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Optimizing Green Investment and CSR to Enhance Palm Oil Firm Performance in Indonesia: The Role of Financial Slack as a Moderating Factor

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ABSTRACT: This study explores how green investment (GI) and corporate social responsibility (CSR) influence the performance of palm oil companies in Indonesia, with financial slack examined as a moderating factor. The research is motivated by the urgent need to address greenhouse gas emissions resulting from land conversion in palm oil plantations and the limited empirical studies focused on the agribusiness sector, particularly palm oil. Using a quantitative approach, the study analyzes data from eight palm oil sub-sector firms listed on the Indonesia Stock Exchange (IDX) from 2021 to 2023, generating 24 firm-year observations. Data were obtained from annual and sustainability reports, and analyzed using structural equation modeling with Partial Least Squares (SEM-PLS) via Warp-PLS 8.0. The results reveal that green investment has a significant negative impact on firm performance, while corporate social responsibility exerts a positive effect. Financial slack does not moderate the relationship between GI and performance but weakens the positive influence of CSR on performance. These findings suggest that the effectiveness of GI and CSR strategies in enhancing firm performance is contingent upon the firm's financial condition. Moreover, in capital-intensive industries like palm oil, financial slack may complicate the intended benefits of CSR. The study's limitations, particularly the small sample size and focus on listed companies, highlight the need for broader future research.

Keywords: Green Investment, CSR, Financial Slack, Firm Performance.

INTRODUCTION

Climate change is an environmental issue that has garnered global attention since the industrial revolution in the 19th century and continues to do so today. One of its primary causes is human activity, which has led to a temperature increase of approximately 0,8°C to 1,2°C above pre-industrial levels as of 2017 with a rise of 0.2°C per decade (Intergovernmental Panel on Climate Change (IPCC), 2022, p. 51). Climate change has highly destructive impacts, particularly on economic stability across various regions worldwide, by 2050, climate change is expected to cause global economic losses amounting to almost 10% of total economic value (Guo et al., 2021, p. 1).

According to data from the World Bank (2021), Indonesia ranks 97^{th} out of 181 countries exposed to climate change risks contributing approximately 1,240.8 million tons of carbon dioxide equivalent (Gt CO2e) which represents 2.3% of total global emissions. Indonesia is the seventh-largest greenhouse gas emitter worldwide (Yonatan, 2023) with one of the main contributing factors being land-use change and deforestation. Around 498,000 hectares of forest are lost annually due to land clearing for palm oil plantations (Dunne, 2019).

The operational performance of palm oil firms is affected by internal factors such as firm size, liquidity, and financial leverage, alongside external influences like exchange rate fluctuations and international crude palm oil (CPO) prices (Suroso et al., 2020). Nonetheless, due to increasing attention on sustainability, firm performance assessment has expanded to include environmental and social impact considerations positioning Green Investment (GI) and Corporate Social Responsibility (CSR) as essential elements for ensuring the sustainability of palm oil enterprises (Suhardjo et al., 2024).

Corporate Social Responsibility (CSR) serves as a main strategy for mitigating negative environmental impacts while simultaneously enhancing the firm's competitiveness and sustainability (Shahzad et al., 2020). The interplay between strategy, social responsibility, and environmental innovation supports business activities, strengthens sustainable competitive advantage, improves environmental performance and promotes corporate sustainability (Le, 2022).

GI funding within the CSR framework not only enhances environmental performance but also improves profitability, competitiveness, and operational efficiency through innovation, ultimately contributing to long-term economic sustainability (Ye & Dela, 2023; Zhang & Berhe, 2022). The social, economic, and environmental dimensions of GI and CSR are essential elements in developing long-term strategies that support sustainable firm performance (Jinru et al., 2022; Zheng et al., 2021). Moreover, CSR initiatives support positive relationship with stakeholders, enhance investor trust, and improve firm image, all of which contribute to better reputation, productivity, and long-term financial performance (Luo & Qu, 2023; Sun & Stuebs, 2013; Uadiale & Fagbemi, 2012).

The firm's ability to manage its resources, particularly in developing sustainability values is a prerequisite for adopting sustainable practices. Therefore, some of the firm's resources must be set aside for sustainability (Ibrahim & Larasati, 2024). Integrating financial slack into CSR implementation and GI to achieve sustainability is expected to reduce uncertainty and risks in CSR processes and environmental management, thereby creating value if aligned with corporate objectives (Symeou et al., 2019). Greater slack resources allow companies to engage in CSR and environmental activities, demonstrating to stakeholders their readiness to invest in such activities (Anita & Jessica, 2023).

Empirical evidence consistently indicates a notable positive linkage between GI and firm financial performance (Indriastuti & Chariri, 2021; Luo & Qu, 2023; Ye & Dela, 2023; Zhang & Berhe, 2022). There are influence between CSR initiatives and firm's financial performance (Asogwa et al., 2020; Indriastuti & Chariri, 2021; Le, 2022; Meiyana & Aisyah, 2019; Uadiale & Fagbemi, 2012; Wu, 2023; Xiliang et al., 2023). Furthermore, financial slack acts as a moderating role in

strengthening the linkage between CSR initiatives and environmentally focused investments (measured with ESG) with firm's financial performance (Abdillah & Gunawan, 2023; Duque-Grisales & Aguilera-Caracuel, 2021; Lin et al., 2019). However, some empirical studies contradicted these findings, showing no significant association between environmentally focused investments and the financial performance of firms (Asaqdah & Putra, 2021; Cordeiro & Sarkis, 1997; Link & Naveh, 2006; Meiyana & Aisyah, 2019; Novia & Candy, 2023), no measurable influence of environmentally sustainable investment on firm's financial outcomes (Nureen et al., 2023), and even a weakening effect of financial slack in affecting the association between CSR and performance of the firm (Anita & Jessica, 2023).

GI and CSR are widely recognized as contributing to improved firm financial performance through various mechanisms, including enhanced operational efficiency, improved corporate reputation, and stronger stakeholder relationships. However, empirical findings on the relationship between GI and CSR and financial performance remain mixed and inconclusive. While some studies report a significant and positive association, others find no meaningful impact or even negative effects, particularly when contextual factors such as financial slack, or a firm's internal financial cushion, are not accounted for. Moreover, much of the existing research has been conducted in developed countries or within large industrial sectors, which may not accurately reflect the conditions of the agribusiness sector in developing economies like Indonesia. As the world's largest palm oil producer, Indonesia faces considerable environmental challenges, particularly from deforestation and land-use change, which significantly contribute to greenhouse gas emissions. Despite the sector's potential for integrating GI and CSR to improve both performance and sustainability, empirical evidence remains limited on how these initiatives specifically affect the financial performance of palm oil companies, especially in the presence or absence of financial slack.

Therefore, this study addresses an urgent need to empirically examine the effects of GI and CSR on the financial performance of palm oil firms listed on the Indonesia Stock Exchange, while also investigating the moderating role of financial slack in these relationships. By focusing on the context of developing countries, the agribusiness sector, and the internal financial dynamics of firms, this research aims to fill the existing gap in the literature and provide insights that are both contextually relevant and practically applicable. In light of this objective, the central research question posed by this study is: To what extent do GI and CSR affect the financial performance of palm oil firms listed on the Indonesia Stock Exchange, and how does financial slack moderate these relationships within the context of a developing country's agribusiness sector?

To address this aim, the study proposes the following hypotheses: 1) GI contributes positively and significantly to firm performance; 2) CSR have a favorable and significant effect firm performance; 3) The presence of financial slack amplifies the association between GI and firm performance; dan 4) Financial slack enhances the link between CSR and firm performance. Based on the hypothesis development, the research model used in this study can be visualized in the following schematic diagram (see Figure 1).

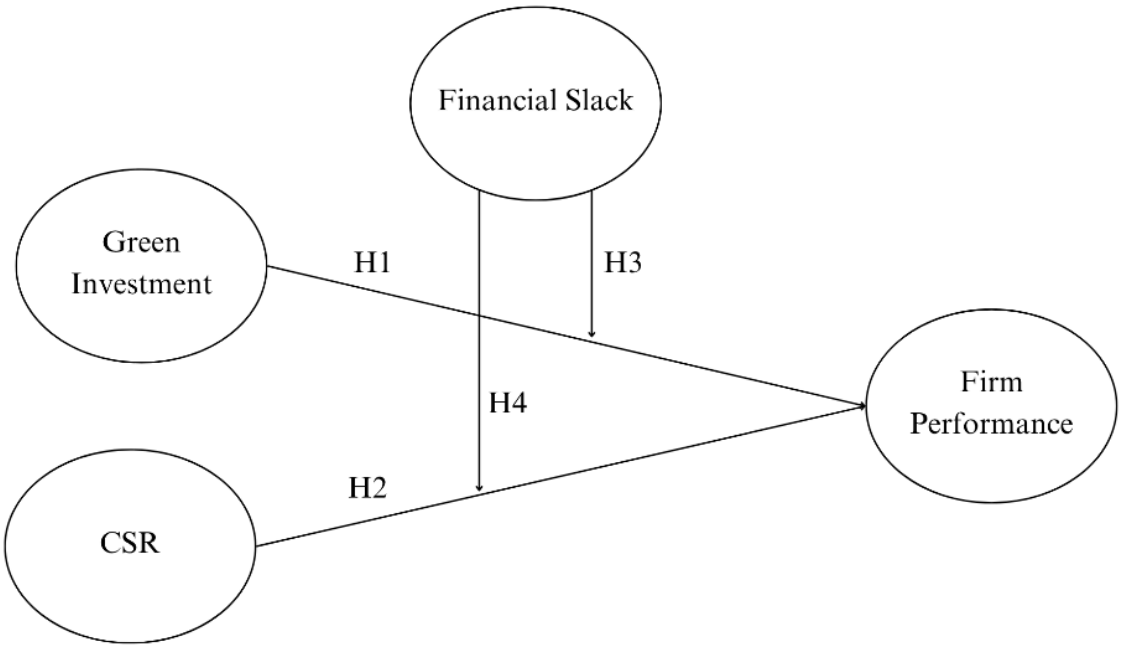

Figure 1. Conceptual Framework

METHOD

This study adopts a quantitative approach utilizing secondary data that focuses on the agribusiness industry, specifically narrowed down to the palm oil sub-sector listed on the Indonesia Stock Exchange from 2021 to 2023. A non-probability sampling technique was utilized for sample selection, with purposive sampling applied as the deliberate sampling strategy. A total of 24 companies from the palm oil sub-sector listed on the Indonesia Stock Exchange between 2021 until 2023 were included in the population for this study. However, only those companies that had annual reports and sustainability reports, provided information on environmental investment costs, and did not experience profit deficits during the period were selected as the sample for this research. Based on these criteria, 8 companies met the requirements for further analysis with a 3-year observation period, resulting in a total of 24 observations for this study.

This research investigates the relationship between GI, CSR, financial slack, and firm performance using a reflective model. GI is measured by the total financial allocation for environmental practices (Agoraki et al., 2023; Setyahuni et al., 2023), CSR is evaluated using the GRI 13 standard, which reflects the firm's social and environmental responsibilities (Asogwa et al., 2020; Harsana et al., 2020), financial slack is assessed using the ratio of free cash flow to revenue, indicating the firm's liquidity (Anita & Jessica, 2023; Lin et al., 2019), and firm performance is measured return on equity (ROE) (Okanda et al., 2025; Rafli, 2024; Yang et al., 2019).

Given the relatively small sample size (n=24), Partial Least Squares-Structural Equation Modelling (PLS-SEM) was selected as the most appropriate statistical technique for data analysis. PLS-SEM is particularly suitable for small-sample studies and complex models involving moderation or mediation, as it does not impose strict assumptions regarding data distribution or sample size (Hair

et al., 2021). PLS employs bootstrapping, a nonparametric resampling procedure, which enables statistical inference without requiring normality assumptions. This makes it highly robust for exploratory studies in emerging fields or sectors with limited data availability, such as sustainability reporting in the palm oil industry.

The use of PLS-SEM also allows for simultaneous assessment of measurement and structural models, enabling the estimation of complex interrelationships among constructs with increased statistical power even in small datasets. However, the small sample size may limit the generalizability of the findings, and results should be interpreted with caution, particularly in terms of external validity. Nonetheless, the insights provided remain valuable for hypothesis testing and theory development within industry-specific contexts.

This research employs a moderation variable as part of the research model; therefore, path analysis is utilized as the analytical tool. The statistical analysis in this study is performed through PLS-SEM, utilizing the Warp-PLS 8.0 software as the primary analytical tool. The evaluation of the inner model or structural model assessment, serves as the initial stage of analysis to verify the accuracy and reliability of the constructed structural model using 10 model fit measures. These measures include the average path coefficient (APC), average R-square (ARS), and average adjusted R-squared (AARS), which assess the model's goodness of fit, as well as the average block variance inflation factor (AVIF) and average full collinearity VIF (AFVIF), which evaluate multicollinearity. Additionally, the Tenenhaus GoF provides insight into the overall model fit, while the Sympson's paradox ratio (SPR), R-squared contribution ratio (RSCR), statistical suppression ratio (SSR), and nonlinear bivariate causality direction ratio (NLBCDR) are used to examine causality and predictive validity (Ghozali, 2021). Hypotheses are tested at a 95% confidence level (Bustani & Juniar, 2023).

The research model can be described by the following equation:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_1 Z + \beta_4 X_2 Z + \varepsilon$$

Keterangan:

Y = Firm Performance

$\beta_1, \beta_2, \beta_3, \beta_4$ = Regression coefficients

X_1 = Green Investment

X_2 = CSR

Z = Organizational Slack

ε = Standard error

The summary of the variables and their operational definitions are stated in Table 1.

Tabel 1. Operational Variables

Variable	Definition	Measurement
Green Investment (X1)	Refers to the allocation of funds toward projects that emphasise environmental sustainability, encompassing eco-friendly production methods, green infrastructure development, and the creation of environmentally responsible goods and services (Setyahuni et al., 2023; Yaya et al., 2022)	Total firm investment in environmental practices
CSR (X2)	Represents the moral obligation that an organization holds towards its stakeholders, reflecting its commitment to ethical and responsible practices (Yang et al., 2019)	$CSRI_i = \frac{\sum X_{yi}}{n_i}$ Description: $CSRI_i$: CSR Disclosure Index Firm i $\sum X_{yi}$: Total disclosed CSR items n_i : Expected total CSR disclosure items
Financial Slack (Z)	Denotes the surplus financial resources available to an organization at a given point within a planning period, providing flexibility to seize opportunities or buffer against uncertainties (Voss et al., 2008).	$Financial\ Slack = \frac{Free\ cash\ flow}{Total\ Earnings}$
Firm Performance (Y)	Refers to a firm's ability to utilize its resources efficiently in achieving objectives that align with its strategic goals, while also considering the value these objectives deliver to its stakeholders (Taouab & Issor, 2019).	$ROE = \frac{Net\ Income\ After\ Interest\ and\ Taxes}{Equity}$

Source: Adapted from Previous Research

RESULT AND DISCUSSION

Descriptive Statistics

As shown in Table 2 there are significant variations among the sampled companies concerning GI, CSR, financial slack, and performance measured by ROE. The mean GI is IDR 13,54 billion with a standard deviation of IDR 21,96 billion, indicating considerable dispersion and the existence of

outliers, with investment values spanning a wide range. CSR averages 0,71 with a standard deviation of 0,12 reflecting relative consistency among companies though some variation persists. Financial slack has a mean of 0,12 and a deviation of 0,11 generally denoting sound financial reserves, albeit with some firms experiencing free cash flow shortages. The average ROE of 0,16 with a deviation of 0,08 representing stable profitability overall with certain companies outperform others with notably higher ROE.

Tabel 2. Descriptive Statistics

Variable	Mean	Median	Min	Max	Standard Deviation
Green Investment	13540153674.92	1580000000	2000000	76545000000	21959670453.30
CSR	0.71	0.73	0.46	0.89	0.12
Financial Slack	0.12	0.14	-0.05	0.36	0.11
ROE	0.16	0.15	0.03	0.33	0.08

Source: Processed Data

Structural Model Analysis (*Inner Model*)

The inner model analysis or structural model analysis is conducted to ensure that the developed structural model is reliable and accurate. The results of the structural model analysis test can be seen in Table 3.

Tabel 3. Structural Model Testing

Criteria	Value	Criteria Description	Remarks
R-Squared	0,435	≤ 0,70 indicates a strong model	Moderate Model
		≤ 0,45 indicates a moderate model	
		≤ 0,25 indicates a weak model	
APC	0,261 P = 0,038	P-value ≤ 0,05	Criteria Met
ARS	0,435 P = 0,003	P-value ≤ 0,05	Criteria Met
AARS	0,316 P = 0,020	P-value ≤ 0,05	Criteria Met
AVIF	1,267	≤ 3,3, but values ≤ 5 are still acceptable	Criteria Met
AFVIF	1,873	≤ 3,3, but values ≤ 5 are still acceptable	Criteria Met
Goodness Tenenhaus (GoF)	0,659	≥ 0,10 (small)	Criteria Met
		≥ 0,25 (medium)	
		≥ 0,36 (large)	

Criteria	Value	Criteria Description	Remarks
SPR	1	Ideally = 1	Criteria Met
		Still acceptable if ≥ 0,70	
RSCR	1	Ideally = 1	Criteria Met
		Still acceptable if ≥ 0,70	
SSR	1	≥ 0,70	Criteria Met
NLBCDR	1	≥ 0,70	Criteria Met

Source: Data processed using Warp-PLS 8.0

Hypothesis Testing

Based on the data analysis using WarpPLS 8.0, hypothesis testing was conducted to identify the influence between variables in this study, as shown in Table 4.

Table 4. Hypothesis Testing

	Hypothesis	Coefficient	*P-Values*	Remarks
H1	Green Investment → Firm Performance	-0,345	0,026	Rejected
H2	CSR → Firm Performance	0,309	0,043	Accepted
H3	Green Investment * Financial Slack → Firm Performance	-0,027	0,448	Rejected
H4	CSR * Financial Slack → Firm Performance	-0,362	0,020	Rejected

Source: Data processed using Warp-PLS 8.0

Note: The significance level used is 5%

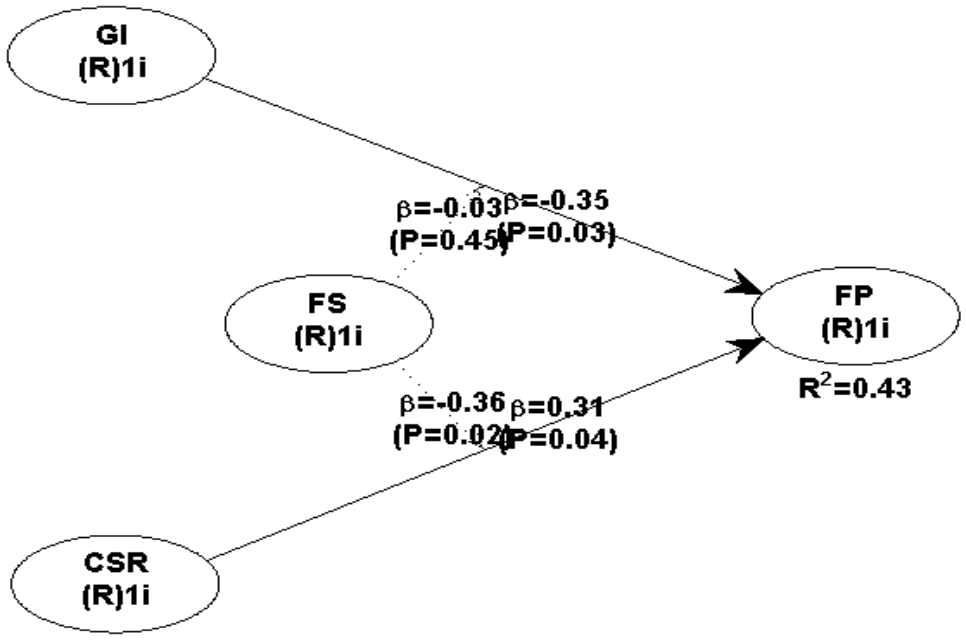

Figure 2. Research Results

Source: Data processed using Warp-PLS 8.0

Hypothesis testing is conducted by examining the coefficient values and p-values, with relationship between variables deemed statistically significant when the the p-value is less than 0,05. The positive or negative influence between variables is indicated by the sign of the coefficient value. A positive coefficient indicates a positive relationship, while a negative coefficient signifies a negative relationship.

As shown in Table 5 and Figure 2, GI has a coefficient of -0,345 with a p-value of 0,026. This suggests that GI has a negative impact on firm performance. The negative coefficient indicates that the higher a firm's GI, the lower its performance. Additionally, the p-value is below 0,05 (0,026 < 0,05) confirming statistical significance. Thus, the initial hypothesis (H1), proposing that GI positively influences firm performance, is rejected. This finding contradicts prior empirical studies that suggest GI positively and significantly influences firm performance (Indriastuti & Chariri, 2021; Luo & Qu, 2023; Ye & Dela, 2023; Zhang & Berhe, 2022).

CSR has a coefficient of 0,309 with a p-value of 0,043. This indicates a positive effect on firm performance. The positive coefficient implies that the higher the CSR activities of a firm, the better its performance. Moreover, the p-value of 0,043 is below 0,05 (0,043 < 0,05), making this result statistically significant. Therefore, the second hypothesis (H2), which states that CSR positively affects firm performance is supported. This result aligns with previous empirical studies that found CSR to have a positive and significant impact on firm performance (Asogwa et al., 2020; Indriastuti & Chariri, 2021; Le, 2022; Meiyana & Aisyah, 2019; Wu, 2023; Xiliang et al., 2023).

Financial slack's moderating role in the link between GI and firm performance is reflected by a coefficient of 0, and a p-value of 0,448. The negative but small coefficient suggests that financial slack does not substantially diminish the impact of GI on firm performance. Furthermore, the p-value exceeds the conventional significance level of 0,05 (0,448 > 0,05) indicating no statistical significance. Thus, the third hypothesis (H3) asserting that financial slack strengthens the effect of GI on company performance is rejected. This finding is inconsistent with empirical research reporting that financial slack enhances the relationship between GI (measured through ESG criteria) and firm performance (Abdillah & Gunawan, 2023; Duque-Grisales & Aguilera-Caracuel, 2021; Lin et al., 2019).

Financial slack exhibits a coefficient of -0,362 with a p-value of 0,020 in its moderating role between CSR and firm performance. The negative coefficient demonstrates that financial slack actually diminishes CSR's positive impact on performance. Since the p-value is below 0,05 (0,020 < 0,05), the result is statistically significant. Accordingly, the fourth hypothesis (H4), which predicted that financial slack enhances CSR's influence on firm performance, is rejected. This aligns with prior studies indicating that financial slack weakens the CSR-performance relationship (Anita & Jessica, 2023).

The findings of this study demonstrate that GI exerts a significantly adverse effect on firm performance, suggesting that increased spending on environmental initiatives tends to lower firm profitability. This supports the notion that such investments can escalate operational costs—such as those related to sustainability certifications and environmental compliance—thereby reducing short-term financial gains (Meiyana & Aisyah, 2019; Novia & Candy, 2023). Legitimacy theory helps explain this, asserting that businesses must align with societal expectations to preserve their

social license to operate (Deegan, 2019). However, these added costs may pose a financial strain, especially for firms lacking sufficient capital reserves.

From a stakeholder theory angle, GI may clash with shareholder expectations that favor immediate returns (Widiatmoko & Indarti, 2018). Investors focused on profitability may view these expenditures as threats, causing downward pressure on share value (Novia & Candy, 2023). While legitimacy theory explains the external pressure for companies to conform to societal norms, stakeholder theory complements this by highlighting the diverse expectations from internal and external stakeholders. These theories together explain why GI, although socially favorable, may receive resistance from key stakeholders who are concerned with short-term returns. The results of this research contrast with previous empirical studies that found a positive impact of GI on corporate performance in other industrial sectors (Indriastuti & Chariri, 2021; Luo & Qu, 2023; Ye & Dela, 2023; Zhang & Berhe, 2022). This difference is likely due to variations in industry characteristics and business models. The palm oil industry which heavily relies on cost efficiency, experiences a direct negative effect from increased operational costs caused by GI, leading to a reduction in profitability.

Conversely, Corporate Social Responsibility (CSR) has been found to exert a significant positive effect on firm performance. The effective implementation of CSR assists companies in the palm oil industry to enhance their reputation and mitigate pressures from both government authorities and society related to social and environmental concerns (Deegan, 2019; O'Donovan, 2002). This is consistent with legitimacy theory, which stresses the importance of maintaining corporate legitimacy through responsible social practices (Deegan, 2019). Furthermore, stakeholder theory emphasizes that the sustainability of a firm largely depends on meeting the interests of various stakeholders via CSR activities, which can reduce social conflicts, improve productivity, and attract investments (Bridoux & Stoelhorst, 2022; Meiyana & Aisyah, 2019). Integrating both theories, CSR can be seen as a strategic tool that enables firms to maintain legitimacy in the public eye while simultaneously aligning with stakeholder expectations. When a company successfully manages this dual alignment, it reaps reputational and operational benefits that translate into improved financial performance. These results correspond with numerous previous studies demonstrating a positive relationship between CSR and firm performance (Asogwa et al., 2020; Indriastuti & Chariri, 2021; Le, 2022; Meiyana & Aisyah, 2019; Wu, 2023; Xiliang et al., 2023).

Regarding financial slack as a moderator, this study finds that financial slack does not moderate the relationship between GI and firm performance. This suggests that having financial slack does not necessarily strengthen the positive effect of GI on performance, likely because GI are more motivated by social legitimacy needs than financial factors (Schembera, 2018). Additionally, conflicting stakeholder expectations may cause tensions, meaning financial slack is not a primary factor in either enhancing or diminishing the effect of GI (Novia & Candy, 2023). This result differs from findings in other sectors where financial slack acts as a positive moderator between GI and firm performance (Abdillah & Gunawan, 2023; Duque-Grisales & Aguilera-Caracuel, 2021; Lin et al., 2019).

Conversely, financial slack is found to weaken the influence of CSR on firm performance. This can be explained by the fact that with financial slack, the legitimacy gained through CSR becomes

less critical for achieving financial success (Lu et al., 2020; Orazayeva & Arslan, 2025). This finding further reinforces the interplay between legitimacy and stakeholder theories, financial slack alters the firm's dependency on external legitimacy and reshapes stakeholder expectations. The reduced necessity to gain approval from external parties weakens the functional impact of CSR on performance (Bhandari & Javakhadze, 2017). Furthermore, signaling theory explains that CSR may lose credibility as a signal of competent management if it is seen as a mere use of excess resources resulting from financial slack (Bhandari & Javakhadze, 2017). This finding is consistent with previous studies showing that financial slack weakens the link between CSR and firm performance (Anita & Jessica, 2023).

Compared to previous studies that generally show positive associations between GI and firm performance across various sectors, the negative relationship found in this study can be attributed to contextual differences, particularly the unique characteristics of the palm oil industry. Unlike capital-intensive or innovation-driven industries where GI is strategically integrated, the palm oil sector is highly cost-sensitive and dependent on operational efficiency. Here, GI often functions more as a compliance mechanism due to strong external pressures from governments, civil society, and international buyers, rather than as a driver of competitive advantage. In addition, geographical and institutional contexts, such as regulatory enforcement, stakeholder expectations, and market maturity, further differentiate the strategic value of GI and CSR across sectors and regions, leading to varied impacts on firm performance.

CONCLUSION

This study reveals that GI has a significant negative impact on firm performance, whereas CSR exerts a significant positive influence. Financial slack does not moderate the effect of GI on performance but weakens the impact of CSR on firm performance. These findings affirm that although GI are often driven by social legitimacy needs, increased operational costs can suppress short-term profitability, while CSR can enhance corporate image and stakeholder relationships, thereby supporting better performance. The role of financial slack as a moderator is complex, as financial flexibility does not always strengthen the positive effects of sustainability initiatives and may even diminish the effectiveness of CSR in improving performance. The results affirm that while GI are frequently motivated by social legitimacy concerns, the associated rise in operational expenses can negatively affect short-term profitability. CSR initiatives help improve a company's reputation and foster better stakeholder relations, thereby enhancing overall performance. The moderating role of financial slack is intricate; financial resources do not invariably amplify the positive outcomes of sustainability efforts and may, in fact, diminish the influence of CSR on performance. This research underscores the necessity of comprehending the industry-specific context, particularly within the palm oil sector, to effectively manage strategies related to GI and corporate social responsibility. Firms must strike a balance between resource allocation and stakeholder expectations to achieve both financial and social sustainability. Hence, an integrated approach to managing finance and sustainability is critical for optimizing firm performance over the long term.

It is recommended that corporate management approach GI with strategic caution, acknowledging that upfront costs might reduce profitability in the short run. Ensuring adequate funding for essential operations is vital to preserve production efficiency and capacity. Strengthening the integration of CSR into corporate strategies is also crucial to enhance financial outcomes and nurture constructive stakeholder relationships.

In addition, palm oil companies should collaborate with industry associations and certification bodies to ensure that environmental investments are strategically targeted at innovations that offer both ecological and economic benefits, such as energy-efficient technologies or sustainable land management practices. Capacity building for sustainability reporting should also be enhanced to improve transparency and allow better benchmarking across the sector.

The government, on the other hand, plays a critical role in addressing these challenges. It should provide fiscal incentives, such as tax reductions or subsidies, for companies investing in green technologies, thereby easing the financial burden of GI. Moreover, the government should strengthen regulatory frameworks and standardize CSR and GI disclosure through mandatory compliance with GRI 13 or equivalent standards to enhance consistency and accountability. Facilitating access to green financing schemes, particularly for smaller firms with limited financial slack, can also encourage broader participation in sustainability efforts.

Financial slack should be prudently allocated to support eco-friendly innovations that boost operational efficiency and environmental outcomes while generating enduring economic benefits. Furthermore, management must guarantee that CSR efforts are effectively implemented and aligned with market demands and risk considerations, enabling CSR to deliver balanced social and financial returns as anticipated by stakeholders.

The study's limitations include inconsistent CSR disclosures by palm oil companies following GRI 13 guidelines, which complicates data analysis and generalization. Additional limitations stem from the sample selection, as not all palm oil firms listed on the Indonesia Stock Exchange openly report their environmental investment expenditures, restricting comprehensive data collection on corporate environmental commitments. Moreover, assessing the long-term effects of GI on firm performance remains challenging due to the typically extended timeframe required for such investments to manifest significant impacts, limiting analysis within the study's duration.

Future research should consider longitudinal studies with a longer observation period to better capture the delayed effects of GI on firm performance. In addition, comparative studies across sectors or countries could explore whether the negative impact of GI observed in the palm oil industry is consistent in other contexts. Further investigation is also needed into the mechanisms through which financial slack influences CSR effectiveness, possibly using qualitative or mixed-methods approaches to complement the quantitative findings. Exploring the role of board characteristics, governance quality, or ESG maturity as moderating or mediating variables may also provide deeper insights into how sustainability practices affect firm outcomes.

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