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Original Research

Determinants of Voluntary Carbon Disclosure in Indonesian Company: Greenwashing Risks

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Abstract

There is a greenwashing risk in voluntary carbon disclosure and there are no adequate regulations for stakeholder protection. So, there is a risk of providing information that can mislead stakeholders in making decisions. This research will analyze the determinants of carbon emission disclosure by considering the risk of greenwashing in Indonesian companies. This study also uses the ratification period of Presidential Regulation No.98 to analyze its contribution to the relationship between variables. It is necessary to study the role and ability of regulators to intervene in Indonesian companies. This study uses a random effect model to examine the influence between variables. The total data sample for this study is 876 (firm-years). This study also uses the Difference in Difference (DID) method to address the risk of endogeneity, and to evaluate the effect between research variables by adding the ratification period to Presidential Regulation No.98. Empirical results show that corporate governance has a positive effect on carbon emissions disclosure. Changes in carbon emissions has a positive effect on carbon emissions disclosure. The results show the period of ratification of Presidential Regulation No.98 can strengthen the relationship between corporate governance and carbon emissions disclosure, and can strengthen the relationship between changes in carbon emissions and carbon emissions disclosure when companies fail to mitigate carbon emissions.

Keywords: DID Methods, Government Policy and Regulation, Greenwashing Risk, Sustainability, Voluntary Disclosure.

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Introduction

The carbon emissions produced by Indonesia are dominated by the energy sector and the AFOLU (agricultural, forestry and other land use) sector (Central Bureau of Statistics, 2021). Carbon emissions from these two sectors are closely related to all activities carried out by business entities in Indonesia. Business entities are one of the main parties causing extreme climate change, because their activities produce a lot of greenhouse gases and have an impact on people's quality of life. The company's accountability and transparency regarding carbon emissions are important for the company's stakeholders.

Companies are not only expected to contribute to the country's economic growth, but also contribute to adequately address environmental and social problems. The ratification of the Presidential Regulation (Perpres) No.98 of 2021 is the government's effort to address the problem of carbon emissions and also encourage increased financing of green investment. However, until now the carbon emissions disclosure in Indonesia is still voluntary.

There are no policies and regulations that explicitly require companies in Indonesia to disclose all information about carbon emissions in company reports based on certain standards. This situation causes various disclosure techniques for each company, even quite a number of companies do not adequately disclose all carbon emission information in the required reports.

Based on stakeholder theory in the instrumental aspect, it indicates that companies with good environmental performance will publish these achievements and vice versa (Giannarakis et al., 2017; Velte et al., 2020). In contrast to socio-political theory which indicates that companies with poor environmental performance, will make more disclosures to gain stakeholder sympathy (Fontana et al., 2015; Doan & Sassen, 2020).

Thus, the weakness of regulations related to carbon disclosure in Indonesia can mislead stakeholders in making decisions, due to the risk of greenwashing by companies. The results of research by Wedari et al., (2021) indicate greenwashing can occur due to the weakness of the entire system, both from the side of the company as a producer, the community as a consumer, the government as a regulator, and market needs. The company establishes an environmentally friendly image as a good communication and marketing strategy.

For companies, an environmentally friendly identity becomes important due to pressure from the market by investors, consumers and competitors (Gil-Cordero et al., 2020). However, stakeholders sometimes do not pay attention to the way the company takes to achieve these goals. Many consumers support the green movement without first analyzing the actions taken by producers (Uyar et al., 2020). This is because consumers are too optimistic about what producers offer and have a narrow understanding of environmental concerns.

In terms of regulation, the existing regulations are still loose to regulate environmental movements. This is followed by regulators who still do not provide space for participation for organizations, non-governmental organizations, and environmental activists in the process of monitoring, soliciting aspirations, and making environmental regulations, especially regarding greenwashing. This condition provides an opportunity for entities to carry out greenwashing which can mislead stakeholders. Research by Cowan & Deegan (2011); Tauringana & Chithambo (2015); Grauel & Gotthardt (2016); Guenther et al., (2016) prove that policies and regulations can intervene in the actions and decisions of companies, especially the issue of carbon emissions and carbon disclosure.

Greenwashing is also motivated by the company's obligation to realize the sustainable development goals (SDGs) determined by the United Nations. Greenwashing can make companies seem sustainable in their accountability reports on SDGs (Kalesnik et al., 2021). Greenwashing can be done by exaggerating the impact that is actually small, including activities that are actually normally carried out by companies as innovations to achieve the SDGs, or even inserting things that are not related to these achievements (Mateo-Márquez et al., 2021). Voluntary environmental disclosure is a medium that companies can use for greenwashing.

Research by Wedari et al., (2021) investigated the issue of greenwashing in the relationship between voluntary environmental disclosures and actual environmental performance of Australian companies. The study found evidence that companies with poor environmental performance have the potential to do greenwashing to change the negative perceptions of stakeholders. On the other hand, there is no evidence of greenwashing practices in companies with good environmental performance. This study supports the need for further regulation, including mandatory environmental disclosures and punitive measures to address the issue of greenwashing in corporate voluntary reporting.

Only a few studies have considered the issue of greenwashing in investigating the relationship between actual environmental performance and voluntary environmental disclosures of companies, especially for Indonesia, is one of the motivations for this study. The last study using Indonesian company data by Ratmono et al., (2021) only examined the relationship between carbon performance and disclosure of carbon emissions. Thus, voluntary carbon disclosure in Indonesia still raises controversial questions. Are regulations and policies in Indonesia sufficient to encourage carbon control and achieve NDC (Nationally Determined Contribution) targets. Is the company's carbon disclosure relevant to the company's ability to reduce carbon emissions. Is carbon disclosure by companies as an effort to gain legitimacy and fulfill responsibilities to stakeholders or as greenwashing which aims to cover up the company's failure to mitigate environmental damage.

Literature Review

Determinants of Carbon Emission Disclosure

The determinants of carbon disclosure have been extensively investigated by researchers. From the factor of company features, previous research examines the relationship between company size and disclosure of carbon emissions. The findings show that company size has a positive effect on the level of carbon disclosure (Freedman & Jaggi, 2005; Prado-Lorenzo et al., 2009; Prado-Lorenzo & Garcia-Sanchez, 2010;

Rankin et al., 2011; Cotter & Najah, 2012; Luo et al., 2012; Stanny, 2013; Ben-Amar & McIlkenny, 2015; Eleftheriadis & Anagnostopoulou, 2015; Liao et al., 2015; Peng et al., 2015; Tauringana & Chithambo, 2015; Gonzalez-Gonzalez & Ramirez, 2016; Faisal et al., 2018; Giannarakis et al., 2018; Li et al., 2018; Akbaş & Canikli, 2019; Iswati & Setiawan, 2020; Ratmono et al., 2021).

Other company characteristic factors such as profitability has a positive effect on carbon disclosure (Prado-Lorenzo et al., 2009; Gonzalez-Gonzalez & Ramirez, 2016; Faisal et al., 2018; Akbaş & Canikli, 2019). Market value has a positive effect on the level of disclosure (Akbaş & Canikli, 2019). The ratio of foreign sales has a positive effect on carbon disclosure (Stanny & Ely, 2008; Stanny, 2013; Gonzalez-Gonzalez & Ramirez, 2016; Halkos & Skouloudis, 2016). Disclosure history has a positive effect on disclosure of carbon emissions (Stanny & Ely, 2008; Stanny, 2013; Peng et al., 2015). Company reputation has a positive effect on disclosure of carbon emissions (Akbaş & Canikli, 2019). Leverage ratio has a negative effect on disclosure of carbon emissions (Tauringana & Chithambo, 2015; Ben-Amar et al., 2017; Faisal et al., 2018; Iswati & Setiawan, 2020; Ratmono et al., 2021). Financial performance has a positive effect on disclosure of carbon emissions (Andrian & Kevin, 2021).

Corporate governance factors such as board independence has a positive effect on disclosure of carbon emissions (Amran et al., 2014; Liao et al., 2015; Jaggi et al., 2018; Krishnamurti & Velayutham, 2018; He et al., 2019). Female directors has a positive effect on disclosure of carbon emissions (Prado-Lorenzo & Garcia-Sanchez, 2010; Liao et al., 2015; Ben-Amar et al., 2017; Krishnamurti & Velayutham, 2018; Hollindale et al., 2019). Board size has a positive effect on disclosure of carbon emissions (Tauringana & Chithambo, 2015; He et al., 2019; Iswati & Setiawan, 2020). Board size has a negative effect on disclosure of carbon emissions (Prado-Lorenzo & Garcia-Sanchez, 2010). CEO-Chair duality has a positive effect on disclosure of carbon emissions (Prado-Lorenzo & Garcia-Sanchez, 2010). CEO-Chair duality has a negative effect on disclosure of carbon emissions (Amran et al., 2014; Krishnamurti & Velayutham, 2018; He et al., 2019). The Environmental Committee has a positive effect on disclosure of carbon emissions (Rankin et al., 2011; Peters & Romi, 2014; Liao et al., 2015; Córdova et al., 2018; Jaggi et al., 2018). The independent risk management committee has a positive effect on disclosure of carbon emissions (Krishnamurti & Velayutham, 2018). The effectiveness of the board of directors has a positive effect on the disclosure of carbon emissions (Ben-Amar & McIlkenny, 2015). Corporate governance has a positive effect on disclosure of carbon emissions (Elsayih et al., 2018; Nasih et al., 2019; Andrian & Kevin, 2021).

In terms of environmental factors, research by Chu et al., (2013); Amran et al., (2014); Peng et al., (2015); Halkos & Skouloudis (2016); Ben-Amar et al., (2017); Ott et al., (2017); Jaggi et al., (2018); He et al., (2019); Lemma et al., (2019); Luo (2019) found that companies with high carbon emissions also has high carbon disclosure. In contrast to research by Dawkins & Fraas (2011); Gallego-Álvarez et al., (2011); Tauringana & Chithambo (2015); Guenther et al., (2016); Giannarakis et al., (2017); Giannarakis et al., (2018) found that companies with low carbon emissions has high carbon disclosure. Other studies found environmental performance has a negative effect on corporate environmental disclosure (Hughes et al., 2001; Patten, 2002; Cho & Patten, 2007; Clarkson et al., 2011; Cho et al., 2012; Meng et al., 2014). In contrast to research by Luo

& Tang (2014); Giannarakis et al., (2017) found carbon performance has a positive impact on corporate carbon disclosure. Andrian & Kevin (2021) found companies with green strategies and high disclosure of social responsibility has high levels of carbon disclosure. In contrast to other studies that found carbon performance has no significant effect on carbon disclosure (Stanny & Ely, 2008; Kim & Lyon, 2011; Freedman & Jaggi, 2011; Rohani et al., 2021; Ratmono et al., 2021).

In terms of institutional characteristic factors, the government regulations related to the environment has a positive impact on the level of carbon disclosure (Reid & Toffel, 2009; Grauel & Gotthardt, 2016; Guenther et al., 2016). In contrast to research by Luo (2019) found government regulations has a negative effect on the level of carbon disclosure. Research by Cowan & Deegan (2011); Tauringana & Chithambo (2015) found policies and regulations has a positive effect on the level of carbon disclosure. Other studies found the Kyoto protocol has a positive impact on carbon disclosure (Freedman & Jaggi, 2005; Freedman & Jaggi, 2011; Gallego-Álvarez et al., 2011). Research by Luo et al., (2012); Liesen et al., (2015); Luo (2019); Schiemann & Sakhel (2019) found the existence of a carbon trading market can has a positive impact on the level of carbon disclosure. Research by Rankin et al., (2011); Qian et al., (2018) found environmental management systems has a positive effect on the level of carbon disclosure. Other studies found the corporate social responsibility has a positive effect on carbon disclosure (Halkos & Skouloudis, 2016; Giannarakis et al., 2018). Research by Giannarakis et al., (2018); He et al., (2019) found state-owned enterprises has a high level of carbon disclosure. In contrast to research by Chu et al., (2013) found state-owned enterprises has a low level of carbon disclosure.

In terms of stakeholder factors, research by Cotter & Najah (2012); Sullivan & Gouldson (2012); Liesen et al., (2015); Gonzalez-Gonzalez & Ramirez (2016); Kalu et al., (2016); Tang & Demeritt (2018); He et al., (2019) found stakeholder pressure to has a positive effect on the level of carbon disclosure. Other studies found the media coverage has a positive effect on the level of carbon disclosure (Guenther et al., 2016; Li et al., 2017; Li et al., 2018).

All of these determinants have been shown to has a large impact on the carbon emission disclosure. However, there is still controversy regarding the determinants of carbon disclosure, especially corporate governance factors and carbon or environmental performance factors.

Corporate Governance and Carbon Emissions Disclosure

The relationship between corporate governance and carbon emissions disclosure raises various perspectives regarding the findings obtained by previous researchers. On corporate governance factors, research by Tauringana & Chithambo (2015); He et al., (2019); Iswati & Setiawan (2020) found the structure of corporate governance, such as board size, has a positive effect on disclosure of carbon emissions. In contrast to research by Prado-Lorenzo & Garcia-Sanchez (2010) found board size has a negative effect on disclosure of carbon emissions. Other corporate governance structures such as CEO-Chair duality has a positive effect on disclosure of carbon emissions (Prado-Lorenzo & Garcia-Sanchez, 2010). Other studies found the CEO-Chair duality has a negative effect

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on carbon emissions disclosure (Amran et al., 2014; Krishnamurti & Velayutham, 2018; He et al., 2019). Corporate governance has a positive effect on disclosure of carbon emissions (Elsayih et al., 2018; Nasih et al., 2019; Andrian & Kevin, 2021).

Change in Carbon Emissions and Carbon Emissions Disclosure

The relationship between changes in carbon emissions and disclosure of carbon emissions raises various perspectives regarding the findings obtained by previous researchers. Research by Luo & Tang (2014); Giannarakis et al., (2017) found carbon performance has a significant effect on carbon emissions disclosure. In contrast to research by Stanny & Ely (2008); Kim & Lyon (2011); Freedman & Jaggi (2011); Rohani et al., (2021); Ratmono et al., (2021) found carbon performance has no effect on carbon emissions disclosure. Research by Hughes et al., (2001); Patten (2002); Cho & Patten (2007); Clarkson et al., (2011); Cho et al., (2012); Meng et al., (2014) found environmental performance has a negative effect on environmental disclosure.

A recent study by Wedari et al., (2021) investigated the issue of greenwashing in the relationship between voluntary environmental disclosure and environmental performance in Australian companies. The study found the companies with poor environmental performance has the potential to carry out greenwashing to change negative stakeholder perceptions. On the other hand, there is no evidence of greenwashing practices in companies with good environmental performance. This study supports the need for further regulation, including mandatory environmental disclosures and the existence of penalties to address greenwashing in corporate voluntary reporting.

There are 2 theories in the literature that are usually used to investigate the issue of greenwashing and explain the relationship between the level of voluntary environmental disclosure and actual environmental performance (Wedari et al., 2021). The first is socio-political theory, which suggests that companies with poor environmental performance will disclose more environmental information to stakeholders (Al-Tuwaijri et al., 2004; Clarkson et al., 2008; Iatridis, 2013; Luo & Tang, 2014; Oates & Moradi-Motlagh, 2016; Giannarakis et al., 2017; Tadros & Magnan, 2019; Datt et al., 2019; Velte et al., 2020). The second is voluntary disclosure theory, indicating that companies with good environmental performance will disclose more environmental information to their stakeholders (Cho et al., 2006; De Villiers & Van Staden, 2006; Dawkins & Fraas, 2011; Fontana et al., 2015; Doan & Sassen, 2020).

Hypothesis Development

Corporate Governance and Carbon Emission Disclosure

Stakeholder theory indicates that the company will carry out business activities and make decisions that are relevant to stakeholder expectations. External pressures from corporate stakeholders, namely customers, government, investors, non-governmental organizations, local communities, and the media tend to increase steadily regarding social and environmental issues (Miklosik et al., 2021). Companies are expected to be able to carry out business activities and make decisions that are relevant to sustainable development goals (Arslan et al., 2022).

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Corporate governance practices are very important when considering the extent to which companies are proactive in addressing social and environmental issues, particularly climate change. Transparency of carbon disclosure in several countries, especially Indonesia is still voluntary. There are still many companies that do not make adequate disclosures, because there are no rules and standards that can be used as mandatory references for companies. This situation can mislead stakeholders in making decisions. In addition, voluntary disclosure is also vulnerable to greenwashing practices that may be carried out by companies.

Companies with a strong governance structure tend to be more proactive in adequate accountability and transparency in carbon disclosure. This is because companies have a broader perspective regarding the long-term benefits that companies can obtain from implementing responsibility and transparently disclosing environmental information. Thus, implementing adequate corporate governance is an important thing that can be implemented by companies to achieve the expected goals.

The author will review the relationship between corporate governance and carbon disclosure, because previous research results show inconsistent findings. This may be caused by differences in mechanisms for determining carbon emission disclosure based on cultural, environmental and market aspects. By conducting this research, you can narrow the gap in previous research results. In particular, this research can contribute to the limited literature review that investigates the relationship between corporate governance and carbon emissions disclosure in Indonesian companies. In Indonesian companies, research related to this relationship was only carried out by Nasih et al., (2019); Andrian & Kevin (2021).

Their research is also limited to companies in the consumer goods, mining and agriculture sectors, so the results of this research cannot be generalized to all Indonesian companies. This study does not limit the research population to certain sectors. It is possible for all companies from various sectors to become research samples. In addition, this research will consider the ratification of Presidential Regulation No. 98 of 2021 as an important part of research, but don't ignore other periods. The data was taken from 2017 to 2022 after the Paris agreement was signed by Indonesia in 2016. The following is the hypothesis that the author proposes:

Hypothesis 1. Corporate governance has a positive effect on carbon emissions disclosure.

Changes in Carbon Emissions and Carbon Emission Disclosure

Referring to the theory of stakeholders that indicate that the company will carry out actions and make decisions that are relevant to the expectations of stakeholders. In the current era the company is expected to contribute to achieving sustainable development goals. In this case the company does not only focus on achieving adequate financial performance. However, companies also need to create a business environment that cares about social and environmental aspects. One form of company concern for social and environmental aspects can be applied through the achievement of adequate carbon performance.

The company's ability to adequately mitigate carbon emissions is part of the company's accountability to stakeholders. The accountability practice is expected to be relevant to transparency in providing environmental information to stakeholders. The relevance between accountability and transparency practices is very important for stakeholders in order to make the right decisions. In Indonesia, the practice of disclosure of environmental information, especially the disclosure of carbon is still voluntary. Many companies may have good carbon performance, but do not carry out adequate carbon disclosure techniques. Maybe many companies have poor carbon performance, but do adequate disclosure techniques to be seen as a green company. Thus, the problem of greenwashing is very vulnerable to occur in the practice of carbon disclosure in Indonesian companies.

There are two theories in the literature that are usually used to investigate the problem of greenwashing and explain the relationship between the level of voluntary environmental disclosure and actual environmental performance. First is the socio-political theory, indicating that companies with poor environmental performance will reveal more environmental information to stakeholders. Second is stakeholder theory in the instrumental aspect, indicating that companies with good environmental performance will reveal more environmental information to stakeholders.

The relationship between actual environmental performance and the level of environmental disclosure has attracted the attention of many researchers and has produced various findings. Such variations may be due to different environmental performance proxies, different standards and guidelines for the level of environmental disclosure, and the socio-political status and regulations of each country.

In addition, the limitations of research on the issue of greenwashing in investigating the relationship between environmental performance and corporate voluntary environmental disclosures, especially for the State of Indonesia, motivated the authors to investigate this issue. The recent study by Ratmono et al., (2021) only investigated the relationship between carbon performance and carbon disclosure in Indonesian companies, but did not consider the risk of greenwashing. The following is the hypothesis that the author proposes:

Hypothesis 2a. Companies with decreased carbon emissions will provide higher carbon disclosure than companies with increased carbon.

Hypothesis 2b. Companies with increased carbon will provide higher carbon disclosure than companies with decreased carbon.

Results that support H2b can be interpreted as evidence of greenwashing.While the results that support H2a can be interpreted as evidence of no greenwashing.

Research Methods

This research will use the ASEAN corporate governance scorecard. Proxies are also relevant for use in this study, because Indonesia is part of ASEAN countries. The ASEAN corporate governance scorecard consists of 5 areas based on OECD (Organization of Economic Co-operation and Development) principles. All these fields consist of 185 question items. Change in carbon emissions variable are used in this study to identify the risk of greenwashing in Indonesian companies. The method of measuring the change in carbon emissions variable in this study refers to research by Wedari et al., (2021). This study will evaluate the carbon disclosure of Indonesian companies using a checklist and measuring method adopted from Tang et al., (2019).

The population in this study are all companies listed on the Indonesian stock exchange (excluding financial companies) which has sustainability reports from 2017 to 2022 totaling 146 companies. This population was chosen because most of the carbon information can only be found in sustainability reports, so its relevant to this research. The period from 2017 to 2022 is the period after the Paris agreement was signed by Indonesia in 2016. The sample in this study is all of the population, totaling 146 companies. Thus, the total sample data for this study is 876 (company-year).

This study uses a random effect model in analyzing the relationship between variables. The random effect model is a model used to overcome the weaknesses that occur in the fixed effect model. This is because the fixed effect model is considered to reduce parameter efficiency, because it has the consequence of reducing the degree of freedom. The robustness test is used to validate the research results.

This study also uses the Difference in Difference (DID) method to evaluate the effect between research variables by adding the period of ratification of Presidential Regulation No.98. The DID method was also used to overcome endogeneity problems that might occur in this study. The baseline period for the ratification of Presidential Regulation No.98 is 2022. This period is the period after the ratification of Presidential Regulation No.98.

The baseline period will be compared one by one with the other periods in this study, where in this study the observation period is from 2017 to 2022. Through the DID analysis, it is also known what the impact of the ratification of Presidential Regulation no. 98 in the relationship between the analyzed variables.

Results and Discussions

Results

The empirical results for corporate governance, changes in carbon emissions, and carbon emissions disclosure are presented in table 1.

Empirical results show an increase in corporate governance can increase carbon emissions disclosure by 0.544. An increase in change in carbon emissions can increase carbon emissions disclosure by 0.988. An increase in firm size can increase carbon emissions disclosure by 2,022. An increase in industry can increase carbon emissions disclosure by 0.933. An increase in growth of company can increase carbon emissions disclosure by 0.772. These results show that large companies with adequate corporate governance practices and good growth rates will carry out more adequate carbon disclosure. Companies that produce the largest carbon emissions and fail to mitigate carbon emissions will carry out more adequate carbon disclosures.

Table 1. Empirical Results of Corporate Governance, Change in Carbon Emissions, Carbon Emission Disclosure and Control Variables

Variable	Carbon Diclosure Voluntary (CDV)			
	Coef.	std.error	t-value	p-value
Corporate Governance (CG)	0.544	0.137	3.233	0.001
Change in Carbon Emissions (CEP)	0.988	0.679	3.054	0.005
Firm Size	2.022	1.789	2.831	0.010
Firm Leverage	-1.144	1.033	-1.500	0.344
Media Exposure	-1.098	0.991	-0.996	0.467
Industry	0.933	0.657	2.371	0.023
Intensity of Capital	1.002	0.938	1.144	0.401
Growth of Company	0.772	0.651	2.087	0.034
N	876 (Company-Year)			
Adjusted R^2	0.491			
F Value	9.135			
Sig.	0.000			

Discussion of Results

Corporate Governance and Carbon Disclosure Voluntary

Based on empirical results, it shows that the first hypothesis is accepted. Corporate governance has a positive effect on carbon emission disclosure in Indonesian companies. These results are relevant to stakeholder theory which indicates that companies with good stakeholder management will make decisions that are relevant to stakeholder expectations. Stakeholder expectations are not limited to achieving adequate financial performance. Companies also have a responsibility to carry out business activities that are relevant to sustainable development goals.

Overcoming climate change is one of the most important sustainable development goals. Indonesia has an NDC target that must be achieved by 2030. Indonesia invites all people, especially business entities, to contribute to mitigating carbon emissions. Companies with adequate corporate governance have a broader perspective regarding environmental and social issues. The company feels it has a big responsibility towards its stakeholders. To get stakeholder support, the company will carry out business activities and make decisions that are relevant to ethical values.

The majority of Indonesian companies in the research sample have implemented corporate governance that is relevant to certain standards, for example the ASEAN corporate governance scorecard. Research findings show that companies with adequate governance practices based on the ASEAN corporate governance scorecard have a great opportunity to be more transparent in their carbon disclosures. This is because the ASEAN corporate governance scorecard standard is not limited to accountability and transparency of company management towards shareholders, but also other stakeholders, such as society, consumers, government and others. The ASEAN corporate governance scorecard standard is also not limited to management responsibility in managing business to generate company profits, but also management responsibility in environmental and social aspects. It is very relevant that companies with adequate corporate governance practices tend to adopt adequate disclosure practices to attract stakeholder attention.

The results of this study are also relevant to research by Elsayih et al., (2018); Nasih et al., (2019); Andrian & Kevin (2021) found corporate governance has a positive effect on carbon disclosure. Amran et al., (2014); Liao et al., (2015); Jaggi et al., (2018); Krishnamurti & Velayutham (2018); He et al., (2019) found corporate governance factors such as board independence has a positive effect on carbon disclosure. Prado-Lorenzo & Garcia-Sanchez (2010); Liao et al., (2015); Ben-Amar et al., (2017); Krishnamurti & Velayutham (2018); Hollindale et al., (2019) found corporate governance factors such as female directors has a positive effect on disclosure of carbon emissions. Tauringana & Chithambo (2015); He et al., (2019); Iswati & Setiawan (2020) found corporate governance factors such as board size has a positive effect on disclosure of carbon emissions.

Prado-Lorenzo & Garcia-Sanchez (2010) found corporate governance factors such as CEO-Chair duality has a positive effect on disclosure of carbon emissions. Rankin et al., (2011); Peters & Romi (2014); Liao et al., (2015); Córdova et al., (2018); Jaggi et al., (2018) found corporate governance factors such as the environment committee has a positive effect on disclosure of carbon emissions. Krishnamurti & Velayutham (2018) found corporate governance factors such as the independent risk management committee has a positive effect on disclosure of carbon emissions. Ben-Amar & McIlkenny (2015) found corporate governance factors such as the effectiveness of the board of directors has a positive effect on carbon emissions disclosure.

Change in carbon emissions and Carbon Emissions Disclosure

Based on empirical results, it shows that hypothesis 2b is accepted. Companies with increased carbon will provide higher carbon disclosures. The change in carbon emissions variable has a positive sign, which indicates that the majority of Indonesian companies in the research sample failed to mitigate carbon emissions. These results are relevant to socio-political theory which indicates that large companies that fail to mitigate carbon emissions will try to maintain the company's good name and the trust of their stakeholders.

Promotion as a green company and adopting adequate carbon disclosure practices are ways that companies can attract the attention of stakeholders. In contrast, companies with negative changes in carbon emissions have the potential to not carry out adequate carbon disclosure techniques, because there are no mandatory rules and standards that form the basis for companies to do this. The results of this study also reject hypothesis 2a. Voluntary environmental disclosure has weaknesses, namely the potential for greenwashing that can be carried out by companies.

The findings of this research show that the majority of Indonesian companies in the research sample have failed to mitigate carbon emissions, because the value of the change in carbon emissions variable has a positive sign. Then Indonesian companies, which are among the largest carbon emitting industries, tend to adopt more adequate carbon disclosure practices. Thus, most of the Indonesian companies sampled in this research could potentially carry out greenwashing to appear as green companies. Promotion through the media and adequate carbon disclosure are tools that can be used to eliminate the label of environmentally destructive companies. There is no guarantee that the company has actually succeeded in mitigating carbon emissions.

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The role of regulators is very important to overcome this problem. Until now there are no specific regulations that require companies to mitigate carbon emissions and disclose them according to certain standards. So there is no tool to compare each company's ability to mitigate carbon emissions. There are companies that are able to mitigate carbon emissions, but do not implement adequate disclosure techniques. In contrast, there are companies that fail to mitigate carbon emissions, but implement adequate disclosure and promotion to be seen as green companies.

The results of this study are relevant to the research of Wedari et al., (2021) found the potential for greenwashing in Australian companies with poor environmental performance. In contrast, no greenwashing potential was found in Australian companies that has decreased carbon emissions. The results of this study are relevant to socio-political theory which indicates that companies with poor environmental performance will try to change the negative perceptions of stakeholders and try to reduce the risk of information asymmetry. This research supports the need for further regulation, including mandatory environmental disclosures and punitive measures to address greenwashing issues in corporate voluntary reporting.

Robustness Test

Corporate Governance and Carbon Emission Disclosure Period of Ratification Presidential Regulation No.98

The results of the robustness test for corporate governance and carbon emission disclosure period of ratification Presidential Regulations No.98 is stated in table 2.

Table 2. Empirical Results of Corporate Governance and Carbon Emission Disclosure Period of Ratification Presidential Regulation No. 98

Variable	Carbon Disclosure Voluntary				
	t-value				
	2017	2018	2019	2020	2021
Regulation Period	2.113**	2.040**	2.071**	2.039**	3.423**
Corporate Governance	2.462**	2.330**	2.196**	2.040**	2.571**
Interaction of Regulation Period and CG	3.037**	3.221**	2.468**	2.117**	3.106**
Firm Size	0.988	1.871	2.006**	2.121**	2.676**
Firm Leverage	-1.233	-1.101	-0.912	-0.667	-0.943
Media Exposure	-0.673	-0.885	-1.237	-1.450	-1.714
Industry	3.105**	2.671**	2.303**	2.003**	2.844**
Intensity of Capital	1.334	1.205	1.443	1.712	1.450
Growth of Company	3.115**	2.055**	2.118**	2.030**	2.107**
**(significant)					

The robustness results with 2022 as the baseline period show quite consistent results. Especially for corporate governance, interaction of regulation and CG, regulation period, industry, and growth of company variables. These results indicate that the ratification of Presidential Regulation No.98 played a role in influencing the relationship between

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corporate governance and carbon emissions disclosure in Indonesian companies. Ratification of Presidential Regulation No. 98 can strengthen the relationship between corporate governance and carbon emissions disclosure. Consistently large companies with adequate corporate governance practices will carry out carbon disclosures. Companies with good growth rates and those in the largest carbon emitting industries will carry out carbon disclosure.

Change in Carbon Emission and Carbon Emission Disclosure Period of Ratification Presidential Regulation No.98

The results of the robustness test for change in carbon emissions and carbon emission disclosure period of ratification Presidential Regulations No.98 are stated in table 3.

Table 3. Empirical Results of Change in Carbon Emission and Carbon Emission Disclosure Period of Ratification Presidential Regulation No.98

Variable	Carbon Disclosure Voluntary				
	t-value				
	2017	2018	2019	2020	2021
Regulation Period	2.821**	2.638**	2.411**	3.101**	3.530**
Change in Carbon Emission (CEP)	3.202**	2.566**	2.605**	-1.998**	-2.257**
Interaction of Regulation Period and CEP	2.882**	2.413**	3.114**	-1.638	-1.455
Firm Size	3.412**	3.122**	2.677**	2.550**	2.011**
Firm Leverage	-0.774	-1.211	-1.353	-0.880	-0.814
Media Exposure	-0.662	-0.783	-0.884	1.020	0.977
Industry	2.237**	3.032**	1.677	1.255	2.510**
Intensity of Capital	0.836	0.847	1.280	1.015	0.971
Growth of Company	2.101**	2.433**	2.751**	2.673**	2.440**
**(Significant)					

The robustness results with 2022 as the baseline period show inconsistent results. Especially for change in carbon emissions, interaction of regulation period and CEP, and industry variables. These results indicate that the ratification of Presidential Regulation No.98 can strengthen the relationship between changes in carbon emissions and carbon emissions disclosure in certain circumstances. These results consistently show that large companies with good growth rates, but fail to mitigate carbon emissions, will carry out more adequate carbon disclosures.

Further Analysis

This study used the DID (difference in difference) method in conducting the robustness test. This research also wants to see the ratification of Presidential Regulation No. 98 of 2021 can strengthen or weaken the relationship between corporate governance, change in carbon emission, and carbon emission disclosure. The DID method was also used to overcome endogeneity problems that might occur in this study. The baseline period of ratification of Presidential Regulation No.98 is 2022. This period is the period after the

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ratification of Presidential Regulation No.98 which will be compared one by one with the other periods in this study. The observation period in this study is from 2017 to 2022.

The robustness test results of corporate governance and carbon emission disclosure indicate that the ratification of presidential regulation No.98 can strengthen the relationship between corporate governance and disclosure of carbon emissions. These results are consistent every time the test is carried out per period with 2022 as the baseline period. This shows that the company considers the government as an important stakeholder in managing business and making decisions. The company will adjust its business activities to the applicable standards and regulations to gain legitimacy from stakeholders, especially the government, to maintain business continuity in the long term.

This is good because through regulations made by the government, the government can control companies. Activities and decision-making by companies can be directed to be relevant to the government's goals to achieve NDC targets and adequately achieve sustainable development goals. Environmental disclosure, especially carbon information in Indonesia is still voluntary. Further regulations are needed regarding environmental disclosure obligations based on certain standards to mitigate greenwashing risks and other risks that can mislead stakeholders in making decisions.

The results of the robustness test for change in carbon emissions and carbon emission disclosure indicate that the ratification of Presidential Regulation No. 98 can strengthen the relationship between change in carbon emissions and carbon emission disclosure in certain circumstances. The test results are inconsistent for each observation period with 2022 as the baseline period. The results of the robustness test show the period of ratification of Presidential Regulation No.98 can strengthen the relationship between variables when change in carbon emission has a positive effect on carbon emission disclosure.

Meanwhile, when changes in carbon emissions have a negative effect on carbon emissions disclosure, the period of ratification of Presidential Regulation No.98 has no impact on the relationship between these variables. The negative impact between the relationship changes in carbon emissions and carbon emissions disclosure occurred in 2020 and 2021. Those years were the extreme period of the Covid-19 pandemic which caused an economic crisis and many company activities stopped. So, the company's first focus in 2020 and 2021 will be on financial recovery, not on environmental aspects. Then in 2022 there is a positive relationship between change in carbon emissions and carbon emissions disclosure.

Overall, there is a risk of greenwashing in voluntary carbon disclosure practices in Indonesian companies. Companies that fail to mitigate carbon emissions will implement more adequate environmental information disclosure techniques to be seen as green companies and transparent in their business activities. While companies that have succeeded in mitigating carbon emissions, do not disclose this information because there are no mandatory standards that can be used as a reference in carbon disclosure practices. Environmental disclosure, especially disclosure of carbon information in Indonesia is still voluntary.

This proves that current regulations in Indonesia are not sufficient to make companies carry out adequate carbon mitigation and disclosure practices. Ratification of Presidential Regulation No. 98 regulates the application of carbon economic values to achieve national NDC targets and control greenhouse gas emissions in national development. However, it does not regulate the company's obligation to disclose carbon emissions according to certain standards and regulations. This situation can mislead stakeholders in making decisions.

Conclusion

The results of this study indicate that voluntary carbon disclosure in Indonesia is influenced by the principles of corporate governance and the ability of companies to mitigate carbon emissions. Companies that fail to mitigate carbon emissions are more at risk of carrying out greenwashing actions through carbon disclosure, compared to companies that succeed in mitigating carbon emissions. This is because carbon disclosure in Indonesia is still voluntary. There are no regulations requiring Indonesian companies to disclose carbon information according to specific standards. This can also have a impact on the perception of company management in carrying out carbon disclosures. Carbon disclosure can be used as a tool to gain stakeholder trust and achieve certain goals. The findings of this research are relevant to socio-political theory which indicates that all business activities and decision making by company management can be influenced by the interests to be achieved. In this case, companies with increased carbon emissions in the current year will adopt more adequate carbon disclosure techniques. The role of the regulator also influences this, because the regulator is part of the company's stakeholders. Company management will adjust all relevant business activities and decision making to stakeholder expectations. Adequate corporate governance practices can influence management's perspective in making choices. Companies have the motivation to adopt ethical actions that can provide benefits in the long term. This is relevant to the concept of stakeholder theory which indicates that companies with good stakeholder management can survive for a long time. This research supports the need for further and adequate regulation related to carbon emission mitigation, including mandatory environmental disclosures and punitive measures to address greenwashing issues in corporate voluntary reporting. It is hoped that future research can complement the weaknesses in this research which only focuses on the role of current regulations in influencing the relationship between variables. The risk of greenwashing in this research has also not been discussed in depth. This research is limited to proving the existence of greenwashing risks in Indonesian companies, but has not fully explored this problem in depth.

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