

IMPACT OF GREEN ACCOUNTING, MATERIAL FLOW COST ACCOUNTING, CAPITAL STRUCTURE ON FINANCIAL PERFORMANCE WITH FIRM DEBT AS MODERATOR

Wulandari^{1*}, Mukhzarudfa², and Dica Lady Silvera³

^{1,2,3} Accounting Department, Faculty of Economics and Business, Jambi University, Muaro Jambi, Indonesia, 36361

¹wulandr1401@gmail.com ; ²mukhzarudfa@unja.ac.id ; ³dsilvera@unja.ac.id

ABSTRACT

This study examines the effect of green accounting, material flow cost accounting (MFCA), and capital structure on financial performance, with firm debt as a moderating variable. Using a quantitative approach, the research analyses secondary data from 109 basic materials sector companies listed on the Indonesia Stock Exchange (IDX) for the 2016–2023 period. Data were collected through documentation and analysed using Microsoft Excel and E-Views 12 with panel data regression, including model selection tests, classical assumption tests, and descriptive statistics. T-tests and the coefficient of determination (R^2) were employed to assess the significance of each variable. The findings show that green accounting significantly affects financial performance, while MFCA and capital structure do not. Firm debt moderates the relationship between green accounting and financial performance but has no moderating effect on the influence of MFCA and capital structure. Theoretical implications support the view that environmental sustainability, represented by green accounting, contributes to firm value, aligning with stakeholder and legitimacy theories. Companies are encouraged to adopt green accounting as a strategic tool, particularly in environmentally intensive industries, and to consider debt structure to maximise its financial impact. Future research should investigate other sectors or external factors influencing the effectiveness of MFCA and capital structure. Broader samples and mixed methods may also enhance understanding of how environmental and financial strategies interact in corporate settings.

Keywords: Green Accounting, Material Flow Cost Accounting, Capital Structure, Financial Performance, Firm Debt

INTRODUCTION

Indonesian economy demonstrated positive growth in the first quarter of 2024, with a Gross Domestic Product (GDP) at current prices recorded at IDR 5,288.3 trillion, while at constant 2010 prices, it stood at IDR 3,112.9 trillion. The economic growth during the first quarter of 2024, in comparison to the same period in 2023 reached 5.11%, reflecting an increase in economic activity across various sectors. The Indonesian economy is supported by several sectors that play a crucial role in growth, one of which is the basic materials sector, which makes a significant contribution. In the second quarter of 2024, the manufacturing industry contributed 18.52% to the GDP, an increase from 18.26% during the same period the previous year (Badan Pusat Statistik, 2024).

The company's fiscal outcomes can be affected by a range of factors, with one key element being the implementation of green accounting. Companies are not only required to generate profits but also have a responsibility to provide tranquility to society and preserve the environment. This highlights that environmental aspects should be a key consideration in business operations. This assertion is reinforced by research findings conducted by (Arsyiyanti et al., 2024) and (Ramadhani et al., 2022), which assert that green accounting positively influences financial performance. A significant phenomenon regarding the significance of enacting green accounting in companies within the basic materials sector is the case of environmental pollution experienced by PT Toba Pulp Lestari Tbk in 2021. The company's activities caused environmental pollution around Lake Toba's caldera, negatively affecting the ecosystem and the surrounding communities (Kementerian Lingkungan Hidup dan Kehutanan, 2021). Another case involving environmental pollution occurred with PT Tjiwi Kimia, which was reported by the Sidoarjo Environmental Agency (DLHK) in July 2021 for allegedly dumping waste into the Brantas River. The liquid waste discharged into the river contained harmful substances that exceeded water quality

standards, contributing to a 0.19% downturn in the company's net sales by the end of March 2021 (rri.co.id, 2021).

Financial performance may also be shaped by various other determinants, such as the use of material flow cost accounting (MFCA). As explained in ISO 14053, MFCA is a cost calculation method focused on cost efficiency and waste management (ISO, 2021). MFCA helps companies not only enhance operational efficiency but also supports better financial performance through waste cost reduction and optimal raw material usage. This statement is supported by studies conducted by (Santi, 2022) and (Siregar, 2021), which confirms that MFCA exerts a positive influence on financial performance. Capital structure is another important factor in improving financial performance. The right capital structure is essential because the appropriate decision in managing the balance between debt and equity can enhance capital cost efficiency, reduce financial risk, and enhance a company's profitability. Moreover, an efficient capital structure enables a company to better leverage investment opportunities. This statement is supported by research conducted by (Alfitri, 2022) and (Ningsih & Utami, 2020), which suggests that capital structure positively impacts financial performance.

This study will examine the moderating effect of firm debt, considering that previous research by (Gemilang & Wiyono, 2022) and (Arviolda, 2022) indicates that firm debt can contribute to improving financial performance. Both current and non-current liabilities are involved, where each type of obligation has significant consequences for the stability of a company's financial performance. The larger the obligations a company must bear, the higher the risks it faces, especially when dealing with market fluctuations or uncertain economic conditions (Maritza & Wenten, 2024). Firm debt as a moderating variable allows for a more in-depth analysis of a company's performance, enabling the identification of more effective strategies for managing risks and maximising financial performance amid economic uncertainty.

This study is expected to contribute to solving the problem of declining financial performance due to weak environmental cost management and suboptimal capital structure strategies. By identifying the significant influence of green accounting and the moderating role of firm debt, this research offers practical insights for companies in the basic materials sector to adopt more sustainable and financially sound practices. Academically, the study enriches the existing literature by integrating environmental accounting, MFCA, capital structure, and firm debt in one comprehensive model, which has been rarely examined in previous research, especially in the context of developing economies like Indonesia.

THEORETICAL FRAMEWORK AND HYPOTHESIS DEVELOPMENT

Stakeholder Theory

Freeman first introduced the concept of stakeholders in 1983, explaining that the concept of a stakeholder is a framework for business policy and planning, as well as corporate social responsibility, involving management and stakeholders (Freeman & McVea, 2001). Stakeholders include independent regulators such as the government, courts, regulatory bodies, the media, and the press. While they do not have a direct interest in the entity, they act as controllers with the role of "gatekeepers." They are fully independent of the entity but have the power to indirectly impose responsibility. The government, courts, regulatory bodies, the media, and the press are considered part of these stakeholders (Subroto & Endaryati, 2023).

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Legitimacy Theory

This theoretical framework was developed by (Dowling & Pfeffer, 1975) has since become among the most prominent and extensively utilised fundamental theoretical models in scholarly research, on environmental, social, and sustainability accounting. It is often employed to explain disclosures related to social, environmental, and sustainability issues. This theory is frequently discussed to explain approaches to ecological data disclosure in annual reports. It is based on the concept of organisational legitimacy, which addresses the gap between social and environmental responsibilities and societal expectations, as well as the firm's fiscal performance and reputation (Fuadah et al., 2018). This theory centres on the relationship between a company and society. It posits that a company is an integral part of society and, therefore, must consider and adhere to the prevailing social norms. Adherence to these norms helps the company gain legitimacy or legitimate recognition from society. At the heart of this theory lies the concept of a "social contract" between the company and society, wherein the company functions and makes use of economic resources. Legitimacy is essential in fostering the company's long-term sustainability (Titisari, 2020).

Pecking Order Theory

The Pecking Order Theory was introduced by (Myers, 1984), which explains the importance for companies to choose the most appropriate source of funding to finance their operations. This theory suggests that companies have a hierarchy of priorities when selecting sources of funding for their investments. The first priority is retained earnings, which are considered the safest and cheapest option as they do not incur obligations to pay interest or dividends. By using retained earnings, companies can fully utilise their profits without needing to involve external parties. Companies will maintain a portfolio of liquid investments that are ready to be used to anticipate cash shortfalls caused by consistent dividend policies, profit fluctuations, and emerging investment opportunities. However, if retained earnings are inadequate, companies will seek debt as an alternative source of financing. Debt financing is preferred because it doesn't give creditors voting rights in the company's internal decision-making, thus maintaining managerial control. Moreover, the expense of issuing debt is generally lower than that of issuing shares, with the company's obligations limited to interest payments and debt repayments (Kurniasari & Wibowo, 2017).

Green Accounting on Financial Performance

The legitimacy theory suggests that companies need strategies to ensure their business continuity, one of which is by improving financial performance (Subroto & Endaryati, 2023). Financial performance tends to improve when a company has a good reputation in the eyes of the public. One way to build this reputation is by enhancing environmental awareness, such as reducing the risk of environmental damage, addressing the negative impacts of operational activities, and preventing environmental disasters (Almunawwaroh et al., 2022).

Companies need to allocate funds for environmental costs or implement green accounting to create a good environmental reputation. The goal of green accounting is to minimise the negative impact of economic activities on the environment. Companies with environmental awareness are more likely to create policies that support environmental sustainability (Almunawwaroh et al., 2022). By allocating funds for environmental concerns, stakeholders who care about the company's sustainability will consider the long-term benefits that will result (Subroto & Endaryati, 2023).

H1: Green accounting influences a company's financial performance

Material Flow Cost Accounting on Financial Performance

Environmental responsibility for companies can be understood as part of their responsibility towards stakeholders, based on stakeholder theory (Fuadah et al., 2018). Material Flow Cost Accounting (MFCA) is an environmental management accounting tool utilised to assess the environmental management practices within a company. MFCA serves as a management tool that helps companies evaluate the costs associated with material usage in production, allowing them to make better decisions regarding waste management (Asia Productivity Organization, 2014). Measuring environmental management is beneficial for assessing whether a company is managing its environmental impact well, which in turn has implications for its profitability.

Previous research by (Siregar, 2021) and (Fatimah et al., 2023) Demonstrates a positive correlation between MFCA and corporate sustainability. Corporate sustainability is linked to the ability to continuously improve profits, which aligns with the principle of profitability. This is consistent with the MFCA concept, which aims to help companies maximise the utilisation of raw materials in the production process.

H2: Material Flow Cost Accounting influences a company's financial performance

Capital Structure on Financial Performance

The Pecking Order Theory explains that companies must select the most appropriate funding source to finance their operations. This is because companies have a hierarchy of priorities in choosing sources of funding for their investments (Kurniasari & Wibowo, 2017). Short-term liabilities are those that must be settled within a relatively short period, usually one year. These liabilities can arise from both operational and financing activities. Short-term liabilities from operational activities include trade payables, unearned revenue, wage payables, tax liabilities, and accrued expenses. On the other hand, short-term liabilities from financing activities include short-term loans, interest payables, and portions of long-term debts that are due (Arniwita et al., 2021).

Short-term debt is typically used to finance current assets and is paid off using current assets. Current assets encompass cash and other assets that can be readily converted into cash or utilised in the company's operations within one year, such as cash, receivables, inventories, prepaid expenses, and marketable securities maturing within a year (Siswanto, 2021). If a company is unable to settle its short-term liabilities, its ability to pay off long-term liabilities will be questioned, thus raising concerns about the company's survival.

H3: Green accounting influences a company's financial performance

Firm Debt in Moderating the Effect of Green Accounting on Financial Performance

Long-term debt, with a maturity period of more than one year, can serve as an additional capital source for companies to carry out sustainable activities (Aryawati et al., 2022). In the context of green accounting, which emphasizes environmental and social aspects, companies require financial resources to support the implementation of environmentally friendly practices that may require significant initial investments (Abdullah, 2020).

Debt can be used to obtain additional capital. However, firm debt can also increase financial risk if not managed properly. When companies use debt to finance sustainable projects related to green accounting, it is important to ensure that the benefits generated from these activities can offset the costs and risks of the debt. If not, substantial debt may burden the company's financial performance, particularly if it faces difficulties meeting its debt obligations. Companies must consider the balance between financial interests and sustainability. Green accounting helps companies identify business operations' environmental and social consequences, but firm debt adds additional pressure to achieve higher financial targets. Managing green accounting can positively influence financial performance if a company can effectively leverage debt. However, inadequate debt management may impede the attainment of optimal financial outcomes

H4: Firm debt moderates the influence of green accounting on financial performance

Firm Debt in Moderating the Effect of Material Flow Cost Accounting on Financial Performance

Firm debt can moderate the relationship between Material Flow Cost Accounting (MFCA) and financial performance, as a company's debt can influence its overall performance (Bukusu & Kurnianti, 2022). MFCA is an accounting method that focuses on identifying and reducing material waste in the production process to improve efficiency and reduce costs. When a company has firm debt, its ability to allocate resources to optimise MFCA can be affected, either positively or negatively, depending on how the debt is utilised.

If the company's debt is used for investment in more efficient technologies or processes, it can make MFCA function more effectively. For example, the company might use debt funds to upgrade machinery or systems that are more efficient in raw material usage, thus reducing waste and improving financial performance. In this context, firm debt acts as a driving factor that enables the company to

implement MFCA more efficiently, thereby enhancing profitability through reduced material costs and better resource management. However, firm debt can also present risks if used ineffectively. High levels of debt without proper management may trap the company in interest payments and other obligations, worsening its financial condition. In such cases, even if MFCA successfully identifies and reduces material waste, the efficiency gains may not be sufficient to cover the high costs of poorly managed debt. Therefore, firm debt as a moderating variable requires strategic management to ensure that the positive impact of MFCA on financial performance can be fully realized

H5: Firm debt moderates the influence of Material Flow Cost Accounting on financial performance

Firm Debt in Moderating the Effect of Capital Structure on Financial Performance

Firm debt can impact the connection between capital structure and financial performance, as the company's debt level notably influences the impact of capital structure on financial performance (Andriani & Susanto, 2021). When a company's capital structure consists of a high proportion of debt, this can significantly affect financial performance. Elevated levels of debt may raise the cost of capital, as the company is required to pay interest and other obligations associated with the debt. If the company fails to manage its debt efficiently, this financial strain could erode its financial performance.

Firm debt can have a positive impact if used wisely for investments that generate returns greater than the debt costs. In this case, a capital structure that includes debt can improve the company's potential for financial returns. For example, a company using debt to expand its operations or boost production capacity may experience an increase in revenue that matches or exceeds the cost of debt. Thus, firm debt can become a factor that enhances the company's capital use efficiency. Firm debt as a moderator allows the company to leverage its capital optimally. A carefully managed debt level can help improve financial performance. However, if debt is used excessively, the company may face greater financial risks, which could ultimately lower its financial performance. On the other hand, with strategically managed firm debt, the company can achieve the right balance in its capital structure, maximizing profit potential without incurring excessive risks.

H6: Firm debt moderates the influence of capital structure on financial performance

RESEARCH METHOD

This study utilizes a quantitative methodology focusing on numerical data analysis and objective measurements. Quantitative research involves more complex methods due to the use of larger sample sizes and systematic procedures throughout the research process (Sekaran, 2017). The data collection method utilised is documentation, which involves recording data from company reports and relevant literature to support the research's objectives. According to (Sekaran, 2017), the documentation technique involves gathering information from written and recorded materials such as archives, reports, journals, photographs, and other recorded documents. This methodology is appropriate for the study as it enables the researcher to objectively examine the relationship between multiple measurable variables—namely green accounting, material flow cost accounting (MFCA), capital structure, and firm debt—on financial performance. By using statistical tools such as panel data regression, the study can identify patterns, correlations, and moderating effects with a high level of precision and replicability. Furthermore, since the research aims to generalize findings from a large sample of 109 companies over an 8-year period, a quantitative approach ensures that the conclusions drawn are both statistically significant and relevant for policy and managerial decision-making in the basic materials sector

Population and Sample

A total of 109 companies from the basic materials sector listed on the IDX between 2016 and 2023 were chosen as the sample for this research. The selection employed purposive sampling, including firms that met certain defined requirements. The sample includes 10 companies consistently listed on the IDX over the 8-year observation period, resulting in a total of 80 observations. Purposive sampling ensures that the selected companies meet specific requirements set by the researcher, enabling more focused and relevant analysis.

Financial Performance

The assessment of financial performance in this study focuses on profitability ratio analysis, specifically Return on Assets (ROA):

$$ROA = \frac{\text{Net Profit Before Tax}}{\text{Total Assets}} \times 100\%$$

Green Accounting

Green accounting provides information on a company's positive or negative contributions to the environment. Companies implementing it tend to have better going concern (the ability to continue operating in the long term), making it a crucial strategic factor for future corporate development. Green accounting in Indonesia is realised through PROPER (Corporate Performance Rating Program in Environmental Management). The company's achievement in following the PROPER Program serves as the main benchmark in assessing Green Accounting performance. The PROPER rating system consists of five colour levels: Gold (5 Point), Green (4 Point), Blue (3 Point), Red (2 Point), and Black (1 Point).

Material Flow Cost Accounting

MFCA becomes key in identifying problems and improvement efforts. MFCA has three dimensions: production costs, planted area, and production yield. In this study, the author uses production cost indicators as a measurement of MFCA:

$$\text{Material Flow Cost Accounting (MFCA)} = \text{Log (Production Cost)}$$

Capital Structure

Capital structure refers to the proportion of long-term debt and equity used to finance corporate investments. Decisions regarding funding sources are a crucial aspect of corporate finance. An optimal capital structure, with the lowest capital cost, will enhance a company's value. This can be seen as a balance between long-term debt and equity. Capital structure can be measured using the Debt-to-Asset Ratio (DAR):

$$DAR = \frac{\text{Total Debt}}{\text{Total Assets}} \times 100\%$$

Firm Debt

Firm debt can be understood as an indicator of a company's ability to settle all its obligations. If a company's liabilities are too large, this can increase risks that outweigh potential profits, ultimately negatively impacting the company's financial performance. The ratio used to measure firm debt is the Debt to Equity Ratio (DER), which compares the amount of debt to the company's equity:

$$DER = \frac{\text{Total Debt}}{\text{Total Equity}} \times 100\%$$

Data Analysis Method

The dataset utilised in this research was analysed using panel data regression, processed through Microsoft Excel and E-Views 12. Panel data, which combines time series and cross-sectional data, enables a more comprehensive and dynamic analysis. This method was chosen for its advantages in accounting for individual heterogeneity and reducing multicollinearity. Three panel data estimation approaches: Common Effect, Fixed Effect, and Random Effect were evaluated and chosen by applying the Chow, Hausman, and Lagrange Multiplier (LM) tests. The following regression model was employed:

$$FP = \alpha + \beta_1 GA + \beta_2 MF + \beta_3 CS + \beta_4 FD + \beta_5 FD * GA + \beta_6 FD * MF + \beta_7 FD * CS + e$$

ANALYSIS

Descriptive statistics for the study variables are shown in Table 1, the results of descriptive statistical testing, showing that the number of data points (N) for each variable is 80, derived from 10 sample companies in the basic materials sector listed on the Indonesia Stock Exchange from 2016 to 2023. The financial performance variable ranges from 0.168853 to 0.251199, with an average of 0.048407 and a standard deviation of 0.079768, peaking with Unggul Indah Cahaya Tbk. in 2021 and lowest with Polychem Indonesia Tbk. in 2020. Green accounting scores range from 2 to 5, averaging 3.387500 with a standard deviation of 0.684249, with the highest scores in Aneka Tambang Tbk. and Semen Indonesia, and the lowest in Polychem Indonesia Tbk. and Unggul Indah Cahaya Tbk. The material flow cost accounting variable varies from 15.47532 to 24.35099, with an average of 20.62492 and a standard deviation of 2.593241, reaching its highest in Aneka Tambang Tbk. (2022) and lowest in Timah Tbk. (2016). The capital structure ranges from 0.131480 to 1.295741, with a mean of 0.412926 and a standard deviation of 0.219754, highest in Semen Indonesia (2019) and lowest in Polychem Indonesia Tbk. (2018). Lastly, firm debt ranges from 0.151384 to 2.872140, with an average of 0.757495 and a standard deviation of 0.626462, highest in Timah Tbk. (2019) and lowest in Polychem Indonesia Tbk. (2018).

Table 1 Descriptive Statistics Result

Variable	Maximum	Minimum	Mean	Std. Dev
FP	0.251199	-0.168853	0.048407	0.079768
GA	5.000000	2.000000	3.387500	0.684249
MFCA	24.35099	15.47532	20.62492	2.593241
CS	1.295741	0.131480	0.412926	0.219754
FD	2.872140	0.151384	0.757495	0.626462

Source: Data Processing Results

Three approaches are available to estimate a panel data regression model: Common Effect (CEM), Fixed Effect (FEM), and Random Effect (REM). The Common Effect model assumes that every unit has the same influence on the dependent variable, while the Fixed Effect model accounts for individual differences by assigning each unit its own intercept and focusing on within-unit variation. In contrast, the Random Effect model assumes that differences among units can be explained by unobserved random factors and is chosen based on statistical tests such as the Chow, Hausman, and Lagrange Multiplier tests.

Table 2 Summary of the Model Selection

Test Type	Model Estimation	P-Value	α	Selected Model
Chow	CEM – FEM	0,00	0,05	FEM
Hausman	FEM – REM	0,74	0,05	REM
Lagrange-Multiplier	CEM – REM	0,00	0,05	REM

Source: Data Processing Results

Based on the tests above, the selected model for this study is the Random Effect Model (REM). The Chow Test, used to choose between the CEM and FEM, produced a probability of $0.000 < 0.05$ and the selection of FEM. However, the Hausman Test, which compares FEM and REM, showed a probability of $0.7467 > 0.05$, indicating thus selecting REM. Finally, the LM Test, which compares CEM and REM, resulted in $0.0000 < 0.05$, confirming that REM is more appropriate.

Hypothesis Testing result

Table 3 below presents a summary of the hypothesis testing results. Each result is explained in detail and supported by relevant previous studies in the subsequent sections following the table:

Table 3 Summary t-Test

	Hypothesis	t-statistic	t-table	Sig.	Result
H ₁	Green accounting influences a company's financial performance	2,02	1,99	0,04	Accepted
H ₂	Material Flow Cost Accounting influences a company's financial performance	1,21	1,99	0,22	Rejected
H ₃	Green accounting influences a company's financial performance	1,02	1,99	0,30	Rejected
H ₄	Firm debt moderates the influence of green accounting on financial performance	2,16	1,99	0, 03	Accepted
H ₅	Firm debt moderates the influence of Material Flow Cost Accounting on financial performance	0,48	1,99	0,62	Rejected
H ₆	Firm debt moderates the influence of capital structure on financial performance	1,17	1,99	0,24	Rejected

Source: Data Processing Results

The Influence of Green Accounting on Financial Performance

The regression hypothesis test indicates that the green accounting variable (X1) has a significance level of $0.0464 < 0.05$, suggesting that green accounting significantly affects financial performance (Y), and thus the first hypothesis (H₁) is accepted. This finding implies that whether a company allocates higher or lower environmental costs influences its financial performance. Green accounting aligns with Deegan's legitimacy theory, which posits that companies must ensure their operational activities meet societal expectations to maintain legitimacy. PT Aneka Tambang Tbk (ANTM), a basic materials company, exemplifies strong green accounting implementation, evidenced by its consistent PROPER ratings of Gold and Green from 2016 to 2023. ANTM's commitment to environmental sustainability contributes positively to its financial performance through legal risk reduction, operational efficiency, improved investor perception, especially those concerned with ESG factors, and easier access to business opportunities. While these findings support stakeholder theory by highlighting how green accounting fosters corporate accountability, its limited impact on stock price fluctuations suggests that investors may still perceive environmental expenditures as non-profitable, despite their long-term value. The study supports findings from (Arsyiyanti et al., 2024), (Sari, 2023), and (Ramadhani et al., 2022), which all affirm the significant influence of green accounting on financial performance, although conflicting results from (Mabruroh & Anwar, 2022), (Angelina & Nursasi, 2021), and (Faizah, 2020) suggest otherwise, likely due to differing perceptions of PROPER disclosures.

The Influence of Material Flow Cost Accounting on Financial Performance

The regression hypothesis test reveals a significance level of $0.2271 > 0.05$ for the material flow cost accounting (MFCA) variable (X2), indicating that MFCA does not significantly affect financial performance (Y), and thus the second hypothesis (H₂) is rejected. While MFCA aims to reduce waste and environmental impact through better material cost control—ideally improving financial outcomes this result suggests that such benefits may not materialize without optimal implementation or clear understanding of the system. Stakeholder theory, which anticipates increased company reputation through environmental accountability, does not align with this result, as the lack of significant financial effect could stem from inadequate execution or more dominant external influences. From a theoretical perspective, stakeholder theory anticipates that proactive environmental accountability should enhance a company's reputation and, consequently, its financial performance. However, the empirical results indicate a disconnect, possibly due to ineffective execution, weak internal control systems, or more dominant external factors such as volatile commodity prices. For example, in resource-intensive industries like PT Timah Tbk, macroeconomic pressures such as declining global tin prices in Q1 2023 significantly impacted the company's profitability, overshadowing potential efficiency gains from MFCA implementation.

This research supports findings by (Asti, 2021), (Afni & Achyani, 2023), and (Oktadifa & Widajantie, 2024), who argue that while MFCA can boost operational efficiency, its effect on financial performance is not always direct. In contrast, (Santi, 2022), (Siregar, 2021), and (Fatimah et al., 2023) MFCA positively influences financial performance, likely due to more successful implementation or differing contextual factors such as human resource management and marketing strategies. From a managerial and policy standpoint, the insignificant result serves as a cautionary note. For MFCA to contribute meaningfully to financial outcomes, firms must ensure proper training, internal commitment, and alignment with strategic financial planning. Management should not merely adopt MFCA for compliance or image-building purposes but must embed it within core financial performance evaluation systems. Additionally, policymakers could consider creating incentives or regulatory frameworks that reward firms for demonstrable environmental and financial integration, ensuring that sustainability efforts are not isolated from profit-oriented objectives.

The Influence of Capital Structure on Financial Performance

The regression hypothesis test shows a significance level of $0.3085 > 0.05$ for the capital structure variable (X3), indicating that capital structure has no significant influence on financial performance (Y), and the third hypothesis (H3) is thus rejected. This finding suggests that decisions related to the proportion of debt and equity financing may not be a critical determinant of financial performance in the sampled context. The result contradicts the pecking order theory, which posits that firms prioritize internal financing over debt and equity due to cost implications—implying that capital structure should inherently impact profitability. However, this discrepancy could be attributed to several unanticipated or contextual factors. For instance, during periods of economic uncertainty or inflationary pressure, external elements such as rising input costs and changing consumer behaviour may influence firm performance more than capital composition. An illustrative case is PT Semen Indonesia, which, despite efforts to optimize its capital structure by reducing debt levels, still recorded lower profits due to increasing raw material and energy costs.

The study aligns with findings from (Gemilang & Wiyono, 2022), (Redemptus & Susilowati, 2024), and (Harsono & Pamungkas, 2020), who emphasize that other variables like operational efficiency or macroeconomic factors might have a stronger influence. However, differing conclusions from (Alfitri, 2022), (Ningsih & Utami, 2020), and (Wardhani & Suwarno, 2021) suggest capital structure does play a role in financial performance, particularly when methodology, research periods, or industrial contexts vary. From a strategic decision-making perspective, the non-significant impact of capital structure underscores the importance for managers to look beyond financing decisions when aiming to boost profitability. Emphasis should be placed on improving internal efficiencies, innovation, and risk mitigation strategies rather than over-focusing on debt-to-equity ratios. Furthermore, firms may need to adopt a more adaptive financial strategy that considers external volatility and sector-specific challenges. For policymakers and regulators, the findings suggest that financial performance cannot be reliably predicted based on capital structure metrics alone, thus encouraging a broader evaluation framework that includes operational resilience and environmental sustainability.

The Moderating Role of Firm Debt on the Relationship Between Green Accounting and Financial Performance

Regression analysis reveals a significant interaction between green accounting and firm debt on financial performance, with a p-value of $0.0340 < 0.05$, thereby accepting hypothesis H4. This indicates that firm debt moderates the influence of green accounting on financial performance in companies within the basic materials sector listed on the Indonesia Stock Exchange. This finding aligns with legitimacy theory, where sustainable practices like green accounting enhance social and environmental legitimacy, especially when reinforced by financial discipline imposed by creditors. Similarly, from the pecking order theory perspective, significant debt may compel companies to optimize operational efficiency through initiatives like green accounting to satisfy lenders and mitigate financial risks. For instance, PT Krakatau Steel used debt to fund projects such as hydrogen-based technology to reduce fossil fuel dependency. This led to reported reductions in CO₂ emissions and operational costs, consequently improving financial results in 2021. These results contradict (Maritza & Wenten, 2024), who found that firm debt negatively moderates this relationship due to high interest burdens eroding financial gains from green initiatives. However, this study posits that with optimal leverage levels and

efficient debt management, firm debt can serve as a financial discipline tool, encouraging stronger environmental accountability and operational improvements.

The Moderating Role of Firm Debt on the Relationship Between Material Flow Cost Accounting and Financial Performance

Regression analysis of the interaction between MFCA and firm debt shows a significance level of $0.6280 > 0.05$, leading to the rejection of hypothesis H5. This indicates that firm debt does not moderate the relationship between MFCA and financial performance in companies within the basic materials sector listed on the Indonesia Stock Exchange. This result partially contradicts stakeholder theory, which assumes that efficient resource management through MFCA creates value for stakeholders. However, in practice, high levels of firm debt may divert management's focus toward short-term debt obligations rather than long-term strategic initiatives like MFCA. This is exemplified by PT Indocement Tunggul Prakarsa Tbk, which, facing high short-term debt, deprioritized MFCA implementation. In 2020, the company saw declining revenue and net profit while its debt rose by 11.69%, reflecting a shift in resource allocation away from long-term efficiency projects. This suggests that in highly leveraged firms, the financial pressure may inhibit MFCA's full potential to enhance financial performance, underscoring the idea that debt does not necessarily enhance the effectiveness of sustainability-related accounting practices when financial constraints dominate managerial priorities.

The Moderating Role of Firm Debt on the Relationship Between Capital Structure and Financial Performance

The interaction test between capital structure and firm debt on financial performance reveals a significance level of 0.2438, indicating the absence of a moderating effect of firm debt in this relationship within IDX-listed basic materials companies. This outcome diverges from the pecking order theory's expectations, which advocates using debt as a means to optimise capital structure and, consequently, firm performance. The study indicates that firms may prioritize external financing or focus more on short-term liabilities, limiting the strategic use of debt. Additionally, the financial performance in this sector is often influenced more by external factors like commodity prices and market demand than by capital structure or debt levels. This suggests inefficiencies in managing debt-funded capital, with firm debt possibly being viewed as a burden rather than a value-enhancing tool.

CONCLUSION

This study concludes that green accounting significantly influences financial performance, indicating that environmental cost allocation affects corporate profitability in line with legitimacy and stakeholder theories. However, material flow cost accounting (MFCA) does not affect financial performance, suggesting that while it reduces waste, its impact on profitability is indirect. Similarly, capital structure does not influence financial performance, implying that financing decisions do not always determine corporate performance. Firm debt moderates the relationship between green accounting and financial performance, showing that debt can drive companies to manage environmental impacts effectively. Conversely, firm debt does not moderate the relationship between MFCA and financial performance, as debt obligations are primarily allocated to short-term financial commitments rather than sustainability initiatives. Additionally, firm debt does not moderate the relationship between capital structure and financial performance, indicating that companies prioritise external funding sources other than debt to enhance financial performance. This study has practical implications for corporate sustainability strategies and financial planning, particularly by encouraging the adoption of green accounting to enhance financial performance under debt pressure. Theoretically, it reinforces the relevance of legitimacy and stakeholder theories in explaining the link between environmental initiatives and financial outcomes. However, the study is limited to the basic materials sector and may be influenced by unmeasured external factors. Future research should broaden the industry scope, incorporate additional variables such as corporate governance or technological innovation, and apply more advanced statistical methods to gain deeper insight.

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