



CURRENT

Jurnal Kajian Akuntansi dan Bisnis Terkini

<https://current.ejournal.unri.ac.id>



DOES FOREIGN OWNERSHIP MATTER IN THE RELATIONSHIP BETWEEN FIRM SIZE AND CARBON EMISSION DISCLOSURE?

Arif Santoso^{1*}, Ratri Kurniasari², Riskon Ginting³, Adilah Permananingrum⁴, Husnil Barry⁵

^{1,2,3,4,5} Department of Business Administration, Politeknik Negeri Jakarta, Depok, Indonesia

*Email: arif.santoso@lecturer.pnj.ac.id

Keywords

Carbon Emission Disclosure; Energy Sector; Firm Size; Foreign Ownership; Sustainability

Article informations

Received:

2025-07-29

Accepted:

2025-11-15

Available Online:

2025-11-26

Abstract

As the issue of climate change escalates, carbon emissions have become a growing concern for stakeholders. Carbon emission disclosure (EMISSION) is no longer an option for companies seeking legitimacy, but rather a strategic necessity to ensure corporate sustainability. This study aims to examine the relationship between firm size (FSIZE), foreign ownership (FOROWN), and EMISSION. The study was conducted on energy sector companies in Indonesia during the period 2019-2022. The final sample of this study was 225 observations units and was analyzed using Moderated Regression Analysis (MRA) in STATA 16. This study found that FSIZE has a positive and significant effect on EMISSION. FOROWN shows an important role in strengthening the relationship between FSIZE and EMISSION. The role is more pronounced in smaller firms, where stakeholder monitoring and attention may be weaker. This finding supports Stakeholder Theory and has been confirmed through sub-sample analysis, quantile regression, and coarsened exact matching (CEM). The findings confirm that larger companies, especially those backed by foreign investors, can act as a force for good in encouraging environmental transparency practices and responding to stakeholder demands. In addition, this study also offers unique empirical and practical insights in the corporate social responsibility (CSR) literature.

INTRODUCTION

The concept of sustainability is inseparable from the issue of carbon emissions. Increased carbon emissions in the atmosphere have been widely recognized as the main driver of global warming and climate change (Bhatti et al., 2024). This phenomenon has triggered a series of environmental disturbances, such as rising sea levels, extreme weather events, and disruption of ecological systems. This in turn poses significant challenges to various aspects of human life, such as food security, public health, and local, national and global economic stability (Eldos et al., 2025). This has attracted the attention of various non-governmental organizations (NGOs), governments, investors and various stakeholders who encourage collective action to mitigate climate change problems, especially carbon emissions caused by human activities. Nowadays, carbon emissions are not only related to environmental issues but also socio-economic issues that demand transparent and responsible responses (Azuazu et al.,



2023).

In order to respond to the challenges of pressing environmental issues, governments and regulators have established several policies aimed at promoting sustainability and climate transparency. This includes the Financial Services Authority (OJK), which mandates corporate sustainability reporting through OJK Regulation (POJK) No. 51/POJK.03/2017 for public companies. This regulation is further strengthened by international commitments such as the Paris Agreement, where Indonesia is one of the countries committed to this matter. The Paris Agreement is committed to reducing carbon emissions and reducing global temperature rise (Kissinger et al., 2019). It also encourages countries and companies to take measurable and transparent actions to address and mitigate climate change.

In recent years, the issue of carbon emission is considered as part of corporate social responsibility because most of the carbon emission contributors are generated from the industrial sector (Mbanyele & Muchenje, 2022), such as the energy sector. This sector operates in an environment of uncertainty due to its environmental impacts, so it is subject to scrutiny from various stakeholders, including regulators, investors, and the communities. In the midst of increasing global and stakeholder attention on the issue of carbon emissions caused by companies, mitigation and corporate responsibility actions are part of the strategy to maintain legitimacy (Liu et al., 2023). Therefore, many parties have declared themselves as environmentally conscious companies through sustainability reports and some net-zero targets (Trouwloon et al., 2023).

Although many companies have stated their commitments, concerns remain among stakeholders. This is because there is still limited concrete evidence of company actions in establishing sustainability strategies and practices, especially regarding carbon emissions (Boiral et al., 2024; Jiang et al., 2025). Furthermore, stakeholders need this information to make decisions regarding going concern and other economic decisions (Setiawan et al., 2025). This further emphasizes the importance of carbon emission disclosure (Mazzotta et al., 2020). Consequently, this subject has been widely discussed in the literature on corporate ethics, management, and accounting.

Prior research offers empirical evidence of the beneficial consequences of disclosing carbon emissions. Carbon emission disclosure increases the value of the company along with the fulfillment of stakeholders' information requests related to environmental responsibility (Vestrelli et al., 2024). Carbon emission disclosure also improves financial performance (Saleh & Mohammad, 2025). Other studies also provide empirical evidence that environment-related disclosures are associated with a firm's cost of capital, cost of debt, and audit fees (Agoraki et al., 2023; Alshahrani et al., 2024; Nasih et al., 2024). This highlights the substantial potential for carbon emission disclosure to impact business performance, making it important to encourage the practice. However, currently carbon emission disclosure in Indonesia is still voluntary (Wahyuningrum et al., 2024).

Stakeholder Theory proposes that to maintain the company's relationship with stakeholders, it must fulfill the demands and needs of stakeholders (Freeman et al., 2010, 2017), including information on the company's strategies and actions to address climate change and carbon emissions. Such information is used by a wide range of stakeholders to make decisions (Ding et al., 2023). On the other hand, secrecy about the company's responsibilities and efforts to address environmental issues is considered a negative action and affects the legitimacy of the company (Sun et al., 2022). As the number of stakeholders increases, it is considered to have a greater impact on various strategic and corporate decisions related to environmental responsibility practices.

Previous studies have explored various aspects that are thought to influence carbon emission disclosure. First, it is related to management structure, such as independent commissioners, board of directors, board of commissioners, audit committee, foreign directors,



Chief Executive Officer (CEO), and gender diversity (Abdelhaq et al., 2024; Islam & Hossain, 2022; Kouloukoui et al., 2020; Kutlu Furtuna & Sönmez, 2024; Octavio & Setiawan, 2024; Ooi et al., 2019; Susilowati et al., 2024). Second, ownership structure, such as government, foreign, and managerial ownership (Fedorova & Martynova, 2021; Octavio & Setiawan, 2024; Setiawan, Rahmawati, et al., 2024). Third, firm characteristics, such as firm size, leverage, and accounting firm (Oussii & Jeriji, 2024; Santoso, Setiawan, Asrihapsari, et al., 2025). Although studies on carbon emission disclosure factors have been conducted, other factors still need further study, such as firm size.

There have been quite a number of studies on firm size and carbon emission disclosure, but most of them are limited as control variables, not discussed in depth, and the findings are diverse. For example, previous studies provide empirical evidence that firm size drives carbon emission disclosure (Akbaş & Canikli, 2019; Githaiga, 2025; Nasih et al., 2019). Other studies in Indonesia show that larger companies tend to reduce carbon emission disclosure (Yustina et al., 2024), while the study by Mukhibad et al. (2024) found that firm size has no effect on carbon emission disclosure. To address this gap, this study proposes to use foreign ownership as a moderating variable. Foreign ownership is expected to encourage corporate transparency and accountability (Garanina & Aray, 2021), including carbon emission disclosure. Previous studies have provided an important baseline regarding the role of foreign ownership on carbon emission disclosure. Some studies found that foreign ownership increases disclosure (Nuhu & Alam, 2024; Octavio & Setiawan, 2024), while other studies provide findings that foreign ownership inhibits disclosure (Setiawan, Rahmawati, et al., 2024).

The moderating effect of foreign ownership in the relationship between business size and carbon emission disclosure has not been studied, as far as we are aware, and there aren't many studies on this topic. This potentially omits important information that perhaps foreign ownership in larger firms may encourage carbon emission disclosure. This is because larger companies are likely to have a greater concentration on increasing carbon emissions, so stakeholders, especially shareholders (e.g. foreign ownership) will encourage more disclosure so that they get the information needed to assess the company's performance and sustainability (Azar et al., 2021; Buertey, 2021). Larger companies also tend to have better governance, as they need to protect their reputation as they are more likely to have negative impacts on the environment and stakeholders (Garcia et al., 2017). Therefore, they focus not only on financial performance and short-term profits but also sustainable development.

In light of the explanation above, the purpose of this study is to look into how firm size affects disclosure of carbon emissions. The moderating variable in this study's relationship is foreign ownership. The study offers a number of significant contributions by investigating this. First, our study offers significant empirical support for the moderating effect of foreign ownership in the association between firm size and carbon emission disclosure, which has not been previously investigated in the literature. Second, the study is conducted on energy companies that are sensitive to carbon emission issues, especially along with larger firm size, which offers important information on how stakeholder and operational size shape carbon emission disclosure practices. Although studies on energy companies have been conducted previously by Kartikasary et al. (2023), however, the index used only focuses on emissions with limited discussion on the topic of carbon accounting, reporting, and accountability. Furthermore, the study was conducted in a developing country, i.e. Indonesia, where environmental regulations and their implementation are still experiencing limitations and challenges, so incorporating foreign shareholders will provide important insights because they are considered to be able to bring global insights that are more environmentally concerned into company policies. Third, this study contributes to the development of Stakeholder Theory. Lastly, this study provides important strategies to encourage carbon emission disclosure practices, namely with firm size and foreign ownership, and supports the integration of foreign



investment and sustainable development.

HYPOTHESIS DEVELOPMENT

Hypothesis Development

Stakeholder theory suggests that larger companies tend to be subject to greater public pressure (Brammer & Millington, 2004). This is because their operations are larger and tend to be potentially damaging to the environment, such as through increased carbon emissions. In addition, these companies tend to have larger stakeholders. The pressure will be greater as stakeholders become more aware and start using information on environmental impacts to make decisions (Ding et al., 2023). Therefore, there is an increased expectation of transparency and accountability for companies to be more responsive to public concerns (Kartikasary et al., 2023). Companies that do not address these needs will potentially suffer damage to reputation, loyalty and legitimacy. Consequently, companies may undertake carbon emission disclosure to fulfill stakeholder demands and prevent potential conflicts (Kutlu Furtuna & Sönmez, 2024).

Firm size is also often associated with greater resources that can be used to cover costs associated with carbon emission disclosure (Githaiga, 2025). As previous studies provide empirical evidence that carbon emission disclosure has an important role in company performance (Alshahrani et al., 2024; Saleh & Mohammad, 2025), it is expected that there will be no hesitation among companies to make disclosures. Previous studies have provided important evidence that larger firms tend to be better at carbon emission disclosure (Akbaş & Canikli, 2019; Githaiga, 2025; Gold et al., 2022; Mateo-márquez, 2025; Ratmono et al., 2021). A study conducted on energy companies in Indonesia during the Covid-19 crisis in 2021 also found that larger firms tend to disclose more information (Kartikasary et al., 2023). However, another study in Indonesia found that larger firms tend to inhibit carbon emission disclosure (Yustina et al., 2024). Moreover, firm size had little bearing on carbon emission disclosure, according to a different study on energy companies (Putri et al., 2023). Findings on the influence of firms' size and carbon emission disclosure in Indonesia tend to be diverse, which may be due to a variety of factors, both the level of sensitivity of the sector to carbon emission issues and situational conditions that inhibit and/or encourage disclosure. Considering the complexity of stakeholders in larger firms and the increasing awareness of stakeholders on climate change issues, this study proposes the following hypothesis.

H₁: Larger companies tend to encourage more carbon emission disclosure.

Stakeholder Theory states that to maintain good relations with stakeholders, companies must fulfill the demands of shareholders (Freeman et al., 2021). In this case, larger companies tend to be more visible to the public and are often subject to greater scrutiny from stakeholders, especially shareholders. Consequently, companies tend to consider disclosing more information to maintain legitimacy and public trust. Larger businesses also typically possess greater resources and capacities to implement sustainability reporting standards (Li et al., 2017). However, the level of carbon emissions disclosure may not be equal across different ownership structures.

This study proposes that foreign ownership has the potential to play a moderating role in the relationship between firm size and carbon emission disclosure. Foreign ownership is often considered to bring international standards, expectations, and pressures regarding environmental performance and transparency (Megeid, 2024), from both culture and international values (Santoso & Setiawan, 2024). Therefore, the presence of foreign ownership may provide additional impetus for companies to comply with environmentally sound practices and stakeholder information needs. Previous studies provide important evidence that foreign investors encourage disclosures related to carbon emissions (Bose et al., 2023; Octavio & Setiawan, 2024). Other studies in the corporate social responsibility literature also support these



findings (Amidjaya & Widagdo, 2020; Nuhu & Alam, 2024; Tokas & Yadav, 2023). Other studies found different results. Garanina & Aray (2021) in their study of various corporate sectors in Russia found that foreign investors inhibit carbon emission disclosure. Another study by Setiawan, Rahmawati, et al. (2024) on banking companies in Southeast Asia also found that foreign ownership inhibits climate change disclosure. This suggests that the pressure from foreign investors on carbon emission disclosure practices may differ depending on the industry sector and its sensitivity to carbon emission issues. In this case, since energy sector companies have the potential to increase the concentration of carbon emission issues, especially in larger companies, this study proposes the following hypothesis.

H₂: The association between firm size and carbon emissions disclosure is strengthened by foreign ownership.

RESEARCH METHOD

This quantitative study looks at how firm size (FSIZE) affects disclosure of carbon emissions (EMISSION), using foreign ownership (FOROWN) as a moderating variable. The study was conducted on energy sector companies. Energy companies are one of the largest emitting sectors in Indonesia. In this case, the intensity of emissions increases along with the volume of production and operations of the company, so that larger companies tend to produce greater levels of emissions. This further emphasizes the relevance of this study. This study uses secondary data derived from Annual Report (AR), Sustainability Report (SR), and other credible data sources. The final research sample was 225 units of analysis from 68 companies during the 2019-2022 period, which were selected by considering the availability and completeness of data on the research variables. The period was chosen by considering OJK regulation No. 51/POJK.03/2017 which mandated sustainability reporting. After approximately 2 years after the regulation, the energy sector is expected to be more proactive in their sustainability practices, thus minimizing the gap in sustainability practices between companies. The complete variables and their measurements are presented in Table 1.

Table 1.

Variable Measurements

Variable	Description	Data Source
Dependent Variable		
Carbon Emission Disclosure (EMISSION)	Total number of carbon emission-related items disclosed, following the framework by Bae Choi et al. (2013).	AR and SR
Independent Variable		
Firm Size (FSIZE)	The natural logarithm of a firm's total assets (Zaid et al., 2024).	Bloomberg
Moderating Variable		
Foreign Ownership (FOROWN)	Proportion of company shares held by foreign investors (Octavio & Setiawan, 2024).	AR
Control Variables		
Leverage (DAR)	Debt-to-asset ratio, representing the firm's financial leverage (Zhou et al., 2021)..	Bloomberg
Return on Equity (ROE)	Net income divided by shareholders' equity, indicating profitability (Shah & Ivascu, 2024).	Bloomberg
Board Size (BSIZE)	Number of board members serving in the company (Beji et al., 2021)	AR
Firm Age (FAGE)	Number of years since the firm was listed until the reporting year (Setiawan, Harymawan, et al., 2024).	AR
BIG4 Accounting Firm (AUDIT)	A binary variable coded "1" if the firm is audited by a BIG4 accounting firm (Putra, 2023).	AR

Note: Sustainability Disclosure (SR); Annual Report (AR)

Carbon emission disclosure in this study uses the index by Bae Choi et al. (2013). This index focuses more on the emissions disclosure aspect compared to other indices such as the Carbon Disclosure Project (CDP) score and the Task Force on Climate-related Financial



Disclosure (TCFD) index. This index has also been widely used in previous studies which indicates that the index is well established (Bae Choi et al., 2013; Bedi & Singh, 2024; Wahyuningrum et al., 2024; Yulianti & Waworuntu, 2024). Other metrics such as the Global Reporting Initiative (GRI) were also used in previous studies on the relationship between FSIZE and EMISSION in the energy sector (Kartikasary et al., 2023). Although the index also discusses emission, disclosure items such as carbon accounting, risks and opportunities, and reporting and accountability are not widely discussed in the index. Therefore, this study uses the index by Bae Choi et al. (2013) which consists of 18 disclosure items divided into five categories, namely risks and opportunities, greenhouse gases (GHG), carbon accounting, energy consumption, GHG mitigation, and accountability. This study focuses on the disclosure of carbon emission information by companies, so companies with more disclosure may not be the best carbon performers. Nonetheless, these disclosures will provide valuable information for investors and other stakeholders to make economic decisions and reduce information asymmetry. FSIZE is measured using the natural logarithm of a firm's total assets, rather than total sales, market capitalization, or number of employees. Hashmi et al. (2020) states that each of these measurements has different implications for company performance. The natural logarithm of total assets is considered more stable and reliable, as it is less affected by market fluctuations, market inefficiencies, and short-term sales. Therefore, it is considered more appropriate to test the effect of FSIZE on EMISSION, which is expected to be a long-term strategy for the company.

Multiple linear regression and Moderated Regression Analysis (MRA) on STATA 16 were employed in this investigation. We started by doing descriptive statistical analysis, correlation matrix, and variance inflation factor (VIF). A regression analysis of firm size on carbon emissions disclosure was then carried out. Third, the moderating effect of foreign ownership on the association between firm size and carbon emission disclosure is tested in this study using MRA. Lastly, this work used quantile regression, coarsened exact matching (CEM), and sub-sampling analysis to address endogeneity concerns and assess the robustness of the findings. The study's regression model is as follows.

$$\begin{aligned} \text{EMISSION}_{i,t} = & \beta_0 + \beta_1 \text{FSIZE}_{i,t} + \beta_2 \text{FOROWN}_{i,t} + \beta_3 (\text{FSIZE} * \text{FOROWN})_{i,t} + \beta_4 \text{DAR}_{i,t} \\ & + \beta_5 \text{ROE}_{i,t} + \beta_6 \text{BSIZE}_{i,t} + \beta_7 \text{FAGE}_{i,t} + \beta_8 \text{AUDIT}_{i,t} + \sum_{t=1}^{T-1} \beta_{9,t} \text{YEAR}_t + \varepsilon_{i,t} \end{aligned}$$

This study uses Year Fixed Effect (Year FE) and robust variance-covariance estimator (vce) to produce more robust and accurate estimation. This is to anticipate the presence of common shocks during the observation period and potential violations of certain basic assumptions.

RESEARCH RESULTS AND DISCUSSION

Descriptive Statistics

The study's descriptive statistics are shown in Table 2. EMISSION has an average of 5.907 with a range of disclosure scores from 0 to 17 and a standard deviation of 5.396. This suggests considerable variation in disclosure practices, indicating that while some companies disclose carbon emissions comprehensively, other companies do not disclose EMISSION information at all. FSIZE shows an average value of 28,900, with minimum and maximum values of 24,891 and 32,750 respectively. The FOROWN variable has an average value of 0.206 or 20.6% owned by foreign investors. In addition, it has a minimum value of 0.000 and a maximum value of 0.990 which indicates a diverse ownership structure among companies. While other companies are controlled by foreign shareholders, other companies are 100% owned by domestic investors. This is a serious discussion as many energy companies exploit



resources in Indonesia. Therefore, it is expected that they can encourage environmentally sound practices, so that potential damage from corporate activities can be minimized.

Table 2.

Descriptive Statistics

Variable	Observations	Mean	Maximum	Minimum	Std. Dev.
EMISSION	225	5.907	17.000	0.000	5.396
FSIZE	225	28.900	32.750	24.891	1.702
FOROWN	225	0.206	0.990	0.000	0.254
DAR	225	0.524	2.418	0.044	0.303
ROE	225	-0.030	2.120	-21.266	1.517
BSIZE	225	7.631	19.000	4.000	3.080
FAGE	225	11.956	32.000	0.000	8.804
AUDIT	225	0.342	1.000	0.000	0.476

Source: Data processed by STATA 16, 2025

Leverage, measured using DAR, has a mean value of 0.524, indicating that approximately 52% of total assets are financed through debt. ROE shows a slightly negative average (-0.030) with highly dispersed values (minimum -21.266; maximum 2.120) and substantial variability (SD = 1.517), reflecting the diverse financial conditions of the sampled firms. Corporate governance variables also exhibit considerable variation. Board size (BSIZE) ranges from 4 to 19 members, suggesting differences in expertise and experience that may enhance the quality of board discussions. Firm age (FAGE) varies between newly listed firms (0 years) and those listed for up to 32 years, with an average of 12 years. Auditor affiliation (AUDIT) further shows that only 34.2% of firms are audited by BIG4 auditors, which is generally associated with higher reporting credibility.

The correlations among variables are presented in Table 3. At the 5% significance level, FSIZE and FOROWN display positive and significant associations with EMISSION. Among the control variables, only BSIZE, FAGE, and AUDIT show positive and significant correlations with EMISSION, while the remaining controls exhibit no significant relationships. The Variance Inflation Factor (VIF) values reported in Table 3 indicate that all variables fall below the recommended threshold, confirming the absence of multicollinearity issues (Saunders et al., 2023).

Table 3

Correlation Matrix and VIF

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	VIF
(1) EMISSION	1.000								
(2) FSIZE	0.622* (0.000)	1.000							2.21
(3) FOROWN	0.172* (0.010)	0.161* (0.016)	1.000						1.12
(4) DAR	-0.041 (0.542)	0.004 (0.955)	-0.002 (0.982)	1.000					1.13
(5) ROE	0.038 (0.569)	0.121 (0.071)	0.078 (0.244)	-0.133* (0.045)	1.000				1.04
(6) BSIZE	0.427* (0.000)	0.652* (0.000)	0.310* (0.000)	-0.101 (0.130)	0.098 (0.142)	1.000			1.98
(7) FAGE	0.250* (0.000)	0.351* (0.000)	0.135* (0.043)	0.130 (0.052)	-0.032 (0.637)	0.330* (0.000)	1.000		1.24
(8) AUDIT	0.392* (0.000)	0.498* (0.000)	0.068 (0.313)	-0.190* (0.004)	0.110 (0.099)	0.303* (0.000)	0.268* (0.000)	1.000	1.45

* $p < 0.05$

Source: Data processed by STATA 16, 2025



Regression Results and Integrated Discussion

This study examines the effect of FSIZE on EMISSION with FOROWN as a moderating variable. This study uses five control variables, namely DAR, ROE, BSIZE, FAGE, and AUDIT. In the first stage, this study tests the effect of FSIZE on EMISSION and the results are presented in Table 4 (Column 1). The results show that FSIZE has a positive and significant effect on EMISSION (coeff. 1.588) at 1% significance level, so H1 is accepted. This finding supports previous evidence which found that FSIZE drives disclosures related to emissions and climate change across global countries (Al-Qahtani & Elgharbawy, 2020; Gold et al., 2022; Mateo-márquez, 2025; Moses et al., 2025), East Africa (Githaiga, 2025), and Indonesia (Ratmono et al., 2021) especially the mining and energy sector (Kartikasary et al., 2023; Nasih et al., 2019). Previous studies have also found different results, where FSIZE has no effect and even a negative effect on disclosure (Mukhibad et al., 2024; Riantono & Sunarto, 2022; Yustina et al., 2024). This indicates that the practice of EMISSION is still experiencing gaps, industry sensitivity factors on carbon emission issues, and the company's environment may be an important basis for stakeholder decisions to encourage or reject carbon emission disclosure. Moreover, EMISSION in many countries (e.g. Indonesia) is still voluntary.

The second stage, using MRA, this study examines the moderating role of FSOWN on EMISSION. FSOWN is the result of the interaction between FSIZE and FOROWN. The results are presented in Table 4 (Column 2). Based on this examination, as in the previous study, FOROWN has a negative effect on EMISSION (Setiawan, Rahmawati, et al., 2024). Nevertheless, this study found important information that FSOWN strengthens the relationship between FSIZE and EMISSION (coeff. 2.437) at the 1% level. Thus, H2 is accepted. The results show that foreign investors are less involved in EMISSION. Foreigners may have limited understanding of local stakeholders' expectations (Estélyi & Nisar, 2016), and tend to focus on short-term performance (Jung et al., 2022). Since carbon disclosure often entails additional costs and may negatively affect short-term profitability (Siddique et al., 2021), they may place less emphasis on such disclosure. However, in larger firms, foreign ownership appears to strengthen the positive effect of FSIZE on EMISSION. Larger companies tend to face greater pressure to be more environmentally responsible and committed to carbon reduction (Haque & Ntim, 2018), therefore, investing in environmentally conscious practices and conducting EMISSION is considered a better decision to maintain the company's legitimacy and meet stakeholder demands. In this case, foreign investors also need that information to make decisions, given the sensitivity of energy companies to carbon emissions which can impact litigation risk and the company's going concern. The findings align with the literature that foreign investors can encourage companies to be more transparent and reduce information asymmetry (Baba & Baba, 2021).

As proposed by Stakeholder Theory, companies tend to need to consider fulfilling the demands of stakeholders (Freeman et al., 2017). The size of a company is often associated with the level of stakeholder complexity. Consequently, larger companies tend to receive greater attention from stakeholders due to their visibility, operational scale, and potential environmental impact. In the context of the energy sector, which inherently has higher carbon emissions, it is expected to be more transparent and responsible. Companies can act as a force for good, using their scale not only to meet stakeholder demands (Liute & Giacomo, 2021), but also to lead by example in terms of environmental responsibility. Furthermore, companies can also combat the decline in trust towards capitalism and business through such strategies (Deloitte, 2020).

Foreign investors, as one of the important groups of shareholders for the company, often bring international standards and norms related to environmental responsibility and sustainability reporting (Megeid, 2024). Their expectations tend to be higher than local



investors, especially when they come from countries with stricter environmental regulations (Kim et al., 2016; Van et al., 2024). Thus, companies with significant foreign investors may face additional pressure to meet global disclosure expectations and adopt best practices in sustainability reporting.

Table 4.
Baseline Regression

	(1) EMISSION	(2) EMISSION
Fsize	1.588*** (7.56)	1.272*** (5.82)
FOROWN		-67.818*** (-4.12)
FSOWN		2.437*** (4.14)
DAR	0.107 (0.12)	-0.168 (-0.21)
ROE	-0.263 (-1.65)	-0.239 (-1.63)
Bsize	0.160* (1.68)	-0.033 (-0.31)
FAGE	-0.016 (-0.57)	-0.014 (-0.48)
AUDIT	1.548** (2.32)	1.637** (2.54)
_cons	-43.604*** (-8.02)	-33.662*** (-5.69)
Year FE	Yes	Yes
r2_a	0.470	0.501
N	225	225

t statistics in parentheses: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Source: Data processed by STATA 16, 2025

In the context of Indonesia, where carbon disclosure regulations are still relatively weak (Hermawan & Kusuma, 2024), the role of company size and foreign ownership becomes more apparent. Larger companies may voluntarily increase EMISSION as a strategy to prevent regulatory scrutiny and maintain corporate legitimacy, as well as to attract foreign investment (Fan et al., 2025). Foreign investors reinforce this tendency, as their presence can serve as a mechanism for external accountability and good governance through the norms and global expectations they bring. The interaction between Fsize and FOROWN reflects a strategic response to stakeholder advantages. Large companies with FOROWN tend to act as a force for good, using their resources and visibility not only to meet stakeholder demands but also to lead in environmental transparency practices. This strengthens their social license to operate and enhances their legitimacy in the long term through sustainable development. Overall, the findings of this study support Stakeholder Theory.

Robustness Test

Sub-sample analysis: EMISSION with a score of "0" is excluded

This study utilizes the method by (Setiawan, Rahmawati, et al., 2024) to provide more robust empirical evidence for the findings. This study conducted an additional test on sub-sampling by replacing the measurement of the dependent variable (EMISSION). The sample used for this regression consisted of samples with EMISSION values from "1" to "18," and samples with carbon emission disclosure values of "0" were excluded from the sample. After creating this sub-sample, the study retested the baseline model, and the results are presented in Table 5. Based on Table 5, it shows that Fsize remains positively influential on EMISSION at a 1% significance level, and FSOWN strengthens the relationship between Fsize and



EMISSION at a 1% level. Therefore, it can be concluded that these findings are consistent with the main findings and robustly reinforce them.

Table 5.

Sub-Sample Analysis: EMISSION with a score of “0” is excluded

	EMISSION
FSIZE	1.213*** (5.76)
FOROWN	-62.508*** (-3.81)
FSOWN	2.255*** (3.87)
DAR	-0.356 (-0.36)
ROE	-0.176 (-1.36)
BSIZE	-0.083 (-0.77)
FAGE	-0.008 (-0.24)
AUDIT	1.667** (2.46)
_CONS	-30.791*** (-5.44)
Year FE	Yes
r2_a	0.474
N	187

t statistics in parentheses: ** $p < 0.05$, *** $p < 0.01$

Source: Data processed by STATA 16, 2025

Quantile regression

In order to comprehend the association between independent and dependent variables at various quantile points on the EMISSION variable distribution, the study also performed quantile regression (Ting, 2021). This study uses quantiles 0.10, 0.25, 0.50, 0.75, and 0.90. The regression results are displayed in Table 6. The results show that at quantiles 0.10 and 0.25, FSIZE does not affect EMISSION, whereas at other quantiles, namely 0.50, 0.75, and 0.90, FSIZE increases EMISSION. This indicates that the size of the company can increase EMISSION above the average up to a high level of disclosure, making FSIZE a fairly good factor in driving company disclosure. Additionally, the link between FSIZE and EMISSION is strengthened at all quantiles, with the exception of the 0.90 quantile, due to the moderating function of foreign ownership. These findings indicate that FSOWN can strengthen the relationship between FSIZE and EMISSION at low to moderately high disclosure levels. However, at high disclosure levels, the role of FSOWN in strengthening this relationship diminishes. This is because, in instances where the company has disclosed carbon emission information at a high level, or it can be interpreted that the company already has better environmental awareness, there may no longer be a need for encouragement from foreign ownership to undertake such initiatives. The findings of this study can be considered robust as the quantile regression's overall results align with the primary findings.

Table 6.

Quantile Regression

	(0.10) EMISSION	(0.25) EMISSION	(0.50) EMISSION	(0.75) EMISSION	(0.90) EMISSION
FSIZE	0.022 (0.05)	0.613 (1.19)	1.302*** (4.15)	1.316*** (3.59)	1.900*** (5.03)
FOROWN	-114.555** (-2.21)	-81.511** (-2.15)	-56.254** (-2.45)	-65.830*** (-3.63)	-68.209 (-1.47)



	(0.10) EMISSION	(0.25) EMISSION	(0.50) EMISSION	(0.75) EMISSION	(0.90) EMISSION
FSOWN	4.004** (2.13)	2.947** (2.19)	2.062** (2.55)	2.383*** (3.85)	2.377 (1.52)
DAR	-0.004 (-0.00)	0.185 (0.26)	1.480 (1.41)	-1.543 (-0.88)	-4.266** (-2.12)
ROE	-0.189 (-0.11)	-0.192 (-0.53)	-0.124 (-0.26)	-0.722 (-1.10)	-0.779 (-1.12)
BSIZE	0.067 (0.72)	-0.010 (-0.06)	-0.005 (-0.10)	-0.200* (-1.90)	-0.365* (-1.81)
FAGE	0.021 (0.86)	-0.028 (-0.88)	-0.032 (-1.27)	0.017 (0.34)	-0.033 (-0.62)
AUDIT	0.479 (0.46)	2.503*** (2.69)	2.237*** (3.53)	2.811*** (3.10)	1.382 (1.21)
_cons	-1.439 (-0.13)	-16.968 (-1.21)	-36.167*** (-4.27)	-32.210*** (-3.19)	-42.489*** (-4.11)
Year FE	Yes	Yes	Yes	Yes	Yes

t statistics in parentheses: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Source: Data processed by STATA 16, 2025

Coarsened Exact Matching

To address the potential issue of endogeneity from selection bias and omitted variable bias, this study conducts Coarsened Exact Matching (CEM) regression following the method by (Santoso, Setiawan, & Brahmana, 2025). First, this study grouped the control variables into three strata based on the characteristics of FSIZE. Based on this matching, a sample of 220 units of analysis was obtained. Second, this study performed regression on the main model with the sample that passed the matching in the first stage. Table 7 provides the findings of the regression. With a coefficient of 1.276 and a significance level of 1%, the results demonstrate that FSIZE has a positive and significant impact on EMISSION. FSOWN further enhances the relationship with a coefficient of 2.223 at the same level. The consistency and robustness of the study's conclusions are thus confirmed by the CEM results, which coincide with the baseline regression.

Table 7.

Coarsened Exact Matching

	FSIZE_D= 0	FSIZE_D=1
All	127	98
Matched	122	98
Unmatched	5	0
	EMISSION	
FSIZE	1.276*** (5.75)	
FOROWN	-61.728*** (-3.87)	
FSOWN	2.223*** (3.90)	
DAR	1.003 (0.91)	
ROE	-1.231*** (-3.63)	
BSIZE	-0.009 (-0.08)	
FAGE	-0.011 (-0.40)	
AUDIT	1.851*** (2.87)	
_cons	-34.607*** (-5.85)	



	FSIZE_D= 0	FSIZE_D=1
Year FE		Yes
r2_a		0.510
N		220

t statistics in parentheses: *** $p < 0.01$

Note: FSIZE_D “0” represents FSIZE below the average, while FSIZE_D “1” represents FSIZE above the average of the research sample.

Source: Data processed by STATA 16, 2025

CONCLUSION

Within the Stakeholder Theory, this study provides important evidence that firm size increases carbon emission disclosure. Larger companies are often associated with stakeholder complexity, operational scale, resources, and potential environmental impact. Specifically, companies in the energy sector are considered to have a significant impact on carbon emission issues from their operations. As a result, stakeholders put pressure on them to disclose their carbon emissions and other environmental obligations in a transparent manner. As a result, larger firms typically reveal more details about their carbon emissions. This disclosure merely meets the demands of stakeholders but also serves as a force for good. This is because, as a larger company, they receive more media exposure and visibility from various parties, so their environmental practices can serve as an example for other companies to be environmentally responsible. Moreover, these actions can combat the waning public confidence in business and capitalism, which is a contemporary issue in Indonesia. Furthermore, this study offers compelling evidence that foreign ownership improves the association between business size and disclosure of carbon emissions. As investors who bring global insights and expectations, foreign ownership has proven to be a mechanism of good corporate governance that encourages information balance between stakeholders and the company. These findings provide an important foundation for further studies related to carbon emission disclosure, particularly regarding the role of stakeholders in promoting environmentally conscious practices.

The outcomes of this study carry meaningful relevance for practical contexts. First, the research findings indicate that larger companies, especially in the carbon industry, should view carbon emission disclosure not only as compliance with stakeholder demands but also as a strategy for legitimacy and risk management. Second, companies with foreign investors need to be encouraged to align their disclosure practices with international standards, as stakeholders expect higher transparency. The role of foreign investors is especially important for smaller companies, which may have less visibility, thus providing an incentive to neglect environmental responsibilities due to weak regulations. Thirdly, policymakers can leverage the role of foreign investors by encouraging cross-border investments as a means to enhance environmental accountability in domestic companies. This requires the government to create a better investment climate and encourage better regulations related to carbon disclosure. Lastly, these findings provide important insights into Stakeholder Theory that the influence of external stakeholders, particularly foreign investors, can enhance a company's response to sustainability expectations, even within institutional contexts with weak regulations.

This study offers new findings and perspectives in the literature on carbon emission disclosure, but limitations still exist. First, this study measures carbon emission disclosure based on the disclosure item index, so companies with the highest disclosure may not necessarily have the best actual performance. Nevertheless, with companies disclosing more, it indicates that the companies are confident in their performance, especially since they are under the scrutiny and oversight of various stakeholders. Second, this study tests the research model in the context of energy companies in Indonesia, characterized primarily as companies with high potential environmental impact and high visibility, yet with relatively weak environmental regulations. Thus, different contexts regarding the sensitivity level of the industry and the regulatory



environment may yield different findings and be significant for the development of the literature. By acknowledging these limitations, this study presents opportunities for further research. First, examining the influence of foreign ownership based on the nationality and profile of the investor (e.g., individual investor, fund manager, company, etc.). Second, analysis on a cross-country basis and across diverse industries to examine the role of regulatory and industry differences in carbon disclosure. Lastly, further research can explore other factors to fill the gaps in the literature.

REFERENCES

- Abdelhaq, R., Dwekat, A., Atout, S., & Nour, A. I. (2024). The Impact of Board Characteristics on the Level of Voluntary Disclosure: Evidence from Palestinian Listed Companies. *Studies in Systems, Decision and Control*, 528(May), 107–122. https://doi.org/10.1007/978-3-031-56586-1_8
- Agoraki, K. K., Giaka, M., Konstantios, D., & Negkakakis, G. (2023). The relationship between firm-level climate change exposure, financial integration, cost of capital and investment efficiency. *Journal of International Money and Finance*, 141(November 2023), 102994. <https://doi.org/10.1016/j.jimonfin.2023.102994>
- Akbaş, H. E., & Canikli, S. (2019). Determinants of voluntary greenhouse gas emission disclosure: An empirical investigation on Turkish firms. *Sustainability (Switzerland)*, 11(1). <https://doi.org/10.3390/su11010107>
- Al-Qahtani, M., & Elgharbawy, A. (2020). The effect of board diversity on disclosure and management of greenhouse gas information: evidence from the United Kingdom. *Journal of Enterprise Information Management*, 33(6), 1557–1579. <https://doi.org/10.1108/JEIM-08-2019-0247>
- Alshahrani, F., Eulaiwi, B., Duong, L., & Taylor, G. (2024). Climate change disclosure performance and audit fees: evidence from Australia. *Sustainability Accounting, Management and Policy Journal*. <https://doi.org/10.1108/SAMPJ-07-2023-0509>
- Amidjaya, P. G., & Widagdo, A. K. (2020). Sustainability reporting in Indonesian listed banks: Do corporate governance, ownership structure and digital banking matter? *Journal of Applied Accounting Research*, 21(2), 231–247. <https://doi.org/10.1108/JAAR-09-2018-0149>
- Azar, J., Duro, M., Kadach, I., & Ormazabal, G. (2021). The Big Three and corporate carbon emissions around the world. *Journal of Financial Economics*, 142(2), 674–696. <https://doi.org/10.1016/j.jfineco.2021.05.007>
- Azuazu, I. N., Sam, K., Campo, P., & Coulon, F. (2023). Challenges and opportunities for low-carbon remediation in the Niger Delta: Towards sustainable environmental management. *Science of the Total Environment*, 900(July), 165739. <https://doi.org/10.1016/j.scitotenv.2023.165739>
- Baba, B. U., & Baba, U. A. (2021). The effect of ownership structure on social and environmental reporting in Nigeria: the moderating role of intellectual capital disclosure. *Journal of Global Responsibility*, 12(2), 210–244. <https://doi.org/10.1108/JGR-06-2019-0060>
- Bae Choi, B., Lee, D., & Psaros, J. (2013). An analysis of Australian company carbon emission disclosures. *Pacific Accounting Review*, 25(1), 58–79. <https://doi.org/10.1108/01140581311318968>
- Bedi, A., & Singh, B. (2024). Exploring the impact of carbon emission disclosure on firm financial performance: moderating role of firm size. *Management Research Review*. <https://doi.org/10.1108/MRR-01-2023-0015>
- Beji, R., Yousfi, O., Loukil, N., & Omri, A. (2021). Board Diversity and Corporate Social Responsibility: Empirical Evidence from France. *Journal of Business Ethics*, 173(1),



- 133–155. <https://doi.org/10.1007/s10551-020-04522-4>
- Bhatti, U. A., Bhatti, M. A., Tang, H., Syam, M. S., Awwad, E. M., Sharaf, M., & Ghadi, Y. Y. (2024). Global production patterns: Understanding the relationship between greenhouse gas emissions, agriculture greening and climate variability. *Environmental Research*, 245(October 2023), 118049. <https://doi.org/10.1016/j.envres.2023.118049>
- Boiral, O., Brotherton, M. C., & Talbot, D. (2024). Achieving corporate carbon neutrality: A multi-perspective framework. *Journal of Cleaner Production*, 467(November 2023), 143040. <https://doi.org/10.1016/j.jclepro.2024.143040>
- Bose, S., Lim, E., Minnick, K., & Shams, S. (2023). Do foreign institutional investors influence corporate climate change disclosure quality? International evidence. *Corporate Governance: An International Review*, March, 1–26. <https://doi.org/10.1111/corg.12535>
- Brammer, S., & Millington, A. (2004). The development of corporate charitable contributions in the UK: A stakeholder analysis. *Journal of Management Studies*, 41(8), 1411–1434. <https://doi.org/10.1111/j.1467-6486.2004.00480.x>
- Buertey, S. (2021). Board gender diversity and corporate social responsibility assurance: The moderating effect of ownership concentration. *Corporate Social Responsibility and Environmental Management*, 28(6), 1579–1590. <https://doi.org/10.1002/csr.2121>
- Deloitte. (2020). *The Deloitte global millennial survey 2020 - resilient gen-erations hold the key to creating a “better normal.”* Deloitte. <https://www2.deloitte.com/global/en/pages/about-deloitte/articles/millennialsurvey.html>
- Ding, D., Liu, B., & Chang, M. (2023). Carbon Emissions and TCFD Aligned Climate-Related Information Disclosures. *Journal of Business Ethics*, 182(4), 967–1001. <https://doi.org/10.1007/s10551-022-05292-x>
- Eldos, H. I., Tahir, F., Athira, U. N., Mohamed, H. O., Samuel, B., Skariah, S., Al-Ghamdi, S. G., Al-Ansari, T., & Sultan, A. A. (2025). Mapping climate change interaction with human health through DPSIR framework: Qatar perspective. *Heliyon*, 11(3), e42455. <https://doi.org/10.1016/j.heliyon.2025.e42455>
- Estélyi, K. S., & Nisar, T. M. (2016). Diverse boards: Why do firms get foreign nationals on their boards? *Journal of Corporate Finance*, 39, 174–192. <https://doi.org/10.1016/j.jcorpfin.2016.02.006>
- Fan, X., Shen, X., Wang, D., & Zhou, C. (2025). The Paris Agreement and firms’ carbon information disclosure: Honesty or catering? *International Review of Economics and Finance*, 99(October 2024), 103988. <https://doi.org/10.1016/j.iref.2025.103988>
- Fedorova, E., & Martynova, M. (2021). Signalling and Legitimacy Theories for Explaining Climate Information Disclosure by Russian Companies. *Journal of Corporate Finance Research*, 15(2), 16–26. <https://doi.org/10.17323/j.jcfr.2073-0438.15.2.2021.16-26>
- Freeman, R. E., Dmytryiev, S. D., & Phillips, R. A. (2021). Stakeholder Theory and the Resource-Based View of the Firm. *Journal of Management*, 47(7), 1757–1770. <https://doi.org/10.1177/0149206321993576>
- Freeman, R. E., Dmytryiev, S., & Strand, R. G. (2017). Managing for stakeholders in the digital age. In *Corporate social responsibility: Strategy, communication, governance* (pp. 136–15). Cambridge University Press.
- Freeman, R. E., Harrison, J. S., Wicks, A. C., Parmar, B., & de Colle, S. (2010). Stakeholder theory: The state of the art. *Stakeholder Theory: The State of the Art*, 1–343. <https://doi.org/10.1017/CBO9780511815768>
- Garanina, T., & Aray, Y. (2021). Enhancing CSR disclosure through foreign ownership, foreign board members, and cross-listing: Does it work in Russian context? *Emerging Markets Review*, 46, 100754. <https://doi.org/10.1016/j.ememar.2020.100754>



- Garcia, A. S., Mendes-Da-Silva, W., & Orsato, R. (2017). Sensitive industries produce better ESG performance: Evidence from emerging markets. *Journal of Cleaner Production*, 150, 135–147. <https://doi.org/10.1016/j.jclepro.2017.02.180>
- Githaiga, P. N. (2025). Determinants of carbon emission disclosure among listed firms in the East Africa Community partner states. *Social Responsibility Journal*, April. <https://doi.org/10.1108/SRJ-05-2024-0325>
- Gold, N. O., Taib, F. M., & Ma, Y. (2022). Firm-Level Attributes, Industry-Specific Factors, Stakeholder Pressure, and Country-Level Attributes: Global Evidence of What Inspires Corporate Sustainability Practices and Performance. *Sustainability (Switzerland)*, 14(20). <https://doi.org/10.3390/su142013222>
- Haque, F., & Ntim, C. G. (2018). Environmental Policy, Sustainable Development, Governance Mechanisms and Environmental Performance. *Business Strategy and the Environment*, 27(3), 415–435. <https://doi.org/10.1002/bse.2007>
- Hashmi, S. D., Gulzar, S., Ghafoor, Z., & Naz, I. (2020). Sensitivity of firm size measures to practices of corporate finance : evidence from BRICS. *Future Business Journal*, 6(1), 1–19. <https://doi.org/10.1186/s43093-020-00015-y>
- Hermawan, S., & Kusuma, F. I. S. (2024). Navigating the complexities of carbon markets policy in ASEAN: challenges and opportunities. *Environment, Development and Sustainability*. <https://doi.org/10.1007/s10668-024-05268-z>
- Islam, M. S., & Hossain, M. K. (2022). Effects of Corporate Governance Mechanisms on Climate Change Disclosures: Evidence from Listed Banks in an Emerging Economy. *Indian Journal of Corporate Governance*, 15(2), 170–196. <https://doi.org/10.1177/09746862221129339>
- Jiang, X., Kim, S., & Lu, S. (2025). Limited accountability and awareness of corporate emissions target outcomes. *Nature Climate Change*, 15(March). <https://doi.org/10.1038/s41558-024-02236-3>
- Jung, H., Song, S., & Song, C.-K. (2022). Effects of board diversity on firm-level carbon productivity. *SSRN Electronic Journal*. <https://doi.org/https://doi.org/10.2139/Ssrn.4141990>
- Kartikasary, M., Wijanarko, H. M. R., Tihar, A., & Zaldin, A. (2023). The effect of financial distress and firm size on carbon emission disclosure. *E3S Web of Conferences*, 426. <https://doi.org/10.1051/e3sconf/202342602093>
- Kim, N., Moon, J. J., & Yin, H. (2016). Environmental Pressure and the Performance of Foreign Firms in an Emerging Economy. *Journal of Business Ethics*, 137(3), 475–490. <https://doi.org/10.1007/s10551-015-2568-6>
- Kissinger, G., Gupta, A., Mulder, I., & Unterstell, N. (2019). Climate financing needs in the land sector under the Paris Agreement: An assessment of developing country perspectives. *Land Use Policy*, 83(October 2017), 256–269. <https://doi.org/10.1016/j.landusepol.2019.02.007>
- Kouloukoui, D., Marinho, M. M. de O., Gomes, S. M. da S., de Jong, P., Kiperstok, A., & Torres, E. A. (2020). The impact of the board of directors on business climate change management: case of Brazilian companies. *Mitigation and Adaptation Strategies for Global Change*, 25(1), 127–147. <https://doi.org/10.1007/s11027-019-09864-7>
- Kutlu Furtuna, O., & Sönmez, H. (2024). Critical masses and voluntary climate change disclosures: evidence from Türkiye. *Social Responsibility Journal*, 20(5), 956–974. <https://doi.org/10.1108/SRJ-06-2023-0334>
- Li, D., Cao, C., Zhang, L., Chen, X., Ren, S., & Zhao, Y. (2017). Effects of corporate environmental responsibility on financial performance: The moderating role of government regulation and organizational slack. *Journal of Cleaner Production*, 166, 1323–1334. <https://doi.org/10.1016/j.jclepro.2017.08.129>



- Liu, Y. S., Zhou, X., Yang, J. H., Hoepner, A. G. F., & Kakabadse, N. (2023). Carbon emissions, carbon disclosure and organizational performance. *International Review of Financial Analysis*, 90(July), 102846. <https://doi.org/10.1016/j.irfa.2023.102846>
- Liute, A., & Giacomo, M. rosa De. (2021). The environmental performance of UK-based B Corp companies : An analysis based on the triple bottom line approach. *Business Strategy and the Environment*, 31, 810–827.
- Mateo-márquez, A. J. (2025). Absolute emissions targets and voluntary carbon disclosure : an international empirical survey. *Sustainability Accounting, Management and Policy Journal*, 16(2), 584–617. <https://doi.org/10.1108/SAMPJ-09-2023-0634>
- Mazzotta, R., Bronzetti, G., & Veltri, S. (2020). Are mandatory non-financial disclosures credible? Evidence from Italian listed companies. *Corporate Social Responsibility and Environmental Management*, 27(4), 1900–1913. <https://doi.org/10.1002/csr.1935>
- Mbanyele, W., & Muchenje, L. T. (2022). Climate change exposure, risk management and corporate social responsibility: Cross-country evidence. *Journal of Multinational Financial Management*, 66(May), 100771. <https://doi.org/10.1016/j.mulfin.2022.100771>
- Megeid, N. S. A. (2024). The impact of climate risk disclosure on financial performance, financial reporting and risk management: evidence from Egypt. *Future Business Journal*, 10(1). <https://doi.org/10.1186/s43093-024-00309-5>
- Moses, O., Bui, B., Houqe, M. N., & Borghei, Z. (2025). Readiness for Mandatory Climate-Related Disclosures: A Tri-Jurisdictional Analysis of Governance Attributes in Australia, New Zealand and the United Kingdom. *Business Strategy and the Environment*, 34, 3739–3763. <https://doi.org/https://doi.org/10.1002/bse.4154>
- Mukhibad, H., Wahyuningrum, I. F. S., Pertiwi, M. I., Gymnastiar, H. F., & Lestari, T. D. (2024). Environmental Sensitivity Firm, Environment Performance Rating, Profitability, and Carbon Disclosure – Does Firm Size Matter? *IOP Conference Series: Earth and Environmental Science*, 1414(1). <https://doi.org/10.1088/1755-1315/1414/1/012067>
- 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 (Switzerland)*, 11(9). <https://doi.org/10.3390/su11092483>
- Nasih, M., Puspitasari, A., Harymawan, I., Putra, F. K. G., & Djajadikerta, H. G. (2024). The Relationship of Carbon Emission Disclosure on The Cost of Debt. *SAGE Open*, 14(4), 1–15. <https://doi.org/10.1177/21582440241292134>
- Nuhu, Y., & Alam, A. (2024). Ownership structure and sustainability reporting: emerging economies evidence. *International Journal of Accounting and Information Management*, 32(5), 883–908. <https://doi.org/10.1108/IJAIM-09-2023-0228>
- Octavio, M. F. R., & Setiawan, D. (2024). The influence of board characteristics, ownership structure and public attention on climate change disclosure in banking sector companies. *Business Strategy and Development*, 7(2). <https://doi.org/10.1002/bsd2.394>
- Ooi, S. K., Amran, A., Yeap, J. A. L., & Jaaffar, A. H. (2019). Governing climate change: the impact of board attributes on climate change disclosure. *International Journal of Environment and Sustainable Development*, 18(3), 270. <https://doi.org/10.1504/ijesd.2019.10022566>
- Oussii, A. A., & Jeriji, M. (2024). Female directors' representation and firm carbon emissions performance: does family control matter? *Journal of Family Business Management*. <https://doi.org/10.1108/JFBM-06-2024-0121>
- Putra, A. A. (2023). Managerial ability and informative earnings management: the role of CEO-commissioner relationship and board independence. *Corporate Governance*, 23(4),



- 742–765. <https://doi.org/10.1108/CG-02-2022-0067>
- Putri, A. N., Onggo, J., & Andrian, T. (2023). Does Readability Annual Report, External Pressure, and Social Responsibility Disclosure Affect Carbon Emission Disclosure? *E3S Web of Conferences*, 388, 1–10. <https://doi.org/10.1051/e3sconf/202338803013>
- Ratmono, D., Darsono, D., & Selviana, S. (2021). Effect of carbon performance, company characteristics and environmental performance on carbon emission disclosure: Evidence from Indonesia. *International Journal of Energy Economics and Policy*, 11(1), 101–109. <https://doi.org/10.32479/ijeep.10456>
- Riantono, I. E., & Sunarto, F. W. (2022). Factor Affecting Intentions of Indonesian Companies to Disclose Carbon Emission. *International Journal of Energy Economics and Policy*, 12(3), 451–459. <https://doi.org/10.32479/ijeep.12954>
- Saleh, Y., & Mohammad, J. (2025). How Green Credit Policies and Climate Change Practices Drive Banking Financial Performance. *Business Strategy and Development*, 8(1), 1–16. <https://doi.org/10.1002/bsd2.70090>
- Santoso, A., & Setiawan, D. (2024). CEO characteristics and water disclosure: Multi-country evidence. *Sustainable Futures*, 8(May), 100322. <https://doi.org/10.1016/j.sftr.2024.100322>
- Santoso, A., Setiawan, D., Asrihapsari, A., & Pratama, F. A. F. (2025). The Effect of President Commissioner ' s Tenure on Carbon Emission Disclosure: Exploring the Banking Industry. *International Conference on Multidisciplinary Studies (ICoMSi 2024)*, ICoMSi 2024. <https://doi.org/10.2991/978-2-38476-406-8>
- Santoso, A., Setiawan, D., & Brahmana, R. K. (2025). Water Disclosure and Firm Value : A Pathway to Corporate Sustainability. *Business Strategy and Development*, 8(1), 1–17. <https://doi.org/10.1002/bsd2.70082>
- Saunders, M. N. K., Lewis, P., & Thornhill, A. (2023). Research Methods for Business Students. In *Oxford English Dictionary* (Eighth Edi). Pearson. <https://doi.org/10.1093/oed/7394538181>
- Setiawan, D., Harymawan, I., Adhariani, D., Pratama, F. A. F., & Santoso, A. (2024). Does the leverage of a company differ when led by a CEO from a reputable university? *Journal of Open Innovation: Technology, Market, and Complexity*, 10(2), 100310. <https://doi.org/10.1016/j.joitmc.2024.100310>
- Setiawan, D., Rahmawati, I. P., Santoso, A., Saturwa, H. N., & Pratama, F. A. F. (2024). Foreign attributes and climate change disclosure. *International Journal of Disclosure and Governance*. <https://doi.org/10.1057/s41310-024-00280-1>
- Setiawan, D., Santoso, A., Asrihapsari, A., Brahmana, R. K., & Jaaffar, A. H. (2025). What do we know about carbon disclosure ? A bibliometric analysis. *Cogent Social Sciences*, 11(1), -. <https://doi.org/10.1080/23311886.2025.2453899>
- Shah, S. G. M., & Ivascu, L. (2024). Accentuating the moderating influence of green innovation, environmental disclosure, environmental performance, and innovation output between vigorous board and Romanian manufacturing firms' performance. *Environment, Development and Sustainability*, 26(4), 10569–10589. <https://doi.org/10.1007/s10668-023-03164-6>
- 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(March), 101734. <https://doi.org/10.1016/j.irfa.2021.101734>
- Sun, Z. Y., Wang, S. N., & Li, D. (2022). The impacts of carbon emissions and voluntary carbon disclosure on firm value. *Environmental Science and Pollution Research*, 29(40), 60189–60197. <https://doi.org/10.1007/s11356-022-20006-6>
- Susilowati, N., Mahmud, A., Santoso, A., Sari, P. N., & Lestari, S. (2024). President



- commissioner attributes and climate change disclosure: Evidence from Indonesian banking companies. *Accounting Analysis Journal*, 13(2), 140–150. <https://doi.org/https://doi.org/10.15294/aaaj.v13i2.7836>
- Ting, H. I. (2021). CEO gender, power and bank performance: evidence from Chinese banks. *Journal of Enterprising Communities*, 15(1), 155–176. <https://doi.org/10.1108/JEC-04-2020-0065>
- Tokas, K., & Yadav, K. (2023). Foreign Ownership and Corporate Social Responsibility: The Case of an Emerging Market. *Global Business Review*, 24(6), 1302–1325. <https://doi.org/10.1177/0972150920920444>
- Trouwloon, D., Streck, C., Chagas, T., & Martinus, G. (2023). Understanding the Use of Carbon Credits by Companies: A Review of the Defining Elements of Corporate Climate Claims. *Global Challenges*, 7(4). <https://doi.org/10.1002/gch2.202200158>
- Van, L. T. H., Vo, D. H., Vu, N. T., Ho, C. M., & Nguyen, T. C. (2024). From foreign direct investment to environmental regulations: Does a feedback effect ever exist? *Heliyon*, 10(8), e28657. <https://doi.org/10.1016/j.heliyon.2024.e28657>
- Vestrelli, R., Fronzetti Colladon, A., & Pisello, A. L. (2024). When attention to climate change matters: The impact of climate risk disclosure on firm market value. *Energy Policy*, 185(33), 113938. <https://doi.org/10.1016/j.enpol.2023.113938>
- Wahyuningrum, I. F. S., Ihlashul'amal, M., Utami, S., Djajadikerta, H. G., & Sriningsih, S. (2024). Determinants of carbon emission disclosure and the moderating role of environmental performance. *Cogent Business and Management*, 11(1), -. <https://doi.org/10.1080/23311975.2023.2300518>
- Yulianti, E., & Waworuntu, S. R. (2024). The Effect of Company Size, Profitability, Leverage, Media Exposure, and Liquidity on Carbon Emissions Disclosure. *Annals of Data Science*. <https://doi.org/10.1007/s40745-024-00564-x>
- Yustina, A. I., Dewi, C. N., Mahmudah, H., & Andreanantenaina, H. (2024). Corporate Governance Mechanism for Carbon Emission Disclosure: Evidence from State-Owned Enterprises in Indonesia. *Global Business and Finance Review*, 29(4), 28–42. <https://doi.org/10.17549/gbfr.2024.29.4.28>
- Zaid, M. A. A., Issa, A., & Wael Al-Khatib, A. (2024). The power of financial literacy: paving a clear path for the influence of board diversity on intellectual capital disclosure. *Journal of Intellectual Capital*, 25(5), 1184–1209. <https://doi.org/10.1108/JIC-05-2024-0147>
- Zhou, Q., Wang, Y., Zeng, M., Jin, Y., & Zeng, H. (2021). Does China's river chief policy improve corporate water disclosure? A quasi-natural experimental. *Journal of Cleaner Production*, 311(May), 127707. <https://doi.org/10.1016/j.jclepro.2021.127707>

