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Firm Profitability and Carbon Disclosure: The Moderating Effect of Firm Size

Mukti Trio Putra[1*], Intan Zoraya[2], Berto Usman[3]
Universitas Bengkulu, Bengkulu, Indonesia[1,2,3]
muktitrio@unib.ac.id[1], izoraya@unib.ac.id[2], berto_usman@unib.ac.id[3]

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Abstract
Purpose: This study investigates the relationship between firm profitability, measured by Return on Assets (ROA), Return on Equity (ROE), and Net Profit Margin (NPM), and carbon disclosure among publicly listed companies in Indonesia, while also examining how firm size influences this relationship.
Methodology/approach: This study utilizing panel data and multiple regression with a sample of 47 firms from 2018 to 2022.
Results/findings: The results reveal that profitability does not have a significant direct effect on carbon disclosure. However, firm size significantly moderates the relationship between ROA and carbon disclosure, indicating that larger firms face greater scrutiny and are more likely to disclose carbon emissions as part of their legitimacy strategies.
Conclusions: The study concludes that carbon disclosure practices are primarily shaped by external legitimacy pressures, particularly in larger firms, rather than profitability. Inadequate regulatory mandates and limited standardization hinder transparency, underscoring the critical importance of governmental regulation and societal oversight in fostering accountability.
Limitations: This study is limited by its reliance on legitimacy theory, simplified models without control variables, an item-based disclosure measure, exclusive focus on Indonesian listed firms, and a restricted five-year observation period, constraining generalizability and explanatory power.
Contributions: The study contributes by reinforcing legitimacy theory in explaining carbon disclosure, extending insights on firm size's moderating role, and emphasizing that disclosure is shaped more by external pressures than profitability, offering managerial guidance on transparency amid limited regulation.

Keywords: *Carbon Disclosure, Firm Size, Net Profit Margin, Return on Asset, Return on Equity*

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1. Introduction

Climate change, driven by the rise in greenhouse gas (GHG) emissions, particularly carbon dioxide (CO^2), has emerged as one of the most urgent global challenges. It threatens the survival of life on Earth and disrupts economic, social, and ecological stability (Mukherji, 2023). Businesses, especially corporate entities, are significant contributors to carbon emissions through their industrial processes, energy consumption, and distribution activities. Therefore, corporate responsibility to manage and disclose carbon emissions has become a critical element in the discourse of sustainability and corporate governance. In the Indonesian context, carbon emissions have increased significantly by 36.7% since the ratification of the Paris Agreement up to 2022. According to Statista (2023), the manufacturing

industries in Indonesia emitted approximately 110.61 million metric tons of CO_2 equivalent in 2021, placing Indonesia among the largest carbon emitters globally.

These alarming figures underscore the need for greater corporate accountability in carbon disclosure. Although frameworks such as the Carbon Disclosure Project (CDP) and national regulations including Presidential Regulation No. 98 of 2021 and circular letters issued by the Ministry of Industry have mandated carbon reporting in Indonesia, actual disclosure practices remain uneven and relatively low. This situation can be understood through the lens of Legitimacy Theory, which posits that corporations operate within a broader social system of values and norms and require societal approval to sustain their operations. When firms generate significant environmental harm through high carbon emissions, their legitimacy may be at risk. To maintain social acceptance and positive public perception, companies often respond to pressure from stakeholders by disclosing environmental information, including carbon emissions. In this sense, carbon disclosure serves not only as a demonstration of social responsibility but also as a strategic tool for managing external perceptions.

The relationship between profitability and carbon disclosure has emerged as a critical area of inquiry. Companies with higher profitability levels are presumed to have greater resources to allocate toward sustainability and non-financial reporting initiatives. However, from a legitimacy perspective, firms with lower financial performance may face stronger external pressures to disclose environmental impacts as a way to retain their social license to operate. Despite the global attention to carbon reporting, empirical research focusing explicitly on the link between corporate profitability and carbon disclosure in Indonesia is still limited. Previous studies, such as those by Efendy, Ulum, and Widyastuti (2023), have examined the impact of firm characteristics on carbon disclosure but have often treated profitability as a supplementary variable alongside others, such as firm size and leverage. Furthermore, many existing studies rely on signaling or agency theories without fully exploring the relevance of legitimacy theory in the Indonesian context, where social pressure can outweigh regulatory mandates.

Based on the discussion above, several issues remain unaddressed, particularly the lack of empirical studies that examine the relationship between profitability and carbon disclosure from a legitimacy theory perspective. In addition, most prior studies have not positioned profitability as a primary variable and firm size has rarely considered as a potential moderating variable that may influence the relationship. By grounding the analysis in legitimacy theory, this research aims to provide a deeper understanding of how profitability influences corporate carbon disclosure practices. This study seeks to fill this gap by investigating the relationship between profitability, measured through Return on Assets (ROA), Return on Equity (ROE), and Net Profit Margin (NPM), and the level of carbon disclosure among firms listed on the Indonesia Stock Exchange. By grounding the analysis in legitimacy theory, this research aims to provide a deeper understanding of how profitability influences corporate carbon disclosure practices within the Indonesian context.

2. Literature Review and Hypotheses Development

2.1. Legitimacy Theory and Carbon Disclosure

The rationale for corporate carbon emissions disclosure can be understood through the framework of legitimacy theory. As defined by Suchman (1995), legitimacy refers to “a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within a socially constructed system of norms, values, beliefs, and definitions.” This theory posits that the sustainability of corporate operations depends on public acceptance. It operates on the premise that when there is a misalignment between corporate values and societal norms, a firm's legitimacy may be threatened, so all corporate activities and performance must align with the values and norms prevailing in society (Vitaloka, Andriyanto, Amelia, & Indra, 2023). A company will strive to the fullest extent to gain recognition from society, as such legitimacy provides advantages and constitutes a significant potential for ensuring the company’s long-term sustainability (Kodriyah, Kurnia, Sa’adah, & Kholiyah, 2023).

Amid growing public concern regarding climate change, companies increasingly disclose their carbon emissions as a response to external pressure (Qian & Schaltegger, 2017). Carbon emissions disclosure, a form of environmental reporting, involves both quantitative and qualitative information concerning a

company's current and projected carbon usage (Efendy et al., 2023). From this perspective, legitimacy functions as a strategic mechanism through which firms seek to enhance their value by demonstrating commitment to carbon reduction, particularly to key stakeholders such as investors, government institutions, and the public (Lu, Zhu, & Zhang, 2021).

Interestingly, companies with poor environmental performance often engage more proactively in disclosure to counterbalance the negative image associated with their environmental track record. Consequently, carbon emissions disclosure can sometimes be perceived less as a tool for genuine transparency and more as a means of managing public perception (Qian & Schaltegger, 2017). This tendency increases the risk of greenwashing, wherein companies may misrepresent or exaggerate their environmental efforts (Ganda, 2022). Ultimately, while carbon disclosure aims to promote accountability, it may also obscure actual environmental performance when primarily driven by legitimacy concerns.

2.2. Firm Profitability and Carbon Disclosure

Carbon disclosure has the potential to enhance corporate carbon performance, thereby improving long-term financial outcomes (Siddique, Akhtaruzzaman, Rashid, & Hammami, 2021). Profitability is often a consideration in voluntary disclosure decisions, as investors guided by legitimacy theory evaluate not only financial returns but also how firms allocate profits toward environmental efforts such as waste management and emission reduction (Efendy et al., 2023; Ridhwan & Dwiati, 2022; Wiratno & Muaziz, 2020). However, higher profitability may also indicate increased productivity, which can lead to higher emissions; in such cases, firms with large carbon footprints may disclose emissions to mitigate reputational risks (Qian & Schaltegger, 2017).

Profitability is typically measured by Return on Assets (ROA), reflecting a firm's efficiency in generating profit from its assets (Agnese, Cerciello, Oriani, & Taddeo, 2024; Nirino, Santoro, Miglietta, & Quaglia, 2021). Efendy et al. (2023) found ROA to significantly influence carbon disclosure among manufacturing firms in Indonesia, consistent with Siddique et al. (2021), who note that financially sound companies are more likely to commit to consistent and high-quality carbon reporting. Nevertheless, Agnese et al. (2024) argue that the link between profitability and carbon disclosure is context-dependent and complex, highlighting a need for further research to clarify the conditions under which this relationship holds.

Previous studies reveal a persistent debate regarding the extent to which ROA motivates firms to engage in carbon disclosure. This study argues that a higher ROA reflects stronger financial capacity, enabling firms to allocate the resources necessary to pursue legitimacy through carbon disclosure. Although this practice may involve short-term financial costs, it ultimately provides long-term strategic advantages, including efforts to build a stronger reputation that supports the firm's long-term sustainability, as emphasized by (Siddique et al., 2021). Based on this, we propose the following:

H_1: ROA has significant impact on carbon disclosure

Prior literature has consistently treated ROA and ROE as a complementary set of measures for assessing a firm's ability to generate profits (Q. Wang, 2023). While ROA captures the effectiveness of asset utilization in producing earnings, ROE completes the assessment by reflecting the effectiveness of equity utilization. Together, ROA and ROE reflect different dimensions of financial strength that may influence firms' capacity and incentives to disclose carbon information. Efendy et al. (2023) found that corporate profitability significantly influences carbon emission disclosure, using Return on Assets (ROA) as the indicator. When measured by Return on Equity (ROE), however, profitability reflects shareholder interests more directly, making environmental disclosures such as carbon emissions potentially strategic tools to meet shareholder expectations and strengthen reputation. Demonstrating concern for both financial outcomes and environmental impact can, in turn, enhance investor trust and support long-term stock value (Siddique et al., 2021).

In contrast, Agnese et al. (2024) show that some firms remain highly profitable despite ESG-related controversies, indicating a possible decoupling between financial and sustainability performance. In

developing countries like Indonesia, where carbon reporting frameworks are still evolving, the impact of ROE on disclosure decisions merits further study, given the differences in regulatory environments, social pressures, and corporate capacities compared to developed economies. These contradictory findings indicate that the relationship between ROE and carbon dislosure may be context dependent.

Given these mixed results, it remains unclear whether ROE encourages firm to disclose its emission. From the perspective of legitimacy theory, a firm with strong ROE tends to maintain its popularity among investors not only by sustaining high financial returns but also by demonstrating its commitment to sustainability. This aspect is increasingly emphasized by institutional investors in the current era. Carbon emission disclosure can therefore serve as a strategic tool to preserve investor confidence and attract potential new investors. Building upon this theoretical and empirical background, this study proposes the following hypothesis:

H_2: ROE has a significant impact on carbon disclosure

Net Profit Margin (NPM) indicates how efficiently a company converts revenue into profit. A high NPM reflects strong profitability, which can be leveraged to meet stakeholder expectations, including efforts to reduce carbon footprints (Istiqomah & Wahyuningrum, 2020). Yuliana and Wedari (2023) posit that stakeholders may view companies with strong financial performance as having greater resources, thereby enabling them to make more substantial contributions toward addressing social and environmental issues. While some studies report a positive relationship between NPM and carbon disclosure (Nyahuna & Doorasamy, 2023; Ziping & Genzhu, 2018), others suggest the opposite (Istiqomah & Wahyuningrum, 2020). Although NPM may support the legitimacy theory perspective where firms with strong profitability can utilize their financial capacity to satisfy stakeholder expectations regarding sustainability, prior studies indicate that NPM remains a relatively underexplored indicator in examining the nexus between profitability and carbon disclosure. Therefore, we propose to further investigate this relationship as follows:

H_3: NPM has a significant impact on carbon disclosure

Previous studies have identified a clearer relationship between various factors and non-financial disclosure when firm size is taken into consideration (Fadhillah, Syukri, Mubyarto, & Nasrullah, 2024; Hernawati & Ruslim, 2024; Prabandari, Fatimah, Rochayatun, & Sartika, 2023). Larger firms tend to disclose more information because they operate under greater stakeholder scrutiny and possess more abundant resources to support sustainability reporting (Barlinti & Aris, 2023). This view is consistent with findings indicating that larger firms are more likely to be exposed to broader markets and greater stakeholder pressure, which in turn motivates greater investment in various forms of environmental disclosure (Nasih, Harymawan, Paramitasari, & Handayani, 2019). Such findings suggest that firm size not only shapes disclosure practices but also amplifies the strategic motives behind them.

In addition, recent studies examining carbon disclosure and firm attributes show that corporate characteristics, such as governance, performance, and operational structure, are important predictors of disclosure practices (Ericho & Amin, 2024). However, this stream of research has primarily focused on how firm attributes shape carbon disclosure rather than the possibility that disclosure itself may influence corporate behavior over time.

Emerging literature also highlights that disclosure may play a role in shaping internal strategic responses. Drawing on legitimacy theory, scholars argue that climate related disclosures can function in both symbolic and substantive ways, where symbolic disclosure reflects compliance oriented or superficial responses, while substantive disclosure is associated with more meaningful environmental and financial outcomes (Khan & Khan, 2025). Empirical work further suggests that carbon related reporting can stimulate internal changes, such as investments in green innovation, which enhance both environmental and economic performance and strengthen a firm's capability and motivation to disclose environmental information (Li, Huang, Ren, Chen, & Ning, 2018).

Despite these developments, limited attention has been given to understanding whether the extent of carbon disclosure may influence corporate characteristics in subsequent periods. The theoretical and

empirical insights described above indicate that carbon disclosure has the potential not only to reflect firm attributes but also to shape strategic decision making, performance trajectories, and legitimacy seeking behaviors. This gap highlights the importance of examining the possibility of a reverse relationship. Therefore, this study proposes:

H_4: Firm Size moderates the relationship between ROA and carbon disclosure

H_5: Firm size moderates the relationship between ROE and carbon disclosure

H_6: Firm size moderates the relationship between NPM and carbon disclosure

Table 1. Previous studies

Author(s)	Variables	Topic	Key Findings
Siddique et al. (2021)	Carbon disclosure, carbon performance, financial outcomes	Impact of carbon disclosure on financial and environmental performance	Carbon disclosure strengthens carbon performance and enhances long-term financial outcomes; firms benefit in legitimacy and sustainability.
Efendy et al. (2023)	ROA, carbon emission disclosure	Profitability as determinant of carbon disclosure (Indonesia)	ROA has a significant positive effect on carbon disclosure, indicating that profitable firms disclose more consistently.
Agnese et al. (2024)	Profitability, ESG controversies, disclosure	Contextual nature of profitability–disclosure relationship	Profitability–disclosure link is inconsistent; some firms remain profitable despite poor ESG conduct, showing contextual and non-linear dynamics.
Ziping and Genzhu (2018)	NPM, carbon disclosure	Profit margins and carbon reporting behavior	Higher NPM increases the likelihood of carbon disclosure, suggesting firms use financial strength to support transparency.
Nyahuna and Doorasamy (2023)	Profitability, carbon reporting	Drivers of voluntary emission reporting	Profitability positively influences carbon reporting, supporting the view that financially strong firms disclose to maintain legitimacy.
Istiqomah and Wahyuningrum (2020)	NPM, sustainability disclosure	Profitability's influence on disclosure	NPM negatively affects disclosure in some cases, as firms with high emissions may strategically reduce visibility to avoid scrutiny.
Nasih et al. (2019)	Firm size, carbon emission disclosure	Influence of firm size on disclosure	Larger firms disclose more due to stronger stakeholder pressure, higher visibility, and greater reporting resources.
Barlinti and Aris (2023)	Firm size, sustainability reporting	Firm visibility and disclosure practices	Large firms engage more actively in sustainability reporting because of higher public scrutiny and capacity.
Ericho and Amin (2024)	Firm attributes, carbon disclosure	Determinants of carbon disclosure	Corporate characteristics influence disclosure, but the reverse relationship remains underexplored, revealing a literature gap.
Li et al. (2018)	Environmental legitimacy, green innovation, carbon disclosure	Legitimacy pressure and strategic response	Carbon disclosure promotes internal changes such as green innovation, improving both economic and environmental performance.

2.3. Research Framework

To provide a clearer understanding of the proposed hypotheses, we present a visualization of the conceptual relationships along with their operationalization in the research model. Figure 1 illustrates the research framework:

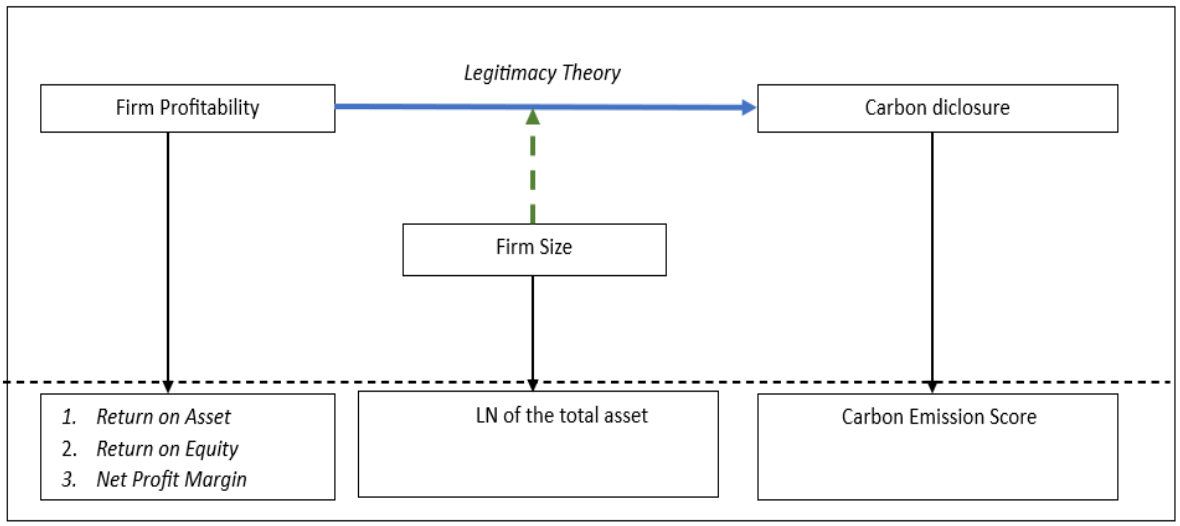

Figure 1. Research framework

Figure 1 shows the relationship between firm profitability and carbon disclosure within the framework of legitimacy theory, positing that financially robust firms are more inclined to disclose environmental information as a strategy to maintain or enhance their legitimacy in the eyes of stakeholders. Firm profitability is measured through three widely used financial indicators: Return on Assets (ROA), Return on Equity (ROE), and Net Profit Margin (NPM). These indicators collectively reflect a firm's efficiency in generating profits from its assets and equity base, as well as its overall financial performance. Carbon disclosure, on the other hand, is assessed using a carbon emission score, which captures the extent to which firms publicly report their carbon emissions and climate-related data. The model also includes firm size as a moderating variable, given its potential influence on both profitability and disclosure behavior. Larger firms tend to face greater scrutiny from stakeholders, including regulators, investors, and the public, and are thus more likely to engage in proactive environmental reporting. Firm size is operationalized using the natural logarithm of total assets, a standard approach in empirical corporate governance research.

3. Research Methods

3.1. Data and Sample

This study examines the influence of corporate profitability on carbon disclosure among publicly listed companies in Indonesia. The population consists of all firms listed on the Indonesia Stock Exchange (IDX) across a diverse range of industrial sectors. However, as carbon disclosure is not uniformly practiced across all listed firms, the final sample is restricted to companies that have disclosed their carbon emissions during the period from 2018 to 2022. Carbon disclosure data were obtained from ESG Intelligence at Universitas Airlangga and measured using the Carbon Emission Score, which captures the proportion of carbon related items disclosed relative to the indicators specified in the Global Reporting Initiative framework.

Financial data, including ROA, ROE, NPM, and firm size, were collected from audited annual reports. The detailed sample selection procedure and the industry classification based on the Global Industry Classification Standard are presented in Appendix A and Appendix B in order to maintain conciseness in the main text. The final sample consists of 47 publicly listed companies with a total of 235 firm year observations across nine sectors.

Table 2. Operational definition of variables

Variables	Proxies	Operational Definition	Measurement	Source
Carbon Disclosure	Carbon Disclosure Scores	The extent to which a company reports information related to carbon emissions as part of its sustainability or environmental communication.	$\frac{Number\ of\ items\ disclosed}{Total\ Carbon\ Disclosure\ items\ in\ GRI}$	ESG Intelligence
Profitability	ROA	A measure of profitability that reflects the company efficiency in generating earnings from its total assets.	$\frac{Net\ Income}{Total\ Assets}$	Firm's Annual Report
	ROE	A measure of profitability that reflects the company ability to generate earnings for shareholders from total equity invested.	$\frac{Net\ Income}{Shareholder\ Equity}$	Firm's Annual Report
	NPM	A measure of profitability that indicates the proportion of net profit earned from total revenue after all expenses are deducted.	$\frac{Net\ Profit}{Total\ Revenue}$	Firm's Annual Report
Firm Size	Natural logarithm of total assets	An indicator of the scale of company operations and the level of visibility to stakeholders, which may influence disclosure behavior.	*Ln (Total Assets)*	Firm's Annual Report

3.2. Multiple Regression Model

To empirically investigate profitability effect on carbon disclosure, the following baseline regression model is proposed.

$$CESi,t = \alpha + \beta 1ROAi,t + \beta 2ROEi,t + \beta 3NPMi,t + \varepsilon \quad (1)$$

The multiple regression model was selected because it is suitable for analyzing panel data and provides reliable estimates for relationships observed across firms and over time (Lu et al., 2021; G. Wang et al., 2022). This model is used to examine whether the independent variables significantly influence the dependent variable, this model employs CES as the dependent variable (Romadloni & Pravitasari, 2022). ROA, ROE, and NPM function as proxy measures of profitability. In addition to examining the direct effects of firm profitability on carbon disclosure, this study also investigates the moderating role of firm size in the relationship between profitability and carbon disclosure. The model is outlined as follows:

$$CESi,t = \alpha + \beta1ROAi,t + \beta2ROEi,t + \beta3NPMi,t + \beta4\ (ROAi,t*FSi,t\ ) + \beta5(ROEi,t*FSi,t\ ) + \beta6(NPMi,t*FSi,t\ ) + \varepsilon \quad (2)$$

Model 2 incorporates firm size as a moderating variable to examine whether the relationship between profitability and carbon emission disclosure varies according to the scale of the company. Interaction terms between each profitability indicator and firm size are included to determine whether the influence of profitability on carbon disclosure changes across firms of different sizes. The use of interaction terms therefore allows for a more comprehensive understanding of how firm characteristics shape disclosure behavior.

4. Results and Discussion

4.1. Descriptive Statistics

First step in analysing is providing the detail of descriptive statistic on the variables which presented in Table 3.

Tabel 3. Descriptive statistics

Variable	Obs.	Mean	Median	Min	Max	SD	SUM
CES	235	0.402	0.286	0.000	1.000	26.118	94.429
ROA	235	0.074	0.045	-0.406	1.239	3.989	17.379
ROE	235	0.116	0.086	-2.543	1.451	25.410	27.195
NPM	235	0.144	0.075	-3.300	4.279	53.771	33.906
FS	235	18.543	17.169	12.257	42.447	5252.438	4357.509

A descriptive analysis was conducted using the compiled data on the Carbon Emission Score (CES) from ESG.AI, as well as ROA, ROE, NPM, and Firm Size (FS) from each sample. As presented in Table 3, the CES variable serves as the dependent variable, with an average mean score of approximately 40.2 percent. The independent variables include ROA, ROE, and NPM. Specifically, ROA exhibits a mean score of approximately 7.4 percent, while ROE has a mean of approximately 11.6 percent. The NPM variable shows an average mean of around 14.4 percent. Meanwhile, FS, which functions as the moderator variable, displays a mean value of approximately 18,543. The subsequent section will present the results of the correlation test.

Tabel 4. Correlation test

No	Variable	1	2	3	4	5
1	CES	1				
2	ROA	0.157	1			
3	ROE	0.094	0.446	1		
4	NPM	0.107	0.333	0.006	1	
5	FS	0.035	-0.074	-0.084	0.074	1

Table 4 display the information of the correlation test output. The result shows that all variables (ROA, ROE, NPM, FS) have a positive sign of correlation with CES.

4.2. Model Selection and Hypotheses Testing

Before implementing the proposed statistical model, it is essential to conduct model selection tests to enhance the predictability of the outputs. According to Usman (2020), there are three primary techniques that can be adopted for panel data estimation: Pooled Least Squares (PLS), Fixed Effects Model (FEM), and Random Effects Model (REM). Following the appropriate model selection procedures, the Chow test and the Breusch-Pagan Lagrange Multiplier (B-P LM) test are necessary. The Chow test compares the PLS model with the FEM, while the B-P LM test compares the PLS model with the REM. Furthermore, the Hausman test is employed to determine whether the FEM or REM is more suitable.

Because the data analysis includes two models, one to interpret the direct effect and another to interpret the moderation effect, the same model selection procedures were applied to both models. Consistent with the initial model selection framework, we first conducted the Chow test to evaluate whether the PLS or FEM model was more appropriate. In the un-tabulated results, we report that the Chow test output does not support the null hypothesis, suggesting that the FEM model is preferable. Subsequently, we performed the Breusch-Pagan Lagrange Multiplier (B-P LM) test to determine whether the model aligns more closely with the PLS or REM. T

he resulting p-value (0.000) is significant at the 0.01 level (Breusch-Pagan test: LM = 63.113), thus rejecting the null hypothesis and indicating that the REM is more appropriate than the PLS model. Finally, we applied the Hausman test to identify whether the FEM or REM provides a better specification. The Hausman test results demonstrate that the cross-section random probability for the proposed model is significant ($p < 0.01$), indicating a preference for the REM model. The second model produced an identical result to the first model, further confirming the REM as the appropriate specification. As Allison (2009) highlights, when repeated observations of the same subjects are available over time, the subject itself can act as its own control. Based on these results, the REM model was ultimately selected, and Table 5 presents the results of the main analysis and hypotheses testing.

Table 5. Hypothesis test

Variable	Hypotheses	Model 1 CES	Model 2 CES
ROA	H_1	0.195	-1.186
ROE	H_2	0.097	-0.796
NPM	H_3	0.071	0.243
FS		0.005	-0.009
ROA x FS	H_4	-	0.099*
ROE x FS	H_5	-	0.043
NPM x FS	H_6	-	-0.010
Constant		0.282	0.530
R-squared		0.038	0.066
Adjusted R-squared		0.021	0.037
F-statistic		2.245	2.298
Prob(F-statistic)		0.065	0.028

Note: Each asterisk indicates statistical significance where; *** = p<0.01, ** = p<0.05, and * = p<0.1

As mentioned earlier, to address our hypotheses, we employed two models. The first model was used to examine the direct effects of profitability indicators (ROA, ROE, and NPM) on carbon disclosure. As presented in Table 5, the results from Model 1 indicate that ROA has an insignificant effect on carbon disclosure ($\beta = 0.195$; $p > 0.1$). Consequently, H_1 is not supported. Similarly, ROE also shows an insignificant effect on carbon disclosure ($\beta = 0.195$; $p > 0.1$), and thus, H_2 is not supported. Furthermore, NPM also demonstrates an insignificant effect on carbon disclosure ($\beta = 0.071$; $p > 0.1$). Therefore, H_3 is not supported.

The second model was constructed to assess the moderating role of firm size in the relationship between profitability and carbon disclosure. As shown in Table 5, the interaction term of ROA*FS has a positive and significant moderating effect on the relationship between ROA and carbon disclosure ($\beta = 0.099$; $p < 0.1$). Accordingly, H_4 is supported. However, the interaction term of ROE*FS shows an insignificant effect on carbon disclosure ($\beta = 0.043$; $p > 0.1$), thus H_5 is not supported. Lastly, the interaction term of NPM*FS also exhibits an insignificant effect on carbon disclosure ($\beta = -0.010$; $p > 0.1$). These insignificant effects are further substantiated by the R^2 values: in the first model, the independent variables account for only 3.8% of the variance in the dependent variable, while in the second model, this increases slightly to 6.6%.

4.3. Discussions

ROA did not have a significant effect on carbon disclosure (H_1). The findings suggest that while there is a tendency for firms with more effective asset utilization to exert greater effort in delivering high-quality carbon disclosure, as highlighted by Siddique et al. (2021), the effect remains statistically insignificant. This result contrasts with prior studies that reported a negative relationship between ROA and carbon disclosure (Efendy et al., 2023; Qian & Schaltegger, 2017). However, the weak association observed in the current findings also underscores the voluntary nature of carbon disclosure, suggesting that such disclosure may not be driven by pressures arising from firms' asset management efficiency.

These results align with the conclusions of Agnese et al. (2024), who argue that the relationship between ROA and carbon disclosure is context-specific and complex. In the legitimacy theory perspective, this indicates that firms do not rely on profitability, especially related to asset efficiency to justify carbon transparency Instead, disclosure appears to be driven primarily by external legitimacy pressures originating from stakeholders, policymakers, and the wider public rather than by internal financial performance.

ROE was also found to have no significant effect on carbon disclosure (H2). As Efendy et al. (2023) suggest that ROE reflects shareholder interests. Our findings indicate that, shareholder interest in Indonesian context is narrowly focused on profitability and does not extend to the carbon emissions generated during production processes. In line with Agnese et al. (2024), our results highlight a persistent gap between shareholder expectations of profitability and sustainability reporting practices. This aligns with legitimacy theory, which posits that firms disclose environmental information primarily when external audiences demand accountability. The insignificant effect therefore indicates that shareholder driven motivations remain focused on financial returns rather than legitimacy concerns related to carbon emissions and sustainability reporting.

Similarly, NPM did not have a significant effect on carbon disclosure (H_3). Although a higher NPM may provide firms with the financial capacity to support environmental reporting, this financial strength does not appear sufficient to motivate disclosure. This finding contrasts with earlier studies that reported either positive or negative relationships between NPM and disclosure (Istiqomah & Wahyuningrum, 2020; Ziping & Genzhu, 2018). In contrast, our results align with those of Nyahuna and Doorasamy (2023), who argue that although a higher NPM may provide firms with the financial capacity to engage in carbon disclosure, this influence is not strong enough to compel companies to actually disclose their carbon emissions.

Based on legitimacy theory perspective, internal financial success is not perceived as a compelling reason to enhance environmental transparency, as disclosure is generally driven by external expectations from society and regulators rather than by internal performance indicators. Firms with stable profits therefore may not see value in disclosing carbon information because disclosure entails costs, may disrupt financial efficiency, and could expose the company to reputational risks. Consequently, even firms with stronger NPM tend to refrain from disclosure unless substantial external pressure requires them to do so.

Taken together, the insignificance of all three profitability indicators reinforces the central logic of legitimacy theory, carbon disclosure is shaped primarily by external legitimacy pressures rather than internal financial performance (Askiah & Valdiansyah, 2025). Firms often disclose carbon information primarily in response to regulatory requirements Siddique et al. (2021), which helps explain the insignificant relationship between profitability and disclosure. In Indonesia, POJK No. 51/POJK.03/2017 requires financial service institutions, issuers, and public companies to publish sustainability reports that include carbon emissions; however, it does not specify detailed emission metrics, resulting in considerable variation in the quality and completeness of disclosure. Subsequent regulations, such as Presidential Regulation No. 98 of 2021 and Ministry of Environment and Forestry Regulation No. 21 of 2022 , apply only to certain sectors, which further limits the comprehensiveness and consistency of carbon reporting across firms. This regulatory structure results in varied disclosure practices and diminishes the influence of profitability on reporting decisions.

Societal pressure represents another dimension of legitimacy that appears to influence corporate carbon disclosure practices. This is reflected in the significant moderating effect of firm size on the relationship between ROA and carbon disclosure (H_4). Larger firms are more exposed to public scrutiny, and improvements in asset utilization may be interpreted as activities that increase environmental impact. Consequently, stakeholders expect greater transparency from these firms, and firm size amplifies the influence of ROA on disclosure. This demonstrates how organizational scale strengthens legitimacy seeking behaviors in environmental reporting.

In contrast, the moderating role of firm size is not evident in the relationship between ROE and carbon disclosure (H_5) or between NPM and carbon disclosure (H_6). As previously noted in the discussion of H_2, ROE primarily reflects the financial benefits accruing to shareholders, who typically show limited interest in factors beyond profitability. Disclosure costs, in particular, may be seen as diminishing shareholder returns. This perspective also helps explain why, despite the inclusion of firm size as a moderating factor, NPM does not significantly influence carbon disclosure. The costs associated with disclosure may erode profits, thereby affecting shareholders' investment decisions. Overall, our findings on the moderating role of firm size partially support the results of previous studies (Fadhillah et al., 2024; Hernawati & Ruslim, 2024; Prabandari et al., 2023).

Meanwhile, This study also highlighted low R2 in both models (3.8% and 6.6% respectively are consistent with prior research in sustainability and carbon disclosure, where R^2 values tend to be modest due to the multifaceted and context-specific nature of disclosure practice (Adu, Flynn, & Grey, 2023; Al-Mari & Mardini, 2024; Liu, Zhou, Yang, Hoepner, & Kakabadse, 2023; Siddique et al., 2021). Although profitability explains only a small proportion of the variation, the significant moderation effect and the theoretical relevance of the findings underscore the importance of legitimacy pressures in shaping disclosure outcomes.

5. Conclusions

5.1. Conclusion

This study examined the relationship between ROA, ROE, and NPM and the level of carbon disclosure among publicly listed companies in Indonesia, using legitimacy theory as the main analytical lens. The findings show that none of the three profitability measures influence carbon disclosure. This indicates that firms do not rely on ROA, ROE, or NPM when deciding whether to report their carbon emissions. Instead, disclosure appears to be driven primarily by external legitimacy pressures originating from stakeholders, policymakers, and the wider public, rather than internal financial performance.

The regulatory environment in Indonesia helps explain this pattern. Existing requirements, such as POJK Number 51 of 2017, Presidential Regulation Number 98 of 2021, and Ministry of Environment and Forestry Regulation Number 21 of 2022, provide only partial mandates for disclosure. These regulations do not set standardized emission metrics and apply unevenly across sectors, which results in considerable variation in reporting quality. In this context of limited regulatory clarity, societal expectations become a more influential force shaping disclosure behaviour.

The analysis also shows that firm size affects how companies respond to legitimacy pressures. Larger firms tend to disclose more carbon information because they face greater visibility and scrutiny. When these firms improve operational efficiency, external stakeholders may interpret such actions as potentially increasing environmental impact, prompting expectations for more transparent reporting. This dynamic illustrates how companies use disclosure as a strategy to maintain legitimacy in the eyes of the public. By contrast, firm size does not influence the relationship between disclosure and profitability measures that reflect shareholder interests, such as ROE and NPM, since these indicators remain closely aligned with financial priorities rather than environmental accountability.

Overall, this study strengthens the application of legitimacy theory within the Indonesian context by demonstrating that carbon disclosure is shaped more by societal pressure and regulatory gaps than by profitability. The results contribute to a deeper understanding of how firms in emerging economies

navigate external expectations, particularly in settings where reporting standards are evolving and not yet comprehensive.

5.2. Implications

5.2.1. Theoretical Implications

This study provides meaningful contributions to the academic literature by reinforcing the relevance of legitimacy theory in explaining carbon disclosure behavior within the Indonesian context. The findings show that carbon disclosure is not influenced by internal financial performance, as reflected by ROA, ROE, and NPM. This supports the theoretical argument that firms disclose environmental information primarily to maintain social acceptance rather than to signal financial strength. The results also highlight the importance of organizational visibility, as larger firms appear more responsive to legitimacy pressures due to greater public attention and scrutiny. These insights add nuance to legitimacy theory by demonstrating how firm characteristics shape disclosure decisions, particularly in emerging economies where institutional frameworks are still evolving. Overall, the study advances scholarly understanding of how legitimacy mechanisms operate in settings with partial regulatory guidance and high societal expectations.

5.2.2. Practical Implications

For practitioners, the findings underscore the strategic importance of carbon disclosure in maintaining organizational legitimacy. Firms, especially those with large operational scale, may benefit from integrating carbon reporting into their long-term sustainability strategies as a means of strengthening relationships with stakeholders and enhancing corporate reputation. Companies should also recognize that even in the absence of strong profitability incentives, transparent environmental reporting can support broader legitimacy goals and improve stakeholder trust.

For policymakers, the study highlights the need for more comprehensive and standardized regulatory frameworks to enhance carbon reporting practices in Indonesia. Existing regulations, such as POJK Number 51 of 2017 and Presidential Regulation Number 98 of 2021, provide only partial guidance, which contributes to inconsistent disclosure quality across firms. Policymakers may consider establishing clearer emission metrics, expanding reporting obligations to all major sectors, and aligning national standards with widely recognized international frameworks. Strengthening monitoring mechanisms and providing capacity building support for smaller firms would further promote transparency and improve the overall reliability of carbon disclosure in Indonesia.

5.3. Limitations and Recommendations

This study has several limitations. First, the analysis focuses solely on the relationship between profitability and carbon disclosure within the framework of legitimacy theory. During the research process, it became evident that previous studies often combined multiple theoretical perspectives. Future research may therefore consider incorporating alternative frameworks, such as institutional theory, which emphasizes the external pressures that shape corporate disclosure practices; stakeholder theory, which examines how disclosure is influenced by the expectations and interests of various stakeholder groups; or signaling theory, which explores how disclosure can affect investors and their decision making.

Next, this study acknowledges that the models employed remain relatively simple and do not incorporate control variables, which may contribute to the relatively small proportion of variance explained. The models account for only a modest share of the variance in carbon disclosure. While such values are common in disclosure-related research, they underscore the importance of additional explanatory factors, such as firm-level environmental strategies, board environmental expertise, industry-specific emission profiles, stakeholder activism, and national climate policies, that may play a substantial role in shaping disclosure practices.

Future research could integrate these factors and adopt multi-level modeling approaches to enhance explanatory power. Incorporating qualitative data or longitudinal case analyses may also yield richer insights into the determinants of carbon disclosure. Furthermore, subsequent studies could address this

limitation by including control variables such as firm age and industry type to reduce bias and better isolate the influence of the main variables. Furthermore, due to data availability constraints, the measure of carbon disclosure we employed was based on the number of items disclosed by companies relative to the total number of carbon disclosure items in the GRI standard. Future research is encouraged to utilize more detailed data, such as scope 1, 2, and 3 carbon emissions.

Moreover, this study focuses exclusively on publicly listed companies in Indonesia, which may limit the generalizability of the findings to other contexts. In the Indonesian context, the relevant authorities have introduced several regulations on carbon disclosure; however, gaps remain, including a transitional phase in which certain reporting requirements are being gradually made mandatory over the coming years. Furthermore, the absence of a standardized framework for carbon reporting is likely to influence disclosure practices in ways that may not be directly transferable to other jurisdictions. To enhance external validity, future research could replicate this study in other emerging and developed markets to enable cross-country comparisons.

Such research could also utilize multi-country datasets and adopt hierarchical modelling to capture both firm-level and country-level determinants of carbon disclosure, thereby providing a more comprehensive understanding of how institutional, regulatory, and cultural contexts shape corporate environmental reporting behaviours. Lastly, this study only covers a five-year period (2018–2022). We acknowledge that the length of the observation period and the timing of data collection can affect the findings. Future research might extend the period of observation or focus on specific moments to yield more novel insights.

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References

Adu, D. A., Flynn, A., & Grey, C. (2023). Carbon Performance, Financial Performance and Market Value: The Moderating Effect of Pay Incentives. *Business strategy and the Environment, 32*(4), 2111-2135. doi:https://doi.org/10.1002/bse.3239

Agnese, P., Cerciello, M., Oriani, R., & Taddeo, S. (2024). ESG Controversies and Profitability in the European Banking Sector. *Finance Research Letters, 61*. doi:https://doi.org/10.1016/j.frl.2024.105042

Al-Mari, J. R., & Mardini, G. H. (2024). Financial Performance and Carbon Emission Disclosure. *Journal of Business and Socio-Economic Development, 4*(4), 293-307. doi:https://doi.org/10.1108/JBSED-03-2024-0023

Askiah, U., & Valdiansyah, R. H. (2025). Carbon Emission Disclosure and Profitability on Firm Value. *Accounting and Finance Studies, 5*(3), 296-310. doi:https://doi.org/10.47153/afs53.17902025

Barlinti, R. A., & Aris, M. A. (2023). Analisis Kinerja Keuangan, Ukuran Perusahaan, Leverage, dan Volume Penjualan terhadap Corporate Social Responsibility. *Jurnal Akuntansi, Keuangan dan Manajemen, 4*(3), 235-247. doi:https://doi.org/10.35912/jakman.v4i3.1050

Efendy, D. G., Ulum, I., & Widyastuti, A. (2023). The Effect of Company Profitability, Leverage, and Size on Carbon Emission Disclosure with Environmental Performance as a Moderating Variable (Empirical Study on Manufacturing Companies Listed on the Stock Exchange in 2020). *Environmental Issues and Social Inclusion in a Sustainable Era*, 347-356. doi:https://doi.org/10.1201/9781003360483-40

Ericho, M. F., & Amin, M. N. (2024). The Influence of Carbon Emission Disclosure Green Intellectual Capital and Environmental Performance on Firm Value with Moderation of Firm Size. *Quantitative Economics and Management Studies, 5*(4), 752-761. doi:https://doi.org/10.35877/454RI.qems2728

Fadhillah, N., Syukri, A., Mubyarto, N., & Nasrullah, M. (2024). The Effect of Profitability, Leverage and Company Size on Company Value in Sharia National Pension Savings Bank for the Period 2014-2023. *The Asian Journal of Professional & Business Studies, 5*(2), 1-10. doi:https://doi.org/10.61688/ajpbs.v5i2.362

Ganda, F. (2022). The Influence of Carbon Performance on the Financial Debt of Listed Companies in an Emerging Economy: Does Company Size Matter?. *Business Strategy & Development, 5*(1), 44-58. doi:https://doi.org/10.1002/bsd2.182

Hernawati, H., & Ruslim, H. (2024). The Effect of Corporate Governance, Profitability, and Capital Structure on Corporate Risk Disclosure, with Company Size as Moderation. *Eduvest-Journal of Universal Studies, 4*(6), 4944-4956. doi:https://doi.org/10.59188/eduvest.v4i6.1461

Istiqomah, & Wahyuningrum, I. F. S. (2020). Factors Affecting Environmental Disclosure in Companies Listed on the Tokyo Stock Exchange. *Accounting Analysis Journal, 9*(1), 22-29. doi:https://doi.org/10.15294/aaj.v9i1.30019

Khan, N. U., & Khan, M. H. (2025). "Soft" Climate Change Exposure and Firm Performance Across Countries: Legitimacy Theory Perspective. *Business strategy and the Environment, 34*(7), 8554-8570. doi:https://doi.org/10.1002/bse.70029

Kodriyah, K., Kurnia, D., Sa'adah, I. N., & Kholiyah, Y. (2023). Nilai Perusahaan, Kinerja Lingkungan dan Konservatisme Akuntansi. *Jurnal Akuntansi, Keuangan, dan Manajemen, 4*(2), 141-152. doi:https://doi.org/10.35912/jakman.v4i2.1768

Li, D., Huang, M., Ren, S., Chen, X., & Ning, L. (2018). Environmental Legitimacy, Green Innovation, and Corporate Carbon Disclosure: Evidence from CDP China 100. *Journal of Business Ethics, 150*(4), 1089-1104. doi:https://doi.org/10.1007/s10551-016-3187-6

Liu, Y. S., Zhou, X., Yang, J. H., Hoepner, A. G., & Kakabadse, N. (2023). Carbon Emissions, Carbon Disclosure and Organizational Performance. *International Review of Financial Analysis, 90*, 1-17. doi:https://doi.org/10.1016/j.irfa.2023.102846

Lu, W., Zhu, N., & Zhang, J. (2021). The Impact of Carbon Disclosure on Financial Performance under Low Carbon Constraints. *Energies, 14*(14), 1-19. doi:https://doi.org/10.3390/en14144126

Mukherji, A. (2023). Climate Change 2023: Synthesis Report. 1-34. doi:https://doi.org/10.59327/ipcc/ar6-9789291691647.001

Nasih, M., Harymawan, I., Paramitasari, Y. I., & Handayani, A. (2019). Carbon Emissions, Firm Size, and Corporate Governance Structure: Evidence from the Mining and Agricultural Industries in Indonesia. *Sustainability, 11*(9), 1-14. doi:https://doi.org/10.3390/su11092483

Nirino, N., Santoro, G., Miglietta, N., & Quaglia, R. (2021). Corporate Controversies and Company's Financial Performance: Exploring the Moderating Role of ESG Practices. *Technological Forecasting and Social Change, 162*. doi:https://doi.org/10.1016/j.techfore.2020.120341

Nyahuna, T., & Doorasamy, M. (2023). The Effect of Mandatory Carbon Disclosure on Financial Performance: Evidence From South African Listed Carbon-Intensive Companies. *International Journal of Environmental, Sustainability, and Social Science, 4*(3), 635-643. doi:https://doi.org/10.38142/ijesss.v4i3.378

Peraturan Menteri Lingkungan Hidup dan Kehutanan Nomor 21 Tahun 2022 tentang Tata Laksana Penerapan Nilai Ekonomi Karbon.

Peraturan Otoritas Jasa Keuangan Nomor 51/POJK.03/2017 Tahun 2017 tentang Penerapan Keuangan Berkelanjutan bagi Lembaga Jasa Keuangan, Emiten, dan Perusahaan Publik

Peraturan Presiden (Perpres) Nomor 98 Tahun 2021 tentang Penyelenggaraan Nilai Ekonomi Karbon untuk Pencapaian Target Kontribusi yang Ditetapkan Secara Nasional dan Pengendalian Emisi Gas Rumah Kaca dalam Pembangunan Nasional.

Prabandari, A. R., Fatimah, N., Rochayatun, S., & Sartika, F. (2023). Determining Corporate Social Responsibility Disclosure with Firm Size as Variable Moderation. *Asian Journal of Economics, Business and Accounting, 23*(19), 168-178. doi:https://doi.org/10.9734/ajeba/2023/v23i191082

Qian, W., & Schaltegger, S. (2017). Revisiting Carbon Disclosure and Performance: Legitimacy and Management Views. *The British Accounting Review, 49*(4), 365-379. doi:https://doi.org/10.1016/j.bar.2017.05.005

Ridhwan, A., & Dwiati, A. R. (2022). Pengaruh Profitabilitas, Leverage dan Ukuran Perusahaan terhadap Kebijakan Dividen. *Jurnal Akuntansi, Keuangan, dan Manajemen, 3*(3), 195-206. doi:https://doi.org/10.35912/jakman.v3i3.797

Romadloni, E. A., & Pravitasari, D. (2022). Pengaruh Penerapan Green Accounting terhadap Profitabilitas Perusahaan: Studi Kasus Pabrik Roti Monasqu, Desa Gilang, Kec. Ngunut, Kabupaten Tulungagung Tahun Pembukuan 2015-2021. *Jurnal Akuntansi, Keuangan dan Manajemen, 3*(2), 141-157. doi:https://doi.org/10.35912/jakman.v3i2.890

Siddique, M. A., Akhtaruzzaman, M., Rashid, A., & Hammami, H. (2021). Carbon Disclosure, Carbon Performance and Financial Performance: International Evidence. *International Review of Financial Analysis, 75*. doi:https://doi.org/10.1016/j.irfa.2021.101734

Statista. (2023). Carbon dioxide (CO2) Emissions from Manufacturing Industries in Indonesia from 2017 to 2021 (in 1,000 Metric Tons). Retrieved from https://www.statista.com/statistics/1296530/indonesia-carbon-dioxide-co2-emissions-from-manufacturing-industries/

Suchman, M. C. (1995). Managing Legitimacy: Strategic and Institutional Approaches. *Academy of management review, 20*(3), 571-610. doi:https://doi.org/10.5465/amr.1995.9508080331

Usman, B. (2020). CSR Performance, Firm's Attributes, and Sustainability Reporting. *International Journal of Business and Society, 21*(2), 521-539. doi:https://doi.org/10.33736/ijbs.3269.2020

Vitaloka, O., Andriyanto, R. W., Amelia, Y., & Indra, A. Z. (2023). Pengaruh Corporate Social Responsibility terhadap Agresivitas Pajak. *Jurnal Akuntansi, Keuangan, dan Manajemen, 4*(2), 115-128. doi:https://doi.org/10.35912/jakman.v4i2.1718

Wang, G., Lou, X., Shen, J., Dan, E., Zheng, X., Shao, J., & Li, J. (2022). Corporate Carbon Information Disclosure and Financing Costs: The Moderating Effect of Sustainable Development. *Sustainability, 14*(15), 1-16. doi:https://doi.org/10.3390/su14159159

Wang, Q. (2023). Financial Effects of Carbon Risk and Carbon Disclosure: A Review. *Accounting & Finance, 63*(4), 4175-4219. doi:https://doi.org/10.1111/acfi.13090

Wiratno, A., & Muaziz, F. (2020). Profitabilitas, Ukuran Perusahaan, dan Leverage Mempengaruhi Pengungkapan Emisi Karbon di Indonesia. *Jurnal Ekonomi, Bisnis Dan Akuntansi (JEBA), 22*(1), 28-41.

Yuliana, Y., & Wedari, L. K. (2023). Carbon Performance, Green Strategy, Financial Performance Effect on Carbon Emissions Disclosure: Evidence from High Polluting Industry in Indonesia. *International Journal of Sustainable Development & Planning, 18*(5), 1581-1588. doi:https://doi.org/10.18280/ijsdp.180529

Ziping, D., & Genzhu, L. (2018). Research on the Correlation Between Carbon Performance and Enterprise Performance. *Proceedings of the 2018 International Conference on Economy, Management and Entrepreneurship (ICOEME 2018), 70*, 322-326. doi:https://doi.org/10.2991/icoeme-18.2018.64