggregated total equity which is still mixed together and does not explicitly present the net asset rights of each type of owner.

The limitations of this study are the failure to disaggregate sustainability performance into its three components: environmental performance, social performance, and governance, as well as the use of only one ESG rating agency. This study also failed to test hypotheses for each country, where socioeconomic and political characteristics may impact the results. Future research is recommended to continue and expand this study by disaggregating the three ESG elements, adding ESG ratings from multiple rating agencies, and conducting tests in each country. For investors and creditors, it is recommended that they utilize current-period leverage ratio information in decision-making and predicting future investment and credit returns, including using a new formulation for measuring the debt-to-equity ratio, separated by type of entity owner. Using this formulation, this modified leverage ratio is more relevant because it eliminates the rights of other owners beyond the owner's capacity. Suppose the user is a potential owner of the parent entity due to significant investment and controlling interests. Using a leverage ratio net of NCI interests is more relevant in that case. Management should avoid short-term earnings management practices that are attractive to creditors and investors, but can damage future earnings management and ultimately undermine the company's reputation in the market. Management can optimize operational performance to improve profitability and sustainability, aiming to increase company value and investor confidence. Regulators, particularly capital market authorities, should issue policies on discretionary accrual thresholds or collaborate with independent institutions that publish earnings management scores through accrual policies in earnings reports. Similarly, the publication of ESG scores in collaboration with independent rating agencies should also include the publication of trends in discretionary accrual scores in the income statement over several periods to reflect earnings management practices. This information will be useful for market participants in assessing earnings quality as a basis for decision-making, in addition to sustainability performance.

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