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Do Institutional Ownership Contribute to Decarbonization Strategies? an Empirical Study in Emerging Markets

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ABSTRACT

Purpose: This study aims to examine the relationship between institutional ownership and greenhouse gas (GHG) emissions.

Methodology/approach: The research sample consists of 182 companies listed on the Indonesia Stock Exchange (IDX) during the period 2018–2022, with data collected from Bloomberg and Osiris databases. The analysis was conducted using the Ordinary Least Squares (OLS) method with STATA 17 software.

Findings: The results indicate that institutional ownership has a negative and significant association on total GHG emissions, particularly on Scope 1 emissions. However, the association of institutional ownership on indirect emissions (Scope 2 and 3) is not statistically significant.

Practical and Theoretical contribution/Originality: This study contributes by providing empirical evidence that institutional investors are more effective in reducing direct emissions, while their influence on supply chain and energy consumption-related emissions remains limited. The findings offer valuable insights for companies in enhancing transparency and improving their carbon emission management strategies.

Research Limitation: This study is limited to Indonesian firms over a specific period. Future research should include more countries, a longer timeframe, and additional variables like renewable energy policies and government incentives for broader insights.

Keywords: Corporate Governance, Greenhouse Gas Emissions, Institutional Ownership, Sustainability.

ABSTRAK

Tujuan penelitian: Penelitian ini bertujuan mengkaji pengaruh kepemilikan institusional terhadap total emisi gas rumah kaca (GHG).

Metode/pendekatan: Sampel penelitian terdiri dari 182 perusahaan yang terdaftar di Bursa Efek Indonesia (BEI) selama periode 2018-2022, dengan data yang dikumpulkan dari Bloomberg dan Osiris Database. Analisis dilakukan menggunakan metode Ordinary Least Squares (OLS) dengan software STATA 17.

Hasil: Hasil penelitian menunjukkan bahwa kepemilikan institusional berpengaruh negatif dan signifikan terhadap total emisi GHG, khususnya pada Scope 1. Namun, pengaruh kepemilikan institusional terhadap emisi tidak langsung (Scope 2 dan 3) tidak menunjukkan signifikansi.

Kontribusi Praktik dan Teoretis/Orisinalitas: Temuan penelitian berkontribusi dengan membuktikan bahwa investor institusional lebih efektif dalam menekan emisi langsung, sementara pengaruhnya terhadap emisi rantai pasok dan konsumsi energi masih terbatas. Studi ini memberikan wawasan penting bagi perusahaan dalam meningkatkan transparansi dan strategi pengelolaan emisi karbon

Keterbatasan Penelitian: Penelitian ini terbatas pada perusahaan di Indonesia dalam periode tertentu, sehingga disarankan studi selanjutnya mencakup negara lain, periode yang lebih panjang, serta mempertimbangkan variabel tambahan seperti kebijakan energi terbarukan dan insentif pemerintah untuk memberikan pemahaman yang lebih komprehensif.

Kata Kunci: Emisi Gas Rumah Kaca, Keberlanjutan, Kepemilikan Institusional, Tata Kelola.

INTRODUCTION

In conducting their operations, companies face various types of risks that are not only financial in nature but also involve non-financial risks. These non-financial risks are becoming increasingly important in the context of modern corporate management as they include reputational, operational, as well as environmental and social risks (Alessi et al., 2021). In terms of environmental concerns, climate change and greenhouse gas (GHG) emissions are major factors that can affect a firm's long-term performance and competitiveness (Palea & Drogo, 2020). If these risks are not properly managed, firms may experience a decline in value and increased cost of capital (Al-Qahtani & Elgharbawy, 2020).

GHG emission reporting serves as an important indicator reflecting the extent of pollution generated by a firm. Moreover, such reporting functions as a risk management tool that enhances transparency and accountability. Transparent reporting enables stakeholders to assess the company's commitment to sustainability and environmental responsibility (Downar et al., 2019). The study by Schiemann and Sakhel (2019) shows that firms that proactively disclose their carbon emissions tend to gain greater investor trust and are able to

reduce information asymmetry in the market. Conversely, inconsistencies and inaccuracies in emission reporting may damage a company's reputation and its relationships with stakeholders (Alsaifi et al., 2022).

GHG emissions—consisting of carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O)—are generated from various activities such as fossil fuel combustion, industrial processes, agriculture, and waste management (IPCC, 2006). These emissions are typically grouped into three main categories: scope 1 (direct emissions from company-controlled sources), scope 2 (indirect emissions from purchased energy), and scope 3 (indirect emissions from value-chain activities such as transportation, distribution, and product use (GGP, 2015). High levels of GHG emissions are often a significant environmental risk indicator that can influence market value, reputation, and investor expectations (Choi & Luo, 2021; Galama & Scholtens, 2021; Karim et al., 2021).

Companies that generate large amounts of carbon emissions face a high risk of regulatory sanctions and may also encounter negative environmental impacts. Excessive carbon emissions are closely related to environmental degradation, which may hinder a firm's long-term sustainability (Karim et al., 2021). Lemma et al. (2019) found that firms with high emission levels tend to experience increased cost of capital and a decline in market value due to heightened investor concerns about environmental risks. Therefore, effective carbon emission management is essential for maintaining operational continuity and safeguarding corporate reputation in the eyes of the public and shareholders. This urgency is particularly evident in Indonesia, where the greenhouse effect phenomenon has escalated due to rapid industrial growth and heavy reliance on fossil fuels. Indonesian companies are increasingly scrutinized for their contribution to national GHG emissions, facing mounting pressure to align their operations with the government's commitment to reducing carbon output and mitigating climate change impacts.

Investors are increasingly paying attention to carbon-related information in the investment decision-making process. Firms with lower carbon footprints are perceived as more sustainable and carry lower regulatory risks (Choi & Luo, 2021). A study by Döring et al. (2023) shows that investor pressure to reduce carbon emissions encourages companies to adopt greater transparency and environmentally friendly business practices. Hence, GHG emission disclosure not only plays a role in managing environmental risks but also serves as an important factor in attracting sustainable investment.

Institutional ownership represents the proportion of company shares held by financial institutions such as pension funds, insurance companies, and asset managers. Institutional ownership is believed to have a significant influence in shaping corporate policies, including those related to transparency and carbon emission reporting. Unlike dispersed individual shareholders, institutional investors possess both the monitoring power and the long-term investment horizon necessary to enforce substantive decarbonization strategies. Based on stakeholder theory, institutions as major shareholders have an interest in ensuring that companies operate sustainably and responsibly. Long-term-oriented institutional investors tend to support environmentally friendly business practices as a mitigation strategy against non-financial risks that may adversely impact future firm performance (Dyck et al., 2019).

Several studies show that institutional ownership has a negative impact on corporate carbon emission levels. Institutional investors have the capacity and influence to encourage companies to enhance transparency and adopt stricter policies regarding carbon disclosure and emission reduction. Grewal et al. (2020) explain that pressure from institutional owners can motivate firms to act more proactively in managing emissions as a response to market

expectations and efforts to maintain corporate reputation. In Choi and Luo (2021), firms with higher institutional ownership tend to have more developed sustainability strategies and are more active in reducing emissions. This is also reinforced by Galama and Scholtens (2021), who found that firms under stronger institutional investor pressure are more open in disclosing emissions and undertaking concrete actions to reduce them.

Furthermore, several studies examine how institutional ownership influences internal sustainability-related policies. For example, Döring et al. (2023) show that sustainability-focused institutional investors may encourage firms to implement energy efficiency, renewable energy use, and waste reduction as part of their environmental strategy. Döring et al. (2023) add that institutional investors with strong environmental commitments can significantly influence emission reporting and corporate environmental initiatives, even prompting actual emission reductions to maintain positive relationships with institutional shareholders. Clarkson et al. (2019) also provide evidence that firms dominated by institutional ownership demonstrate higher transparency and better implementation of environmentally friendly technologies. In this context, institutional ownership serves as an important catalyst in shaping corporate carbon reduction policies (Luo, 2019).

However, the literature on the influence of institutional ownership on carbon emissions still shows mixed results. Several studies report inconsistent findings (Amanda et al., 2024; Ardillah & Rusli, 2022; Bedi & Singh, 2025; Kiswanto et al., 2023; Krisnawanto & Solikhah, 2019; Pramuditya & Budiasih, 2020; Putri et al., 2022). Moreover, research on this topic remains relatively limited in emerging markets such as Indonesia, which have governance characteristics and regulatory pressures that differ from those in developed countries. A key weakness in prior studies is that they often limit their analysis to direct emissions (Scope 1 and 2), thereby overlooking the broader carbon footprint embedded in the value chain (Scope 3). This limited scope fails to capture the true extent of corporate environmental impact and the effectiveness of governance roles. These inconsistencies and geographical limitations highlight an important research gap. Therefore, this study seeks to contribute by re-examining the association of institutional ownership on corporate carbon emissions in the Indonesian public market more comprehensively, including all emission categories (scope 1, 2, and 3). This research is crucial as it offers empirical evidence on how ownership structures can drive comprehensive climate accountability in an emerging economy, providing vital insights for regulators aiming to achieve national net-zero targets. Referring to stakeholder theory and the empirical evidence discussed, this study proposes the following hypothesis:

Hypothesis: Institutional ownership has a negative association on carbon emissions.

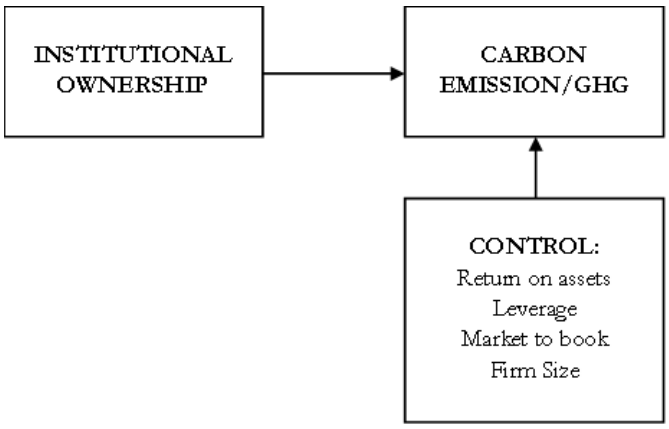

Figure 1. Conceptual Framework

METHOD

This study is quantitative research employing a survey approach. The objects of the research are publicly listed companies on the Indonesia Stock Exchange (IDX) during the 2018–2022 period. The population consists of all companies listed on the IDX during that period, totaling 935 firms. After a screening process to remove incomplete data for the independent, dependent, and control variables, the final sample used in this study comprises 182 observations. The details of the sample selection process are presented in Table 1.

Table 1. Sample Selection

Description	Sample
Total population (2018-2022)	4.675
(-) Missing data for independent, dependent, and control variables	(4.493)
Total final sample	182

Source: Processed data (2024)

The research instrument consists of a collection of quantitative data sourced from published financial statements and sustainability reports, which are available in the Bloomberg and Osiris databases. This study utilizes secondary data obtained from two primary sources: Bloomberg and the Osiris Database. Carbon emissions (GHG), as the dependent variable, are collected from Bloomberg. Similarly, data for the independent variable, institutional ownership (INSOWN), are also retrieved from Bloomberg. Meanwhile, data for the control variables—including return on assets (ROA), leverage (LEV), market-to-book ratio (MTB), and firm size (FSIZE)—are sourced from the Osiris Database. The operational definitions of each variable are presented in Table 2.

Table 2. Variable Definitions

Variable	Definition	References	Data Source
GHG	Natural logarithm of total Greenhouse Gas (GHG) emissions Scope 1+2+3 disclosed by the company.	(Khatri, 2024; Muttakin et al., 2022)	Bloomberg
INSOWN	Percentage of institutional ownership.	(Choi & Luo, 2021; Döring et al., 2023)	Bloomberg
ROA	Net income divided by total assets.	(Choi & Luo, 2021; Muttakin et al., 2022)	Osiris
LEV	Total debt divided by total assets.	(Choi & Luo, 2021; Muttakin et al., 2022)	Osiris
MTB	Market value divided by book value.	(Muttakin et al., 2022)	Osiris
FSIZE	Natural logarithm of total assets.	(Choi & Luo, 2021; Muttakin et al., 2022)	Osiris

Source: Processed data (2024)

The analytical methods employed in this study include descriptive statistics, correlation testing, and Ordinary Least Squares (OLS) regression analysis. Prior to analysis, all variables underwent a winsorizing process to address outliers and ensure data stability. The dataset used is an unbalanced panel, as the number of observations varies across firms during the study period. To address potential standard error bias due to similarities in firm

characteristics, a clustering technique was applied. All analyses were conducted using Stata software version 17.0. The regression model used in this study is specified as follows:

$$GHG_{i,t} = \beta_0 + \beta_1 INSOWN_{i,t} + \beta_2 ROA_{i,t} + \beta_3 LEV_{i,t} + \beta_4 MTB_{i,t} + \beta_5 FSIZE_{i,t} + YearFE + IndustryFE + \varepsilon \quad (1)$$

where:

$GHG_{i,t}$: Carbon Emission of firm *i* in year *t*

β_0 : Konstanta

$\beta_1 INSOWN_{i,t}$: Institutional Ownership of firm *i* in year *t*

$\beta_2 ROA_{i,t}$: Return on assets of firm *i* in year *t*

$\beta_3 LEV_{i,t}$: Leverage firm of *i* in year *t*

$\beta_4 MTB_{i,t}$: Market to book of firm *i* in year *t*

$\beta_5 FSIZE_{i,t}$: Firm size of firm *i* in year *t*

$YearFE$: Year fixed effect

$IndustryFE$: Industry fixed effect

ε : Error

RESULTS AND DISCUSSION

Table 3 presents the distribution of the research sample based on the Standard Industrial Classification (SIC) codes, which identify the sector or industry of the firms, as well as the corresponding research years. The year 2018 recorded the lowest number of observations, with 24 firms, while the highest number was in 2022, with 48 firms.

As shown in Table 3, the sample is dominated by firms in the Mining & Construction sector (SIC 1), with a total of 48 observations over the 2018–2022 period. This sector represents the largest proportion among all categories, reflecting a high representation of extractive industries in the study. It is followed by the Light Manufacturing sector (SIC 2) with 36 observations, and the Finance, Insurance, & Property sector (SIC 6) with 34 observations.

The dominance of these sectors suggests that the sample is heavily represented by industries that, operationally, have significant potential environmental impacts, particularly those related to mining, construction, and manufacturing activities.

	YEAR					
SIC	**2018**	**2019**	**2020**	**2021**	**2022**	**Total**
0: Agriculture, Forestry, & Fisheries	0	0	1	2	2	**5**
1: Mining & Construction	8	10	9	10	11	**48**
2: Light Manufacturing	7	6	7	8	8	**36**
3: Heavy Manufacturing	3	3	3	4	4	**17**
4: Transportation & Public Utilities	3	4	5	6	7	**25**
5: Wholesale & Retail Trade	0	1	2	3	3	**9**
6: Finance, Insurance, & Property	3	5	6	10	10	**34**
7: Office-Based Trade & Services	0	1	2	2	3	**8**
Total	**24**	**30**	**35**	**45**	**48**	**182**

Source: Processed data (2024)

Table 3. Sample Distribution by SIC Code and Year

Descriptive Statistics

Table 4 presents the descriptive statistics of all variables used in this study. The average total greenhouse gas (GHG) emissions disclosed by the firms is 12.263 (in natural logarithmic form), with a minimum value of 5.521 and a maximum of 17.235. For individual emission scopes, the mean values are as follows: Scope 1 (direct emissions) is 10.871, Scope 2 (indirect emissions from energy use) is 10.686, and Scope 3 (value chain emissions) is 10.194, with respective maximum values of 17.146, 14.776, and 17.187.

The independent variable, institutional ownership (INSOWN), shows a mean of 41.398%, ranging from a minimum of 1.469% to a maximum of 99.44%, indicating substantial variation across firms. For the control variables, return on assets (ROA) has an average of 0.057, with the lowest value being –0.249; leverage (LEV) has a mean of 0.529; the market-to-book ratio (MTB) averages 3.150; and firm size (FSIZE), measured as the natural logarithm of total assets, has an average of 22.189.

All continuous variables in this table have been winsorized at the 1st and 99th percentiles to mitigate the impact of extreme outliers.

Table 4. Descriptive Statistics

	Obs.	Mean	STD	Minimum	Median	Maximum
GHG	182	12.263	2.631	5.521	12.467	17.235
SCOPE1	158	10.871	3.676	1.335	10.561	17.146
SCOPE2	158	10.686	2.390	5.422	11.068	14.776
SCOPE3	46	10.194	4.028	2.167	10.910	17.187
INSOWN	182	41.398	30.550	1.469	31.535	99.440
ROA	182	0.057	0.078	-0.249	0.039	0.302
LEV	182	0.529	0.231	0.103	0.512	0.919
MTB	182	3.150	5.243	0.293	1.501	28.745
FSIZE	182	22.189	1.272	18.841	22.001	25.499

Note: This table presents the descriptive statistics of the variables used in the analysis. All continuous variables have been winsorized at the 1st and 99th percentiles.
Source: Processed data (2024)

Pearson Correlation

Based on Table 5, the results of the Pearson correlation analysis indicate significant relationships among the variables used in this study. Greenhouse gas (GHG) emissions are positively and significantly correlated with Scope 1 ($r = 0.905$, $p < 0.01$), Scope 2 ($r = 0.725$, $p < 0.01$), and Scope 3 ($r = 0.519$, $p < 0.01$). Institutional ownership (INSOWN) shows a negative and significant correlation with GHG ($r = –0.248$, $p < 0.01$), Scope 1 ($r = –0.244$, $p < 0.01$), and Scope 2 ($r = –0.143$, $p < 0.1$). However, its correlation with Scope 3 is not significant ($r = 0.082$, $p = 0.587$).

Leverage (LEV) is negatively and significantly correlated with GHG ($r = –0.263$, $p < 0.01$), Scope 1 ($r = –0.269$, $p < 0.01$), and INSOWN ($r = –0.269$, $p < 0.01$). It also shows a weak but significant negative correlation with firm size (FSIZE) ($r = –0.058$, $p < 0.01$). On the other hand, FSIZE is positively correlated with Scope 1 ($r = 0.128$, $p = 0.109$) and Scope 2 ($r = 0.206$, $p < 0.01$), but negatively and insignificantly correlated with Scope 3 ($r = –0.126$, $p = 0.404$). A significant positive correlation is also found between FSIZE and INSOWN ($r = 0.234$, $p < 0.01$), indicating that larger firms tend to have higher levels of institutional ownership. These findings highlight the important relationships between financial and environmental variables in this study, with several correlations found to be statistically significant.

Panel A: From GHG to SCOPE3					
	GHG	SCOPE1	SCOPE2	SCOPE3	
GHG	1.000				
SCOPE1	0.905***	1.000			
	(0.000)				
SCOPE2	0.725***	0.489***	1.000		
	(0.000)	(0.000)			
SCOPE3	0.519***	0.425***	0.580***	1.000	
	(0.000)	(0.006)	(0.000)		
INSOWN	-0.248***	-0.244***	-0.143*	0.082	
	(0.001)	(0.002)	(0.073)	(0.587)	
ROA	0.062	0.123	-0.005	0.384***	
	(0.409)	(0.123)	(0.947)	(0.008)	
LEV	-0.263***	-0.269***	-0.108	-0.221	
	(0.000)	(0.001)	(0.178)	(0.141)	
MTB	-0.254***	-0.264***	-0.127	0.094	
	(0.001)	(0.001)	(0.113)	(0.534)	
FSIZE	0.156**	0.128	0.206***	-0.126	
	(0.035)	(0.109)	(0.010)	(0.404)	
Panel B: From INSOWN to FIZE					
	INSOWN	ROA	LEV	MTB	FSIZE
INSOWN	1.000				
ROA	0.054	1.000			
	(0.467)				
LEV	0.358***	-0.252***	1.000		
	(0.000)	(0.001)			
MTB	0.177**	0.496***	0.141*	1.000	
	(0.017)	(0.000)	(0.058)		
FSIZE	0.234***	-0.278***	0.457***	-0.330***	1.000
	(0.002)	(0.000)	(0.000)	(0.000)	

Note: This table presents the correlation analysis. Symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.
Source: Processed data (2024)

Table 5. Pearson Correlation

Main Regression analysis

The Association Between Institutional Ownership and Carbon Emissions

Based on the OLS regression results presented in Table 6, institutional ownership (INSOWN) shows a negative and statistically significant association with greenhouse gas (GHG) emissions, with a coefficient of –0.012 and a *t*-statistic of –2.69 ($p < 0.01$).

This finding is consistent with stakeholder theory, which posits that institutional investors play a key role in ensuring that companies are accountable to all stakeholders by promoting sustainability and environmental responsibility (Donaldson & Preston, 1995; Freeman, 1984). Institutional investors generally adopt a long-term investment perspective and are more attentive to non-financial risks, including environmental risks, which may influence firm performance in the long run (Dyck et al., 2019).

With growing investor awareness of climate change, firms with high carbon footprints often face pressure from institutional investors to reduce their emissions (Choi & Luo, 2021; Galama & Scholtens, 2021). This pressure not only supports better risk management but also

enhances corporate image and strengthens stakeholder relationships. Firms that fail to manage their carbon emissions may face greater reputational risks, which can negatively impact firm value and institutional investor relations (Döring et al., 2023). Therefore, this result supports the hypothesis that institutional ownership is negatively associated with corporate greenhouse gas emissions.

Table 6. Main Regression Result

	GHG
INSOWN	-0.012***
	(-2.69)
ROA	-0.414
	(-0.28)
LEV	-2.058**
	(-2.26)
MTB	-0.016
	(-0.71)
FSIZE	1.019***
	(6.17)
_cons	-6.446*
	(-1.91)
Year FE	Yes
Industry FE	Yes
Adjusted R^2	0.616
N	182

Note: Standard errors are clustered at the firm level, and *t*-values of the regression coefficients are reported in parentheses. Symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.
Source: Processed data (2024)

For the control variables, leverage (LEV) exhibits a negative and statistically significant association with carbon emissions, with a coefficient of –2.058 and a *t*-statistic of –2.26 ($p < 0.05$). This suggests that firms with higher leverage are more likely to adopt emission reduction policies as part of their strategy to manage financial risk. Firm size (FSIZE) shows a positive and statistically significant association with carbon emissions, with a coefficient of 1.019 and a *t*-statistic of 6.17 ($p < 0.01$). This indicates that larger firms tend to have higher levels of emissions due to the broader scale of their operational activities. Meanwhile, return on assets (ROA) and the market-to-book ratio (MTB) do not show any statistically significant association with carbon emissions in this model. The adjusted R-squared value of 0.616 indicates that the model explains approximately 61.6% of the variation in carbon emissions, suggesting a reasonably good predictive power in identifying the key financial and ownership factors associated with corporate greenhouse gas emissions.

Additional Analysis

The Association Between Institutional Ownership and Each Scope of Carbon Emissions

Based on Table 7, the analysis results show that institutional ownership (INSOWN) has a negative and statistically significant association with Scope 1 emissions, with a coefficient of –0.016 and a t-statistic of –2.17 ($p < 0.05$). However, for Scope 2 and Scope 3 emissions, the association is not statistically significant, with coefficients of –0.004 ($t = –0.68$) and –0.003 ($t = –0.13$), respectively. These findings suggest that institutional investors may be more effective in pressuring firms to reduce direct (Scope 1) emissions—those under their direct

control—while their influence over indirect emissions, particularly those related to the supply chain (Scope 3), remains limited.

Table 7. The Association Between Institutional Ownership and Each Scope of Carbon Emissions

	(1) SCOPE1	(2) SCOPE2	(3) SCOPE3
INSOWN	-0.016**	-0.004	-0.003
	(-2.17)	(-0.68)	(-0.13)
ROA	0.917	-3.141	8.284
	(0.44)	(-1.21)	(1.11)
LEV	-1.036	-2.016*	2.668
	(-1.01)	(-1.90)	(0.49)
MTB	-0.051	0.012	0.022
	(-1.51)	(0.28)	(0.24)
FSIZE	1.266***	0.773***	0.731
	(6.02)	(3.74)	(0.99)
_cons	-12.139***	-4.293	-5.789
	(-2.80)	(-0.99)	(-0.38)
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Adjusted R^2	0.707	0.299	0.497
N	158	158	46

Note: Standard errors are clustered at the firm level, and *t*-values of the regression coefficients are reported in parentheses. Symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.
Source: Processed data (2024)

These findings indicate that institutional ownership plays a role in reducing direct (Scope 1) emissions, which originate from companies' core operational activities, such as fuel combustion and production processes. This result aligns with stakeholder theory, which emphasizes that institutional investors tend to be more sustainability-oriented and encourage companies to minimize their direct environmental impacts. Firms with higher levels of institutional ownership are expected to be more transparent and proactive in reducing carbon emissions, particularly those arising from primary operations, as institutional investors often hold expectations for environmentally responsible and sustainable business practices (Dyck et al., 2019).

However, the insignificant associations between institutional ownership and Scope 2 and Scope 3 emissions reflect the complexity of controlling indirect emissions. Scope 2 emissions relate to purchased energy consumption (e.g., electricity), while Scope 3 emissions include emissions generated across the company's value chain, such as those from suppliers and customer product usage (Hertwich & Wood, 2018). Several studies have noted that controlling Scope 2 and 3 emissions is more difficult because companies must rely on third parties, including energy providers and supply chain partners (Mahapatra et al., 2021). Thus, while institutional pressure may be effective in encouraging reductions in direct emissions, efforts to lower indirect emissions require broader collaboration with external stakeholders (Valls-Val & Bovea, 2021).

Sub-sample Analysis: Environmentally Sensitive vs. Non-sensitive Industries

To strengthen the main findings, an additional analysis was conducted by considering the type of industry based on its level of environmental exposure. Certain sectors are considered more vulnerable to environmental issues due to their operational activities, which often generate waste, pollution, or involve large-scale exploitation of natural resources. Industries

such as mining, energy, chemical manufacturing, and paper production are typically categorized as environmentally sensitive. In this study, the classification of environmentally sensitive and non-sensitive industries is based on a two-digit SIC code approach, adapted from previous literature (Emma & Jennifer, 2021). The SIC codes 10, 12, 13, 14, 26, 28, 29, 33, and 49 were used to represent environmentally sensitive industries. Based on this classification, the dataset was divided into two sub-samples: 65 observations for sensitive industries and 117 observations for non-sensitive industries.

The regression results in Table 8 show that the association between institutional ownership (INSOWN) and carbon emissions (GHG) is statistically significant only within environmentally sensitive industries. In column (1), the coefficient for INSOWN is –0.026, significant at the 1% level (t = –5.93), indicating that in sectors with high environmental exposure, institutional investors actively pressure firms to reduce emissions as part of their responsibility to stakeholders.

Conversely, in the non-sensitive industries (column 2), the relationship between institutional ownership and emissions is not statistically significant (coefficient = 0.002; t = 0.39). These findings reinforce the argument that institutional investor pressure tends to be more influential in firms operating in sectors with high environmental impact. This is consistent with stakeholder theory, which highlights the importance of corporate responsiveness to stakeholder environmental expectations—particularly when environmental risk exposure is greater.

Table 8. Environmentally Sensitive vs. Non-sensitive Industries

	(1)	(2)
	Environmentally Sensitive Industries	**Environmentally Non-sensitive Industries**
	GHG	GHG
INSOWN	-0.026***	0.002
	(-5.93)	(0.39)
ROA	-1.795	0.023
	(-1.04)	(0.01)
LEV	-1.183**	-4.567***
	(-2.41)	(-3.12)
MTB	0.024	-0.050
	(1.10)	(-0.95)
FSIZE	1.520***	0.841***
	(6.58)	(4.23)
_cons	-16.830***	-2.057
	(-3.33)	(-0.49)
Year FE	Yes	Yes
Industry FE	Yes	Yes
Adjusted R^2	0.833	0.622
N	65	117

Note: Standard errors are clustered at the firm level, and t-values of the regression coefficients are reported in parentheses. Symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.
Source: Processed data (2024)

CONCLUSION

This study employs a quantitative approach using secondary data obtained from Bloomberg and Osiris, involving 182 observations of publicly listed companies in Indonesia during the 2018–2022 period. The analysis was conducted using Ordinary Least Squares (OLS)

regression with clustered standard errors to account for similarities in firm characteristics across industries. The key variables examined include total greenhouse gas emissions (GHG) as the dependent variable, institutional ownership as the independent variable, and several control variables such as ROA, leverage, market-to-book ratio, and firm size.

The main findings indicate that institutional ownership is negatively and significantly associated with total carbon emissions (GHG). Additional analyses further show that this negative association is strongest for direct emissions (Scope 1), which originate from firms' core operational activities. These findings underscore the important role of institutional investors in encouraging firms to reduce their operational emissions as part of their environmental responsibilities. Firms with higher levels of institutional ownership tend to adopt more stringent sustainability policies to mitigate environmental risks and strengthen their corporate reputation.

However, the study also finds that institutional ownership does not have a significant association with indirect emissions, either from energy consumption (Scope 2) or value chain activities (Scope 3). This suggests that the influence of institutional investors remains limited to internal operations. Broader collaboration with suppliers and external partners is therefore necessary to ensure comprehensive emission reduction across the entire supply chain. Furthermore, sub-sample analysis by industry reveals that the negative association between institutional ownership and GHG emissions is significant only among firms operating in environmentally sensitive industries. This finding reinforces the role of institutional investors as a key driver of emission reduction, particularly in sectors with high environmental exposure.

This study has several limitations, including its focus solely on Indonesian companies and a limited observation period. Future research is encouraged to expand the sample to other countries, extend the study period, and incorporate additional variables such as renewable energy policies and government incentives. Such efforts may provide more comprehensive insights for designing effective corporate sustainability strategies.

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