
Factors influencing the disclosure of carbon emissions in indonesia

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ABSTRACT

As global attention on environmental sustainability intensifies, understanding the factors influencing corporate transparency in carbon emissions has become increasingly urgent. This analysis aimed to discover whether or not differences in business characteristics such as size, leverage, institutional ownership, foreign ownership, CEO narcissism, CEO tenure, family ownership, and gender parity on the board of directors were associated with changes in emissions. The population of companies involved in agriculture and mining listed on the Indonesia Stock Exchange from 2018 to 2020 makes up the study's population. We selected 177 firms for this study to participate in our sample. Multiple linear regressions were used as a method of analysis. This research found that the size and leverage of a firm are significant determinants of the amount of data accessible about that company's carbon impact. Disclosure of carbon emissions is unaffected by institutional ownership, foreign ownership, CEO narcissism, family ownership, or the presence of women on boards of directors. These findings suggest that policymakers and corporate stakeholders should focus on size and leverage as key factors for improving carbon disclosure practices, while other business characteristics may require additional scrutiny.

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INTRODUCTION

The burning of fossil fuels releases carbon into the atmosphere, either as individual carbon atoms or in combination with other elements (Wiranto & Muaziz, 2020). Human activities, particularly the excessive emission of carbon, are major contributors to climate change and global warming. Environmentally conscious businesses recognize the importance of reducing carbon emissions by maintaining environmental records alongside financial and management accounting records, thus holding themselves accountable to society for their environmental impacts.

A 1.5°C increase in the average global surface temperature leads to more severe weather patterns, rising sea levels, damaged coastal ecosystems, loss of biodiversity, health risks, and economic distress worldwide (Intergovernmental Panel on Climate Change, 2018). According to CDP (2013), just fifty of the world's 500 largest publicly traded companies are responsible for three-quarters of the 3.6 billion metric tons of greenhouse gases emitted globally. Given these alarming figures, [Haque and Islam \(2012\)](#) argue that climate change should be prioritized in business and policy agendas.

[Sugardiman's \(2019\)](#) report on reducing greenhouse gas (GHG) emissions revealed that, in 2017, mining operations accounted for 49% of global GHG emissions, followed by forest and land fires associated with agricultural expansion (25% each), and agriculture itself (11%), contributing to a total of 36% of global emissions. In many countries, including Indonesia, the disclosure of carbon emissions remains voluntary ([Anshari & Isnalita, 2020](#)). This study investigates how various business characteristics—such as company size, leverage, institutional ownership, family ownership, foreign ownership, the presence of women on the board of directors, and CEO narcissism—affect the extent of carbon emission disclosures.

[Choi et al. \(2013\)](#) suggest that a company's size reflects its available resources, implying that larger businesses are more likely to engage in initiatives like carbon emission disclosures. Larger firms have more to gain from transparency about their carbon footprints and, therefore, are more inclined to make high-quality, voluntary disclosures. However, research by [Freedman and Jaggi \(2005\)](#) and [Pratiwi \(2018\)](#) indicates that the amount of pollutants and greenhouse gases reported by corporations is not necessarily correlated with their size.

Leverage, defined as the total amount of a firm's debt ([Rokhmawati & Gunardi, 2017](#)), also plays a role in emission disclosure. Firms with higher leverage are under more scrutiny and are often required to provide more detailed reports, making it likely that greater leverage correlates with more extensive carbon emissions disclosure ([Jensen & Meckling, 1976](#)).

Institutional ownership refers to when corporations or large organizations own a significant portion of a company. The scrutiny associated with institutional investors often enhances a company's accountability and can improve its environmental transparency. [Cotter and Najah \(2012\)](#) and [Pratiwi \(2018\)](#) found that having institutional investors behind climate change disclosures is particularly effective. However, [Hermawan et al. \(2018\)](#) discovered that institutional ownership does not always significantly impact carbon emission reporting.

Family ownership, as defined by [Andres \(2008\)](#), refers to individuals related by blood or marriage to the company's founder. Family-owned businesses are often more focused on maximizing profits and improving financial performance than on environmental responsibility. [Gonzalez-Gonzalez and Zamora-Ramrez \(2016\)](#) found that companies with concentrated ownership were less likely to disclose their carbon emissions.

[Kusumawardani and Laksito \(2011\)](#) suggest that the level of foreign ownership in Indonesian companies can be determined by the proportion of shares held by non-Indonesians. As per [Asrida \(2011\)](#), businesses with international stakeholders are more likely to disclose their Corporate Social Responsibility (CSR) activities. This notion is supported by research from [Do \(2017\)](#), [Hu et al. \(2016\)](#), and [Sunreni \(2016\)](#), which indicates that firms with foreign shareholders are more attuned to social and environmental issues and tend to disclose their carbon emissions more frequently.

[Nielsen and Huese \(2010\)](#) found that women's emotional sensitivity influences their attitudes toward corporate social responsibility and environmental regulations. Women are more likely to be disturbed by reports of natural disasters and, as a result, actively seek out more information about these events. Furthermore, [Ben-Amar et al. \(2015\)](#) and [Liao et al. \(2014\)](#) found a positive correlation between the presence of women in leadership roles and the frequency of carbon emission disclosures within organizations.

CEO narcissism, as defined by the [American Psychiatric Association \(2013\)](#), refers to a need for excessive admiration, a lack of empathy, and an inflated sense of self-importance. It is believed that narcissistic CEOs are more likely to publish numerous disclosures to maintain their company's image ([Hales et al., 2016](#)).

The primary aim of this study is to explore how various factors—such as company size, leverage, institutional ownership, foreign ownership, CEO narcissism, family ownership, and gender diversity on the board—affect the extent to which agricultural and mining companies listed on the Indonesia Stock Exchange disclose their carbon emissions.

Literature Review

Stakeholders Theory

According to [Kusumadilaga \(2010\)](#), stakeholder theory encompasses a set of policies and practices that prioritize not only the interests of shareholders but also the values, legal compliance, public welfare, environmental considerations, and the corporate community's commitment to sustainable development. The theory posits that businesses should recognize and support those who have a vested interest in the company, beyond just financial stakeholders ([Hardianti & Asyik, 2016](#)). In today's evolving business landscape, as noted by [Tauringana and Chithambo \(2016\)](#), managers are increasingly expected to take on broader responsibilities that extend beyond shareholders to include debtors, regulators, analysts, the public, and the environment. This shift reflects the understanding that the interests of various stakeholders must be considered, and thus, access to corporate data should be equally available to all relevant stakeholders, not just shareholders. Stakeholder theory therefore advocates for a more inclusive approach to corporate decision-making, where companies are held accountable not only to their investors but also to society at large, fostering transparency and promoting ethical practices that align with both financial goals and broader societal well-being.

Agency Theory

The concept of agency theory, developed by [Jensen and Meckling \(1976\)](#), defines an agency relationship as an agreement between a principal (one or more individuals) and an agent (those responsible for carrying out the principal's business on their behalf). In this arrangement, the principal grants the agent the legal authority to make decisions on their behalf. Management, acting as the agent, has both an ethical and legal obligation to maximize the company's operations and profits to the best of their ability. In return, the agent is compensated based on the terms of the agreement. However, the principal monitors the agent's actions to ensure the efficient management of the capital at stake. Agency conflicts arise when the goals of the principal and agent are misaligned. While the principal seeks to maximize their welfare, agents often have their own material and emotional needs that must be addressed before they can effectively represent the interests of the principal ([Jensen & Meckling, 1976](#)). This misalignment can lead to inefficiencies and moral hazard, where agents may act in their own self-interest rather than in the best interest of the principal.

Upper Echelon Theory (UET)

The Upper Echelon Theory, proposed by [Hambrick and Mason \(1984\)](#), posits that a company's culture reflects the values and beliefs of its top executives. This theory suggests that the personal characteristics of an organization's leaders can, at least in part, predict the success or failure of its strategy and overall performance. [Tauringana and Chithambo \(2016\)](#) emphasizes the critical role of leaders in making strategic decisions and allocating resources, noting that the direction and success of the organization are significantly influenced by the characteristics and decision-making processes of its top executives. Zein further expands on the Upper Echelon Theory by explaining how a leader's

knowledge, skills, beliefs, and personality traits shape the organization's outcomes, highlighting the importance of leadership in guiding the company towards achieving its goals.

Hypotheses Development

Effect of Company Size on Carbon Emissions Disclosure

Larger companies have greater resources since their size is proportionate to their resources. According to [Choi et al. \(2013\)](#), a company's size can be used to predict its resources. Larger organizations with more resources will find it easier to disseminate information to third parties. Larger capital suggests that the corporation can respond to public criticism in its surroundings more quickly ([Jannah & Muid, 2014](#)).

Disclosure remains voluntary, but larger corporations will be in a better position to do so. As a result, major corporations are more likely than small enterprises to declare their carbon emissions. As a result, a company's disclosure policy will be determined by its scale ([Choi et al., 2013](#)). Based on the given description, the following hypothesis is proposed:

H1: Company size affects the disclosure of carbon emissions.

Leverage Effect on Carbon Emission Disclosure

Companies with high debt tend to avoid voluntary disclosures, such as environmental disclosures, because they incur additional expenses and divert resources that may be utilized to meet other commitments and lessen creditor pressure ([Luo & Tang., 2014](#)). According to stakeholder theory, a company's commitment to its creditors increases in proportion to its leverage, therefore when given the choice between revealing carbon emissions and paying off debts, the latter will be favored ([Choi et al., 2013](#)).

According to [Luo & Tang \(2014\)](#), organizations with significant debt require additional resources to create a preventive carbon reporting system. This theory requires a negative association between the amount to which carbon emissions are hidden and the extent to which carbon emissions are disclosed. Carbon emissions disclosure will be lower when corporations have a high leverage ratio and more transparent when enterprises have a low leverage ratio. [Luo & Tang \(2014\)](#) discovered that leverage influences carbon emissions disclosure. This information leads to the following hypothesis:

H2: Leverage affects the disclosure of carbon emissions.

The Effect of Institutional Ownership on Carbon Emissions Disclosure

Disclosure of carbon emissions may or may not be related to institutional ownership. Institutional ownership can be a good control mechanism for managerial decisions, as it pressures them to fulfill investors' information needs, including data on carbon emissions ([Freedman and Jaggi, 2005](#)). However, companies with significant institutional ownership could restrict voluntary disclosure of business information. Research findings are mixed: some advise that businesses with great institutional ownership act on disclose environmental information more willingly ([Muttakin and Khan, 2014](#)) while others indicate little effect or an adverse link between institutional/block-holder ownership and voluntary disclosure ([Hermawan et al., 2018](#)). This information indicates to the following hypothesis:

H3: Institutional ownership affects carbon emissions disclosure.

Effect of Family Ownership on Carbon Emissions Disclosure

According to [Muttakin and Khan \(2014\)](#), family firms have little incentive to disclose more information than is required voluntarily. [Ho and Wong \(2001\)](#) pointed out that control mechanisms such as voluntary information disclosure are unnecessary in family firms because family members are already involved in day-to-day operations. Since family members can easily access financial and non-

financial data when they become majority shareholders and sit on the board of directors, less information must be published when this structure is in place (Chau & Gray, 2010).

González-González and Zamora-Ramrez (2016) found that firms with concentrated ownership types harm carbon emissions disclosure. It has been found that family businesses are less responsive to disclosure requests from stakeholders and are more concerned with protecting the family's interest in the firm due to a lack of information asymmetry, little demand from stakeholders, and concerns of financial disruption to the firm (Muttakin & Khan, 2014). This information leads to the following hypothesis:

H4: Family ownership affects carbon emissions disclosure.

The Effect of Foreign Ownership on Carbon Emissions Disclosure

Disclosure serves to provide information to multiple stakeholders, based on stakeholder theory (Jahid et al, 2020). Corporations with foreign trade or ownership agreements are more likely to share CSR-related data publicly as per the same theory (Asrida, 2011). Environmental concerns are a greater focus in America and Europe compared to other nations (Sunreni, 2016), creating interest for worldwide communities from countries that have high norms for CSR and environmental standards. However, according to Kang & Hwang (2018) research, intercontinental criticism is often directed towards multinational corporations due their prioritization of profit rather than social welfare programs. This knowledge generates the following hypothesis:

H5: Foreign ownership affects carbon emissions disclosure

The Effect of Women on the Board of Directors on Carbon Emissions Disclosure

Women on boards of directors can positively impact greenhouse gas emissions disclosure, according to Hambrick's Upper Echelon Theory (2007). As per this theory, executives' interpretations of strategic events are influenced by their knowledge, experience, values and personality traits. Women have a unique cognitive framework compared to men resulting in diversified information presented during board decisions which improves the policy-making process. Companies with female representation at top levels are expected to prioritize climate change issues more effectively and address concerns related GHG emission reporting in sustainability as well as annual reports leading towards better GHG emissions disclosures. This data suggests the following hypothesis:

H6: Women on boards affect carbon emissions disclosure.

The Effect of CEO Narcissism Level on Carbon Emissions Disclosure

Narcissism can lead to a negative impact on pro-environmental behavior. This may result in inefficient implementation of environmental preservation measures (Bergman et al., 2014; Dunbar, 2011). Theories like Stakeholders Theory and Upper Echelon Theory suggest that CEO hubris is associated with irresponsible behavior and negatively linked to Corporate Social Responsibility activities. According to Petrenko's study (2016), specific CSR projects might stem from leaders' personal desire for media consideration or image enhancement rather than genuine concern towards social responsibility. These decisions are influenced by the CEO's background, values, and character. (Hambrick & Mason 1984; Hambrick, 2007). This information leads to the following hypothesis:

H7: CEO narcissism level has a positive effect on carbon emissions disclosure.

METHOD

Companies registered on the Indonesia Stock Exchange (IDX) are the subjects of this analysis. Purposive sampling was used to choose research samples for this study under the following circumstances: (1) mining and agriculture companies registered on the Indonesia Stock Exchange from

2018 to 2020 and (2) companies that submitted complete financial, annual, and sustainability reports between 2018 and 2020.

After sampling with the above mentioned criteria, 59 mining and agriculture companies were obtained as research samples.

Table 1. Research Sample

Sample Criteria	Number
Agriculture and Mining firms are registered consecutively on the Indonesia Stock Exchange in 2018-2020	68
Incomplete data	(9)
Total Companies	59
Total Samples for the 2018-2020 research period	177

Table 2. Operational Definition of Variables

No	Variable	Definition	Indicator
Dependent			
1	Carbon Emission Disclosure	Carbon Emissions Disclosure is a revelation used to measure an organization's carbon emissions and set reduction targets (Cahya, 2016).	The following is the Carbon Emissions Disclosure Index produced by Choi et al (2013): 1. Using a dichotomous scale, rate each disclosure item. 2. The highest possible mark is 18, whereas the lowest possible mark is 0. Every single note is value one point. Each item is worth one point, so if the corporation publishes all of the figures in its report, its mark is 18. 3. Totaling every single firm's score
Independent			
1	Company size	Company size is a metric that measures the size of a business and may be calculated using total assets, sales volume, total profit, tax burden, number of employees, and market capitalization value (Septriyawati and Anisah, 2019).	According to Lanis & Richardson (2012): $Size = \ln total\ asset$
2	Leverage	Total debt as a percentage of total business assets is the definition of the leverage ratio (Choi et al., 2013).	According to Choi et al. (2013): Debt To Assets Ratio: Total Assets/Total Debt

3	Institutional Ownership	Institutional ownership refers to the ownership of corporate stock by institutions such as insurance companies, banks, investment firms, and others (Ardiansyah, 2014).	The fraction of shares owned by the following institutions is used to calculate institutional ownership (Lin et al., 2016).
4	Family Ownership	The quantity of shares owned by a company's founding family is referred to as its family ownership (Andres, 2008).	The quantity of share ownership held by the founder and/or the founder's family is calculated as follows (Andres, 2008).
5	Foreign Ownership	Foreign nationals possess a percentage of a company's common stock, which includes people, organizations, and governments. (Wiranata & Nugrahanti, 2013; Guo et al., 2015).	The amount of shares owned by non-domestic investors defines the percentage of foreign ownership (Guo et al., 2015).
6	CEO Narcissism	The level of CEO narcissism is a psychological construct that CEOs have that is associated with self-importance, self-righteousness, getting everything by themselves, self-admiration, arrogance, self-praise, high demands, and arrogance (Olsen et al., 2014).	CEO narcissism is measured using the following scores (Olsen et al., 2014). 1. A score of 1 is given for annual reports that do not include a photo of the CEO. 2. Two points for having a photo of the CEO and other board members in the annual report. 3. Score 3 for annual reports that only include a photo of the CEO less than half a page long. 4. Score 4 if the annual report is filled half a page with the CEO's photo and the other half with text. 5. Score 5 If the annual report has a full-page photo of the CEO
7	Women on Board	Women, in comparison to men, pay closer attention to and are more concerned about environmental and CSR issues (Boulouta, 2013; Nielsen & Huse, 2010).	Women's representation on boards of directors is tracked via a dummy variable that assigns a value of 1 to female board members and a value of 0 to male board members.

RESULTS

Descriptive Statistics

According to the information provided, the average size of a company is 29.3303, with a standard deviation of 1.60643. Institutional ownership is shown by an average score of 0.7037 with a standard deviation equal to 0.25519, while the variable representing leverage has an average value of 0.6022 and lies within the ranges of 0.74295 and 1.0. The typical value of the percentage of foreign ownership is 0.2402, and its standard deviation is 0.25644.

In regard to CEO narcissism, there is an observed mean score equaling to 4.2599., which comes along with a measured variance (standard deviation) equivalent to 0.87920. Further examining family ownership signifies averages around 0.3404 alongside variations panning out as 0.33436.

Moreover, individuals' representation in their reflective positions seem statistically steady despite some fluctuation amongst personnel background; As we see here women's workforce participation records near about starting from approximately which integrates itself firmly across varying concerns. Finally, on this note contentment disclosure regarding carbon emissions happens often online where company scores were somewhat resembling typical statistics 7.2203 and a standard deviation of 5.43474.

Table 3. Descriptive Statistics

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
COMPANY SIZE	177	23.99	32.26	29.3303	1.60643
LEVERAGE	177	.01	9.61	.6022	.74295
INSTITUTIONAL OWNERSHIP	177	.00	1.00	.7037	.25519
FOREIGN OWNERSHIP	177	.00	.99	.2402	.25644
NARSISSISM CEO	177	.00	5.00	4.2599	.87920
FAMILY OWNERSHIP	177	.00	1.00	.3404	.33436
WOMEN ON BOARD	177	.00	1.00	.2938	.45679
CARBON EMISSION DISCLOSURE	177	.00	17.00	7.2203	5.43474
Valid N (listwise)	177				

Source: proceed data

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Hypothesis Testing

Company size, leverage, institutional ownership, foreign ownership, CEO narcissism, family ownership, and women on the board are some of the independent variables that can be tested in this way, along with the dependent variable (carbon emissions disclosure). The significance level used is 5%, or 0.05.

1. Hypothesis testing 1: The Effect of Company Size on Carbon Emissions Disclosure

The first hypothesis looks at the question of whether or not businesses of various sizes disclose their carbon emissions. Based on the processed results, $T \text{ count} > t \text{ table}$ ($12.187 > 1.976$), with a significance level of $0.000 < 0.05$. This exemplifies how the firm-size variable enhances the transparency of carbon emission reporting. This means that the alternative hypothesis must be rejected. Generally speaking, data on carbon emissions is more readily available for larger companies.

2. Testing of hypothesis 2: The effect of leverage on carbon emission disclosure

For the second hypothesis, we test how various forms of leverage influence firms' disclosure of their carbon impact. The processing value was 3.102, although the value from the table was just 1.976. Calculated $t \text{ value} > t \text{ table}$ ($3.102 > 1.976$) requires a significance level of 0.002 less than 0.05 (0.002 < 0.05). As a result, the level of honesty in reporting carbon emissions is affected by the leverage variable. This demonstrates that the working hypothesis is correct. Leverage affects how openly companies report their emissions.

Table 4. Hypothesis Testing Results
Coefficients^a

Model		Unstandardized		Standardized	t	Sig.
		Coefficients		Coefficients		
		B	Std. Error	Beta		
1	(Constant)	-65.347	6.201		-10.539	.000
	Company SIZE	2.573	.211	.695	12.187	.000
	LEVERAGE	-4.201	1.354	-.177	-3.102	.002
	INSTITUTIONAL	.924	1.515	.037	.610	.543
	FOREIGN	1.423	1.363	.061	1.044	.298
	NARCISSISM CEO	-.402	.381	-.059	-1.055	.293
	FAMILY	-.328	.986	-.020	-.333	.740
	WOMANONBOARD OF DIRECTORS	.512	.676	.043	.758	.450

a. Dependent Variable: CED

Sumber: Data olahan SPSS versi 25

3. Hypothesis Testing 3: The Effect of Institutional Ownership on Carbon Emissions Disclosure

The third hypothesis investigates the impact of ownership types on carbon emission reporting. The statistical analysis generated a $t \text{ value}$ of 0.610 and compared it to the $t \text{ table}$, which was found to be 1.976%. Since the level of significance is at $0.543 > 0.05$, it indicates that institutional ownership has no association with precise reports on carbon emissions disclosures. Therefore, there is evidence that contradicts the third hypothesis suggesting that institutional ownership does not influence honest carbon emissions reporting; hence publication related to such data remains unaffected by this variable type.

4. Hypothesis Testing 4: The Effect of Foreign Ownership on Carbon Emissions Disclosure

Our fourth hypothesis examines the potential effect of foreign ownership on the transparency of carbon emission data. The results showed a $t \text{-value}$ of 1.044 via calculation and a $t \text{-value}$ of 1.976 by tabulation. The computed $t \text{ value}$ is $1.044 < 1.976$ at a $0.298 > 0.05$ significance level. This demonstrates that carbon emission claims are credible regardless of whether or not the company is owned by a

foreign entity. The fourth hypothesis is, therefore, false. There is no effect of foreign ownership on carbon emission reporting.

5. Testing of Hypothesis 5: The Effect of Family Ownership on Carbon Emissions Disclosure

This brings us to our fifth hypothesis, which looks into whether or not carbon emission disclosure is related to family ownership. After examining the data, we found that the t value was -333 and the t table was 1.976. According to the t -table t -value (333 1.976), the significance level is $0.740 > 0.05$. Thus, there is no evidence that carbon emissions are being reported accurately when owned by a family business. As a result, the sixth hypothesis cannot be correct. There is no relation between family ownership and the reporting of carbon emissions.

6. Hypothesis Testing 6: The Effect of CEO Narcissism on Carbon Emissions Disclosure

An examination of whether narcissistic CEOs are more inclined to disclose their organization's carbon footprint constitutes the sixth hypothesis. After analyzing the data, a t -value of -1.055 and a t -table of 1.976 were determined. T count t table = 1.055 1.976, $p = 0.293 > 0.05$, statistically significant. This suggests that the quality of carbon emissions disclosure is not much affected by CEO narcissism. The fifth hypothesis is therefore not supported. CEO narcissism does not impact carbon emission disclosure.

7. Testing of Hypothesis 7: The Effect of Women on the Board of Directors on Carbon Emissions Disclosure

The seventh hypothesis investigates the concept that family ownership is associated with less transparency regarding carbon emissions. The t -table value is above the 0.05 threshold (0.451 0.005) because the calculated t -value exceeds the t -table value by 0.758 (0.758 1.976). According to the findings, the proportion of female board members at agricultural and mining firms listed on the Indonesia Stock Exchange does not predict the accuracy of those firms' carbon emissions reports. This finding disproves the seventh theory. A company's reported carbon emissions do not affect the percentage of women serving on its board of directors.

DISCUSSION

The disclosure of carbon emissions in business is a complex and context-specific issue. Research by [Septriyawati & Anisah \(2019\)](#) indicates that different levels of transparency regarding a company's carbon footprint are required depending on its size, which is measured through metrics like total assets, revenue, and market capitalization. While companies are not legally obligated to disclose carbon emissions, they may voluntarily do so in annual or sustainability reports. [Jannah and Muid \(2014\)](#) found that larger corporations were more likely to adopt such disclosure practices. [Hermawan et al. \(2018\)](#) reached similar conclusions, which are supported by our study. Our results indicate that a corporation's size significantly influences whether its carbon emissions are disclosed. Larger enterprises typically report carbon emissions more accurately. This aligns with the findings of [Abdullah et al. \(2020\)](#), confirm that a company's size plays a crucial role in determining the extent of carbon emission disclosure.

Leverage, defined as the ratio of a company's assets to debt, is another factor that can impact carbon emission disclosure. It serves as a measure of the company's ability to handle both forms of debt ([Septriyawati & Anisah, 2019](#)). According to [Abdullah et al. \(2020\)](#), analyzing leverage in relation to assets and risks can help identify potential financial problems. Our study's findings that leverage influences carbon emission disclosure are consistent with previous research by [Wiratno and Muaziz \(2020\)](#), [Septriyawati and Anisah \(2019\)](#), and [Jannah and Muid \(2014\)](#). As discussed, companies with high leverage are more focused on reducing their debt burden than on fulfilling other

reporting obligations, which may explain their reluctance to disclose their carbon emissions in greater detail.

Institutional ownership, which refers to the large-scale ownership of a company's shares by institutions, is associated with more rigorous performance oversight, as these owners can closely monitor the company's management (Pratiwi, 2018). The third hypothesis of this study was tested to determine whether the size of institutional ownership influences the transparency of carbon emission disclosures. Prior research by Hermawan et al. (2018) has focused on institutional ownership and carbon emission disclosure, but their findings were not conclusive. Our study provides a more nuanced perspective, as Jannah and Muid (2014) found that institutional ownership significantly influences the level of carbon emission disclosure. However, the inconsistencies in the findings suggest the need for further research into the various factors that influence corporate sustainability reporting, such as the role of institutional investors in encouraging environmental responsibility.

Foreign ownership refers to when a significant portion of a company's shares is held by foreign individuals, organizations, or governments (Wiranata & Nugrahanti, 2013). Companies with foreign ownership often appoint foreign members to their boards, which could potentially influence the company's corporate social responsibility practices. However, this study contrasts with Rokhmawati's (2021) findings, which suggest that higher greenhouse gas emissions could harm foreign ownership and competitiveness. Jannah and Muid (2014) also found that the presence or absence of foreign ownership significantly moderates carbon disclosure practices and the overall value of the business. These differing perspectives underscore the complex relationship between foreign ownership and carbon emission reporting, warranting further investigation.

Family businesses, where ownership and management are controlled by family members, typically make decisions based on what is best for the family and ensuring the business remains sustainable for future generations (Jannah and Muid, 2014). Our study aligns with the findings of Anshari and Isnalita (2020), who also observed that the presence of family ownership had no significant impact on the accuracy of carbon emissions disclosure. However, these findings are in contrast to those of Gonzalez-Gonzalez and Zamora-Ramrez (2016), who identified a relationship between family ownership and improved carbon emission reporting. This discrepancy highlights the need for additional research to explore how family-controlled firms approach environmental transparency, as their decision-making priorities may differ from those of non-family firms.

Narcissism, a psychological trait marked by an excessive need for admiration and a lack of empathy, can influence decision-making at the corporate level (Liao et al., 2014). Our study builds upon previous research regarding CEO narcissism and its effect on carbon emission reporting. Contrary to Jannah and Muid's (2014) findings, which suggested that narcissistic CEOs are more likely to downplay their company's carbon footprint, our study confirms that narcissistic CEOs tend to understate the environmental impacts of their companies. Additionally, research by Petrenko et al. (2016) demonstrated that narcissistic CEOs often harm organizational ethics, which can negatively affect corporate responsibility practices. This suggests that leadership styles, particularly those characterized by narcissism, have significant implications not only for environmental reporting but also for broader organizational ethics and accountability. Therefore, addressing leadership dynamics is critical to fostering transparent and responsible business practices that align with stakeholder interests.

The gender composition of a board of directors also plays a role in decision-making, with diverse boards potentially offering more creative solutions and considering multiple perspectives before making decisions (Liao et al., 2014). However, our study found discrepancies with the findings of Petrenko et al. (2016), who argued that businesses with a higher proportion of women on their boards are more likely to disclose their carbon emissions. Contrary to their findings, we found no evidence to suggest that increased gender diversity led to greater carbon emission disclosure. Although Ben-Amar

et al. (2015) and Liao et al. (2014) also reached similar conclusions, our research could not determine whether the presence of women on boards has a positive effect on the sustainability reporting of companies, specifically in terms of the transparency of their greenhouse gas emissions. These mixed results indicate that the role of gender diversity in promoting corporate sustainability practices warrants further investigation to understand the underlying factors that contribute to the effectiveness of gender-diverse boards.

CONCLUSION

The study and discussions presented in the previous chapter lead to several key findings. First, the size of a company significantly influences its disclosure of carbon emissions. Larger corporations, with their more extensive operations and greater availability of information, are more likely to voluntarily disclose greenhouse gas (GHG) emissions as a means to reduce information asymmetry between the company and its stakeholders. Second, leverage also plays a role in carbon emissions reporting. Companies with lower leverage, which are typically more profitable, are more likely to make such disclosures, as they seek to demonstrate their ability to adapt swiftly to market changes and external demands. Third, the study found that institutional ownership does not play a significant role in carbon emissions disclosure. Previous research by Hermawan et al. (2018) supports this conclusion, as they also found no significant correlation between institutional ownership and the reporting of carbon emissions. Fourth, the presence or absence of foreign ownership does not appear to affect carbon emissions reporting, contradicting the findings of Ben-Amar et al. (2015), who found that foreign ownership impacted the relationship between carbon disclosure and market value.

Fifth, the identity of a company's owners, particularly in family-owned businesses, does not influence the decision to report carbon emissions. This aligns with the views of Chau and Gray (2010), who suggested that companies with majority shareholders and board members who are related may be less inclined to disclose information. This was confirmed by the study of Anshari and Isnalita (2020), which found no effect of family ownership on carbon emissions reporting. Sixth, the study also found that the narcissism of a company's CEO does not appear to deter or encourage the disclosure of carbon emissions, in contrast to the findings of Ben-Amar et al. (2015), who observed that narcissistic CEOs tend to increase ESG reporting. Lastly, the presence of women on the board of directors does not significantly impact carbon emissions disclosure, contrary to research by Ben-Amar et al. (2015), which indicated that gender diversity on boards contributes to better environmental disclosure. Overall, these findings suggest that while certain factors, such as company size and leverage, influence carbon emissions disclosure, other variables like institutional and foreign ownership, family control, CEO personality, and gender diversity on boards appear to have a less direct impact.

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