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Original Research

Consequences of Carbon Disclosure in Indonesian Company: Requires Adequate Regulations

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Abstract

Previous research found that companies that fail to mitigate carbon emissions will make higher carbon disclosures than companies that successfully mitigate carbon emissions, and companies will also make decisions that are relevant to applicable regulations and policies. This research will explore the stakeholder perspective in assessing the company. This stakeholder perspective will determine whether more adequate regulations are needed to address the problem of greenwashing and stakeholder protection. This research will also explore whether the transparency of carbon information carried out by companies is directly proportional to the accountability for mitigating carbon emissions and whether current environmental regulations are able to motivate companies to mitigate environmental pollution. The results of the study found carbon emission disclosures have a positive effect on financial performance. Carbon emission disclosure has a positive effect on green innovation. Carbon emission disclosure has a negative effect on the cost of debt. The period of ratification of Presidential Regulation No.98 can strengthen the relationship between carbon emission disclosure and financial performance as measured by return on equity (ROE), but not with financial performance as measured by Tobin's Q. The period of ratification of Presidential Regulation No.98 can strengthen the relationship between carbon emission disclosure and green innovation. The period of ratification of Presidential Regulation No.98 has no effect on the relationship between carbon emission disclosure and the cost of debt.

Keywords: Environmental Accounting, Firm Performance, Government, Green Innovation, Policy and Regulation.

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Introduction

In 2016, the Indonesian government signed the Paris Agreement in which there is a nationally determined contribution (NDC) commitment. This commitment was later confirmed to be part of the national development planning document for the 2020–2024 period and made climate change management one of the national priority agendas. In 2021, the president ratified Presidential Regulation (Perpres) No. 98 regarding the implementation of the economic value of carbon for achieving nationally determined contribution targets and controlling greenhouse gas emissions in national development. This makes Indonesia one of the drivers of market-based climate change mitigation at the global level towards a sustainable economic recovery.

Presidential Regulation No. 98 is a replacement for the old regulations relating to carbon emission mitigation, namely Presidential Regulation No.71 of 2011 concerning the implementation of a national greenhouse gas inventory. The following are the differences between the two rules stated in table 1.

Table 1. Comparison of Presidential Regulation No. 98 and Presidential Regulation No. 71

No	Presidential Regulation No.98	Presidential Regulation No.71
1	This regulation concerns the implementation of the economic value of carbon to achieve nationally determined contribution targets and control of greenhouse gas emissions in national development	This regulation concerns the implementation of a national greenhouse gas inventory
2	Regulate carbon trading procedures. This regulation states that carbon trading is carried out through emission trading mechanisms and greenhouse gas emission offsets	Regulates the national greenhouse gas inventrory, as well as monitoring, reporting, verification of greenhouse gases
3	Invite all parties to carry out carbon mitigation and be involved in carbon trading, especially for business entity	Appoint the active participation of sub-national governments namely provinces, districts and cities to prepare a national greenhouse gas inventory. Meanwhile, the development of greenhouse gas inventories only involves central ministries/agencies

Source: Presidential Regulation No.98 dan No.71

Based on table 1 it shows that Presidential Regulation no.71 focuses on conducting a national greenhouse gas inventory. In this case the government focuses on mitigating carbon emissions at the national level. Then, Presidential Regulation No.71 was replaced with Presidential Regulation No.98 which is oriented towards implementing carbon economic values to achieve contribution targets set nationally and controlling greenhouse gas emissions. This presidential regulation on the value of the carbon economy is intended for both domestic and international markets. Through this regulation it is also hoped that it will open up opportunities for Indonesia to receive wider funding in climate change control.

All parties, especially business entities, are expected to contribute to the implementation of the Presidential Regulation No.98. Presidential Regulation No.98 should be able to reach all parties to contribute to controlling carbon emissions. However, there are still deficiencies, namely that there is no specific mention of the obligations of all parties, especially business entities, to carry out carbon mitigation and carbon disclosure. Then, there are no specific standards and rules that can be used as the basis for implementing carbon mitigation and carbon disclosure for business entities. Thus, the success or failure of business entities in mitigating carbon emissions is difficult to compare, because there is no uniformity in the standards and rules that bind business entities in carrying out carbon mitigation and carbon disclosure.

The government needs to reconsider the continuation of regulations related to carbon emission mitigation, because Indonesia has an NDC target that must be achieved. Indonesia has set a target of reducing greenhouse gas emissions by 29% on its own and 41% with international support by 2030. It is not without reason that Indonesia plays a role in achieving this carbon emission reduction target, because Indonesia is included in the top 10 countries emitting the most carbon in the world. World (Ministry of Environment and Forestry, 2021).

Previous research found that companies that fail to mitigate carbon emissions will adopt actions that are considered relevant in maintaining the company's good name, one of which is carrying out higher carbon disclosure and promotion as a green company through the media than companies that successfully mitigate carbon emissions.. The study also succeeded in proving that companies will make decisions that are relevant to the applicable regulations (Silvia & Guo, 2023).

Companies with adequate environmental disclosure should be able to demonstrate that companies can carry out environmental damage mitigation. Accountability and transparency in environmental aspects should encourage companies to mitigate environmental damage through green innovation. Green innovation is a plan used to achieve the company's strategic targets by using new or changed techniques, systems, practices and production processes to reduce the impact of environmental damage.

Research by Xiang et al., (2020) found that environmental disclosure can encourage corporate green innovation. Green innovation is a tool that companies can use to fulfill their responsibilities to stakeholders and the environment. It is interesting to examine the relationship between disclosure of carbon emissions and green innovation in Indonesian companies. Environmental disclosure, especially carbon disclosure in Indonesia is still voluntary. Adequate voluntary disclosure does not guarantee that companies are truly motivated to carry out green innovation. So it is necessary to do an analysis of this problem. The author also has not found research that investigates this problem in Indonesia.

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In addition, this study is also interested in re-examining the relationship between voluntary carbon disclosure, financial performance, and market performance of companies. The instrumental perspective of stakeholder theory shows that business entities that carry out stakeholder management will perform better in terms of profitability, growth, and stability (Laplume, 2021). This theory shows that there is a relationship between the behavior adopted by the company and the results to be obtained.

Companies that carry out stakeholder management properly are likely to succeed in terms of conventional performance (Egels-zanden, 2004). This theoretical perspective also shows the interest of consumers and investors to judge companies based on voluntary disclosure which actually has 2 different consequences. First, it can have an impact on reducing information asymmetry. Second, it allows greenwashing practices behind voluntary disclosure. This situation is feared to mislead stakeholders and lead to inappropriate decision making. It is necessary to know the perspectives of consumers and investors in assessing Indonesian companies through this study. This study will examine the relationship between carbon emission disclosure and financial performance.

This research will also look at the creditor's perspective in assessing the company. Creditors are parties who provide credit or loans to companies. In this case there is an interest rate given as a condition from the creditor for the return of the company's debt. Companies with high environmental risk will have an impact on the high interest rates given by creditors. Is carbon emission disclosure an important matter for creditors to determine the company's interest rate. It is interesting to analyze the relationship between voluntary carbon disclosure and cost of debt in Indonesian companies. This is because most companies in Indonesia are very dependent on external financing from creditors. Research on the relationship between disclosure of carbon emissions and the cost of debt is very limited. The author also has not found research that uses data from Indonesian companies for this problem. Thus, the government's role is very important to overcome these weaknesses through adequate regulation and supervision.

This research will explore the relationship between voluntary carbon disclosure and financial performance, market performance, green innovation, and the cost of debt in companies in Indonesia using views from several different theories. Through this research, it will be proven how the stakeholder perspective is in assessing the company. This stakeholder perspective will determine whether more adequate regulations are needed to overcome the problem of greenwashing. So that in the future the protection of stakeholders will be more guaranteed, especially guarantees in decision making. Similar to previous research, this research also involves the ratification period of Presidential Regulation No. 98 of 2021 to determine its contribution to the relationship between the variables analyzed. It is necessary to study the role and ability of regulators in intervening in Indonesian companies and what stakeholders' perspectives are regarding these regulations.

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Literature Review

Consequences of Carbon Emission Disclosure

Research on the consequences of carbon disclosure has been carried out by previous researchers, such as research analyzing the impact of carbon disclosure on company performance, ecological environment, investor decision making, earnings management, and others (Zhang & Liu, 2020). In the aspect of financial performance, research by Griffin & Sun (2013); Matsumura et al., (2014); Saka & Oshika (2014) found carbon disclosure has a positive effect on firm value. Research by Borghei et al., (2018); Ganda (2018) found carbon disclosure has a positive effect on company financial performance. Research by Blanco et al., (2017); Zhou et al., (2018) found carbon disclosure has a positive effect on agency costs and various other benefits. Another study by Lee et al., (2015); Griffin et al., (2017) found the high cost of disclosure causes carbon disclosure to not provide adequate economic benefits for companies, and can even reduce profitability. Lee et al., (2015) found voluntary carbon disclosure has a negative impact on shareholder value in South Korean companies. Another study by Kim & Lyon (2011); Bimha & Nhamo (2017) found carbon disclosure has no effect on firm value.

In terms of ecological environment, research by Akpalu et al., (2017); Qian et al., (2018) found the carbon disclosure has a impact on reducing carbon emissions and improving the ecological environment. Qian et al., (2018) found carbon disclosure has a positive effect on carbon performance. Another study by Matisoff (2013); Liesen et al., (2015); Tang & Demeritt (2018) found carbon disclosure has no effect on ecological improvement and carbon reduction. Research by Knox-Hayes & Levy (2011); Liesen et al., (2017) found carbon disclosure has a small impact on improving the ecological environment.

In terms of investor decision making, research by Motoshita et al., (2015); Griffin et al., (2017); Liesen et al., (2017) found carbon disclosure has a positive effect on investor decision making. In contrast to research by Lee et al., (2015) found carbon disclosure has a negative effect on investor decision making. Haigh & Shapiro (2011) found carbon disclosure can play a role in investors' assessment of corporate governance. Motoshita et al., (2015) found carbon disclosure can encourage consumers to show low-carbon preferences in shopping activities. Another study by Lee et al., (2015) found investors see disclosure of carbon emissions as bad news. Research by Harmes (2011); Sullivan & Gouldson (2012) found the voluntary carbon disclosure cannot meet the needs of investors. Research by Liu et al., (2016) found the carbon labeling can provide positive and negative pressures for producers, investors, and other stakeholders. Sorensen (2009) found consumers do not pay attention to carbon labels, while research by Upham et al., (2011) found carbon labels can help consumers make more reasonable choices.

In another aspect, research by Matisoff (2013) found carbon disclosure has a positive impact on the transparency of Japanese companies. Schiemann & Sakhel (2019) found companies in Europe that voluntarily disclose carbon information were able to reduce information asymmetry between investors and companies, and vice versa. Research by Lemma et al., (2019); Li & Long (2019) found carbon disclosure has a negative effect on the cost of equity. Li & Long (2019) found the level of marketing can positively moderate the negative relationship between disclosure of carbon emissions and the cost of capital in Chinese companies. Another study by Krishnamurti & Velayutham (2018) found carbon disclosure has a positive impact on stock market liquidity. Research by Knox-Hayes & Levy (2011); Pellegrino & Lodhia (2012) found carbon disclosure has a positive impact on company reputation and can increase company legitimacy. Research by Goss & Roberts (2011); Ge & Liu (2015); Eliwa et al., (2019); Fonseka et al., (2019); Yang et al., (2021) found disclosure of environmental information has a negative effect on the cost of debt. Kleimeier & Viehs (2018); Palea & Drogo (2020); Wang et al., (2022) found that disclosure of climate and carbon information has a negative effect on the cost of debt. Talbi & Omri (2014); Guidara et al., (2014) found voluntary disclosure has a negative effect on the cost of debt.

There is another aspect that may be a consequence of disclosing carbon emissions, namely green innovation. Several studies has a analyzed the impact of environmental disclosure and corporate green innovation. As research by Xiang et al., (2020) found environmental disclosure can encourage corporate green innovation in China. Research by Hong et al., (2020) found disclosure of corporate social responsibility has a significant impact on corporate green innovation in China. The research also succeeded in proving that there is a positive role from environmental regulation by the government. Research that examines the relationship between environmental disclosure and corporate green innovation is very limited, especially for corporate carbon disclosure. Research using Indonesian company data has also not been found.

All of these research results show that disclosure of carbon emissions has impact on several aspects, such as company performance, investor decision making, ecological environment, information asymmetry, cost of capital, cost of debt, and other aspects. However, there is still controversy regarding the consequences of disclosing carbon emissions, especially for aspects of financial performance, green innovation, and cost of debt. In the aspect of financial performance there are inconsistent research results. In addition, research that examines this issue using data from Indonesian companies is very limited and based on certain company sectors, and the research results also vary.

In the green innovation aspect, previous research has proven that environmental disclosure and CSR disclosure has a impact on green innovation. However, has no previous research that focused on carbon disclosure as a factor can influence green innovation, especially in Indonesian companies. Indonesia is one of the countries does not have adequate regulations to protect stakeholders from providing wrong information. Carbon disclosure in Indonesia is still voluntary and there is a risk of greenwashing by companies. It remains controversial whether companies with adequate voluntary disclosure are truly motivated to engage in green innovation. On the aspect of the cost of debt, no research has been found that uses data from Indonesian companies to analyze the relationship between carbon disclosure and the cost of debt. This is important because the cost of debt is one of the main sources of external financing for companies. Therefore, it is very interesting to analyze this problem in Indonesia because most Indonesian companies depend on external financing from creditors.

Carbon Emission Disclosure and Financial Performance

Research on the relationship between carbon disclosure and corporate financial performance raises various controversies. Although disclosure of carbon emissions is considered an important factor in determining company performance, it still raises various views regarding the findings obtained by previous researchers. Griffin & Sun (2013); Matsumura et al., (2014); Saka & Oshika (2014) found carbon disclosure has a positive effect on firm value. Borghei et al., (2018); Ganda (2018) found carbon disclosure has a positive effect on company financial performance. Zhou et al., (2018) found high-quality carbon disclosure led to lower corporate agency costs. Research by Borghei et al., (2018) found the companies disclose carbon information in the current period can increase the return on assets in the future.

In contrast to research by Griffin et al., (2017); Lee et al., (2015) found carbon disclosure does not provide economic benefits and reduces company profitability, due to the high disclosure costs incurred by companies. Other studies found voluntary carbon disclosure has a negative effect on shareholder value (Lee et al., 2015). Bimha & Nhamo (2017); Kim & Lyon (2011) found disclosure of carbon emissions is not significantly correlated with firm value. There is no evidence that disclosure of corporate carbon emissions can increase shareholder value. Another study by Liu et al., (2016) investigated how carbon disclosure can mediate the relationship between carbon performance and financial performance. The findings provide evidence that carbon performance and the level of carbon disclosure has a positive effect on the company's financial performance. Rohani et al., (2021) investigated the relationship between performance and disclosure of carbon emissions on economic performance by proxy for ROE (return on equity), the results showed has no relationship. Lu et al., (2021) found carbon disclosure has no effect on financial performance in carbon-intensive industries.

In Indonesia, research related to the relationship between disclosure of carbon emissions and financial performance has been examined by Soewarno et al., (2018) found carbon disclosure has a positive effect on the financial performance of Indonesian companies participating in PROPER. Hardiyansah et al., (2020) conducted research on companies that won the ISRA (Indonesian Sustainability Reporting Award), the results of the study found carbon disclosure has a positive effect on the company's financial performance. Research by Kurnia et al., (2020) found carbon disclosure has no effect on the financial performance of mining, agro and manufacturing companies.

Carbon Emission Disclosure and Green Innovation

Corporate green innovation is a plan used to achieve the company's strategic targets by using new or transformed production techniques, systems, practices and processes to reduce the impact of environmental damage. Fischer & Newell (2008); Marzucchi & Montresor (2017) found effective environmental policies and regulations can encourage more green innovation in companies. Through analysis of German public survey data, research by Horbach et al., (2012) found government regulations can encourage ecological innovation in German companies.

Another study by Calel & Dechezlepretre (2016); Zhu et al., (2019) found carbon trading schemes to has a significant impact on low-carbon technology innovation in companies. Another study by Xiang et al., (2020) found environmental disclosure can encourage corporate green innovation in China. Research by Hong et al., (2020) found disclosure of corporate social responsibility has a impact on corporate green innovation in China. The research also succeeded in proving there is a positive role from environmental regulation by the government.

The relationship between environmental disclosure and green innovation can be explained by stakeholder theory. Donaldson & Preston (1995) explained that stakeholder theory can be seen, presented and used in several different aspects, namely descriptive aspects, instrumental aspects, and normative aspects. In the descriptive aspect, stakeholder theory is used to describe and explain the characteristics or behavior of entities and stakeholders, such as the nature of the company, how managers and stakeholders behave, and how they perceive the behavior and roles of each.

The instrumental aspect, stakeholder theory is used to identify the relationship between management, stakeholders and entity objectives. How should managers act in the interest of the entity to achieve adequate performance and ensure long-term business continuity. Thus, the entity will pay close attention to the people who have an interest in its business.

The normative aspect, stakeholder theory is used to identify the entity's functions based on norms, ethics, and rules. How managers must act and make decisions to achieve goals based on the principles of norms, ethics and rules. Thus, the company will carry out accountability and transparency in environmental aspects to fulfill its responsibilities to stakeholders and the environment. Companies with adequate environmental disclosure should be able to demonstrate that the company is capable of mitigating environmental damage through green innovation.

Research that examines the relationship between environmental disclosure and corporate green innovation is very limited, especially for corporate carbon disclosure. Research using Indonesian company data has not been found. Thus, this study will analyze the relationship between carbon emissions disclosure and green innovation in Indonesian companies.

Carbon Emission Disclosure and Cost of Debt

The cost of debt is one of the main sources of external financing for companies. Based on the pecking order theory, when a company needs external financing, the company must prioritize debt financing, then equity financing. This is because equity financing often sends overvaluation signals to outside investors which can has a negative impact on financial performance. In addition, compared to equity financing, debt financing is relatively low and the interest costs of debt capital are itemized before tax, which can act as a tax deduction (Wu et al., 2020).

In making loan decisions, lending institutions face several environmental risks, one of which is credit risk. Bad environmental behavior by the company will lead to loss of reputation and managers must detect the company's environmental factors to reduce the risk. Thus, credit risk is a way to influence creditors' decisions. Company environmental disclosure can help creditors make an assessment of the company's environmental investment, environmental risk, and environmental management performance. Environmental disclosure indicators on a regular basis can also motivate companies to protect the environment adequately.

Signaling theory suggests that corporate environmental disclosures can contribute to lowering financing costs by reducing information asymmetry. Companies that actively disclose carbon information will gain several advantages. Such disclosure of corporate carbon information can show the public that the company is in good condition thereby increasing investor confidence. Then, companies can demonstrate to the government their social responsibility and contribution to protecting the environment, including mitigating carbon emissions.

With increasing company transparency, the company's risk is assessed by creditors will be lower. Then, the creditor will charge a lower interest rate, because the rate of return requested by the creditor is the company's risk. This is evidenced by research by Francis et al., (2005) found companies that are sensitive to external funding will have a high level of disclosure, due to the need to have their own capital and low cost of debt. Franco et al., (2016) found bonds issued by companies with high disclosure quality have low debt costs. Goss & Roberts (2011); Ge & Liu (2015); Eliwa et al., (2019); Fonseka et al., (2019); Yang et al., (2021) found environmental information disclosure has a negative effect on the cost of debt. Kleimeier & Viehs (2018); Palea & Drogo (2020); Wang et al., (2022) found carbon disclosure and climate information has a negative effect on the cost of debt. Talbi & Omri (2014); Guidara et al., (2014) found voluntary disclosures has a negative effect on the cost of debt.

Hypothesis Development

Carbon Emission Disclosure and Financial Performance

Referring to the instrumental stakeholder theory perspective, it indicates that there is a relationship between the behavior adopted by the company and the results to be obtained. Companies that carry out stakeholder management appropriately, are likely to succeed in terms of conventional performance. Stakeholder management carried out by the company is usually related to important things for stakeholders. Disclosure of environmental information, especially carbon disclosure is one of the important things for stakeholders. There is interest from stakeholders to assess the company based on the environmental information presented in the company report.

In the current era, environmental issues become an important focus for stakeholders in making decisions. Companies are expected to contribute to the goals of sustainable development. As it is known that the company is an important party that damages the environment through its business activities. Thus, corporate responsibility on social and environmental aspects is indispensable.

In addition to implementing environmental and social accountability, companies are also expected to be transparent in presenting environmental information. However, carbon disclosure in Indonesia is still voluntary. Many companies do not carry out adequate carbon disclosures because there are no mandatory rules and standards that can be used as references.

Thus, the instrumental stakeholder theory perspective also indicates the interest of consumers and investors to assess companies based on voluntary environmental disclosures which actually have 2 different consequences. First, it can have an impact on reducing information asymmetry. Second, it allows the practice of greenwashing behind the voluntary environmental disclosure. This situation is feared to mislead stakeholders and lead to inappropriate decision making. The role of the government is very important to overcome this weakness through adequate regulation and supervision. It is necessary to analyze this problem, especially for Indonesian companies.

All of these studies obtained different results regarding the strength and direction of the relationship between carbon emission disclosures and corporate financial performance, especially for Indonesia. Several studies in Indonesia are also limited to mining, agro, manufacturing companies and companies with certain achievements, so the results of the research cannot be generalized to all Indonesian companies. By doing this research it is possible to narrow the gap in research results and add new literature studies, especially for Indonesia. This study does not limit the research sample to specific sectors or award criteria. All companies from various sectors are possible to be the research sample. The following is the hypothesis that the author proposes:

H_1: Carbon emission disclosure has a positive impact on the financial performance.

Carbon Emission Disclosure and Green Innovation

Referring to stakeholder theory shows that stakeholders have a role in determining the success of the entity in achieving its goals, so that the entity will try to adjust all activities carried out to meet the expectations of its stakeholders. Stakeholder expectations (investors, government and the general public) are also considered not static which in turn requires entities to be more responsive in making decisions. An entity must manage good relations and meet the expectations of its stakeholders to gain support.

In the current era, the focus of stakeholders is not only on the company's ability to achieve financial performance. However, how can companies contribute to mitigating environmental damage and act transparently in providing environmental information. The Indonesian government invites all people, especially business entities to contribute to achieving the national NDC target. Companies have a responsibility to mitigate carbon emissions and disclose the necessary information transparently.

Thus, the company will carry out accountability and transparency in environmental aspects, especially carbon information to fulfill its responsibilities to stakeholders and the environment. Companies with adequate environmental disclosure should be able to mitigate environmental damage through green innovation. Green innovation is a plan used to achieve the company's strategic targets by using new or changed techniques, systems, practices and production processes to reduce the impact of environmental damage.

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Green innovation is a tool that companies can use to fulfill their responsibilities to stakeholders and the environment. Environmental disclosure in Indonesia, especially carbon disclosure is still voluntary. It is still controversial whether adequate voluntary disclosure can guarantee that companies are genuinely motivated to engage in green innovation. So it is necessary to do an analysis of this problem. The author also has not found research that investigates this problem in Indonesia.

Research that examines the relationship of environmental disclosure to green innovation is very limited. In addition, no research has been found that focuses on carbon disclosure and green innovation, especially in Indonesia. The following is the hypothesis that the author proposes:

H_2: Carbon emissions disclosure has a positive effect on green innovation.

Carbon Emission Disclosure and Cost of Debt

Signal theory indicates that disclosure of the company's environment can contribute to lowering the cost of financing by reducing information asymmetry. Environmental information is important information that stakeholders want. The company is expected to fulfill its environmental and social accountability. Companies also need to contribute to achieving sustainable development goals. All business activities carried out by the company have a significant impact on the issue of carbon emissions. Companies that actively implement carbon emission mitigation and disclose carbon information will get several benefits. For example, disclosure of company carbon information can show the public that the company is in good condition, thereby increasing stakeholder trust. Then, companies can show the government about their social responsibilities and contributions to protecting the environment, including reducing carbon emissions.

In addition, the company also gets benefits related to aspects of external financing and the company's rate of return. Cost of debt is the interest rate given as a requirement from creditors for the rate of return on debt made by a company. Based on the pecking order theory, when a company needs external financing, the company must prioritize debt financing, then equity financing. This is because equity financing often sends signals of overvaluation to outside investors which can have a negative impact on financial performance. In addition, compared to equity financing, the cost of debt financing is relatively low. With increased transparency of the company, the risk of the company assessed by creditors will be lower. Then, the creditor will charge a lower interest rate, because the rate of return required by the creditor represents the risk of the company. It is interesting to analyze the relationship between voluntary carbon disclosure and the cost of debt in Indonesian companies. This is because most companies in Indonesia are very dependent on external financing from creditors.

Research on the relationship between disclosure of carbon emissions and the cost of debt is very limited. The author also has not found any research that uses data from Indonesian companies to deal with this problem. The following is the hypothesis that the author proposes:

H_3: Carbon emission disclosure has a negative effect on the cost of debt.

Research Methods

The majority of previous research, especially research using Indonesian company data, used a carbon disclosure checklist adopted from Choi et al., (2013) which totaled 18 disclosure items. Previous studies have only focused on the quantitative aspects of carbon disclosure. Unlike previous research, this study will evaluate the carbon disclosure of Indonesian companies based on a quantitative and qualitative perspective using a checklist and measurement method adopted from Tang et al., (2019).

The financial performance in this study will be proxied by ROE (Return on Equity) and Tobin's Q. ROE is a measure of financial performance in a economic aspect, and Tobin's Q is a measure of financial performance in a market aspect. Green innovation in this study will use disclosure indicators developed by Li et al., (2022). The cost of debt is measured using the interest payment rate, which is defined as the company's interest expense during year t divided by the company's short-term and long-term debt at the beginning of year t (Guidara et al., 2014).

Population of this study is all companies listed on the Indonesian stock exchange (excluding financial companies) with sustainability reports from 2017–2023, total 170 companies. This population was chosen because most of the carbon information can be found in sustainability reports, so it is relevant to this study. The period from 2017 to 2023 is the time after Indonesia signed the Paris agreement in 2016. The sample data for this study is all of the population, totaling 170 companies, so the total sample data is 1190 (company-year).

A random effect model is employed in this study to examine the correlation between the variables. This research also uses the Difference in Difference (DID) method in analyzing the relevance of research variables by involving the ratification of Presidential Regulation No.98. 2023 is the baseline period for ratification of Presidential Regulation No.98. These periods will be compared one by one with other periods in this research. So we will know the impact of this regulation on the relationship between variables.

Results and Discussions

Results

The analysis results for carbon emissions disclosure, financial performance, green innovation, cost of debt and control variable are presented in table 2.

Table 2. analysis Results of Carbon Emission Disclosure, Financial Performance, Green Innovation, Cost of Debt and Control Variable

Variable	ROE	TOBSQ	GI	COD
Carbon Emissions Disclosure	3.451**	2.265**	3.115**	-2.255**
Firm Size	0.988	0.871	2.762**	-0.996

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Variable	ROE	TOBSQ	GI	COD
Firm Leverage	-1.752	-3.335**	-0.887	3.002**
Media Exposure	2.662**	2.437**	-1.334	-2.875**
Industry	1.028	1.774	2.661**	2.646**
Intensity of Capital	3.102**	3.107**	2.373**	1.101
Growth of Company	2.151**	2.874**	1.454	-3.151**
Adjusted R^2	0.441	0.522	0.411	0.524
F Value	7.637	10.762	5.019	11.210

The analysis results show carbon disclosure has a positive effect on financial performance and green innovation. Carbon disclosure also has a negative effect on the cost of debt. Companies with adequate capital intensity and company growth are able to achieve adequate financial performance. Companies with adequate capital intensity also have the opportunity to carry out green innovation adequately. Company growth also has an impact on the cost of debt. Media exposure also has a significant impact on financial performance and cost of debt.

Discussion of Results

Carbon Emission Disclosure and Financial Performance

The empirical results show that carbon emission disclosure has a positive effect on financial performance as measured by return on equity (ROE) and Tobin's q. These results are relevant to the perspective of instrumental stakeholder theory which indicates that there is a relationship between the behavior adopted by the company and the results to be obtained.

Companies that carry out stakeholder management properly tend to be successful in terms of conventional performance. Stakeholder management carried out by companies is usually related to important matters for stakeholders. Disclosure of environmental information, especially carbon disclosure is one of the important things for stakeholders. There is an interest from stakeholders to assess the company based on the environmental information presented in the company's report.

In the current era, environmental issues are an important focus for stakeholders in decision making. Companies are expected to contribute to the goals of sustainable development. As it is known that the company is an important party that damages the environment through its business activities. Thus, corporate responsibility towards social and environmental aspects is indispensable. In addition to implementing environmental and social accountability, companies are also expected to be transparent in presenting environmental information to reduce the risk of information asymmetry.

Information on voluntary carbon disclosure has received a positive response from the market, because the market believes that carbon emission information is one of their considerations in predicting company sustainability. Furthermore, efforts to mitigate carbon emissions and present carbon information adequately can be a marketing tool for companies to improve company performance, such as achieving maximum profitability because consumers will only be interested in using products and services from green companies.

The results of this study are relevant to research by Griffin & Sun (2013); Matsumura et al., (2014); Saka & Oshika (2014) found carbon disclosure has a positive effect on firm value. Borghei et al., (2018); Ganda (2018) found carbon disclosure has a positive effect on the company's financial performance. After disclosing carbon emissions in a certain year, the return on company assets also increases (Borghei et al., 2018).

Soewarno et al., (2018) found carbon emission disclosures have a positive effect on the financial performance of Indonesian companies participating in PROPER. Hardiyansah et al., (2020) conducted research on companies that received ISRA (Indonesian Sustainability Reporting Award), the results of the study found carbon emission disclosures has a positive effect on the company's financial performance.

Carbon Emission Disclosure and Green Innovation

The empirical results show that carbon emissions disclosure has a positive effect on green innovation. These results are relevant to stakeholder theory which indicates that when a company considers stakeholders as an important part of its business, the company will carry out business activities and decision making that are relevant to stakeholder expectations.

One of the expectations of the company's stakeholders is accountability and transparency in environmental aspects. Companies that prioritize environmental damage mitigation in their business activities are considered as companies with low risk. The company is also considered to have contributed to achieving sustainable development goals.

Referring to stakeholder theory shows that stakeholders have a role in determining the success of the entity in achieving its goals, so that the entity will try to adjust all activities carried out to meet the expectations of its stakeholders. Stakeholder (investors, government and the general public) expectations are also considered not static which in turn requires entities to be more responsive in making decisions. An entity must manage good relations and meet the expectations of its stakeholders to gain support.

In the current era, the focus of stakeholders is not only on the company's ability to achieve financial performance. However, how can companies contribute to mitigating environmental damage and act transparently in providing environmental information. The Indonesian government invites all people, especially business entities to contribute to achieving the national NDC target. Companies have a responsibility to mitigate carbon emissions and disclose the necessary information transparently.

Thus, the company will carry out accountability and transparency in environmental aspects, especially carbon information to fulfill its responsibilities to stakeholders and the environment. Companies with adequate environmental disclosure should be able to mitigate environmental damage through green innovation. Green innovation is a plan used to achieve the company's strategic targets by using new or changed techniques, systems, practices and production processes to reduce the impact of environmental damage.

Green innovation is a tool that companies can use to fulfill their responsibilities to stakeholders and the environment. Empirical results show Indonesian companies that have implemented adequate carbon information disclosure techniques in the current year are likely to make efforts to mitigate carbon emissions through green innovations in the following year. This shows that most Indonesian companies has the awareness to contribute to achieving national NDC targets and meeting stakeholder expectations. This company awareness needs to be supported by adequate standards and regulations from the Indonesian government, so that the national NDC target is actually achieved.

The results of this study are relevant to research by Xiang et al., (2020) found environmental disclosure can encourage corporate green innovation in China. Research by Hong et al., (2020) found that disclosure of corporate social responsibility has a impact on corporate green innovation in China. The research also succeeded in proving that there is a positive role from environmental regulation by the government.

Carbon Emission Disclosure and Cost of Debt

The empirical results show that voluntary carbon disclosure has a negative effect on the cost of debt. This finding is relevant to signal theory which indicates that corporate environmental disclosures can contribute to lowering financing costs by reducing information asymmetry. Environmental information is important information desired by stakeholders. Companies are expected to fulfill their environmental and social accountability. Companies also need to contribute to achieving sustainable development goals. All business activities carried out by the company has a significant impact on the issue of carbon emissions.

Companies that actively implement carbon emission mitigation and disclose carbon information will get several benefits. For example, disclosure of company carbon information can show the public that the company is in good condition there by increasing stakeholder trust. Then, companies can demonstrate to the government their social responsibility and contribution to protecting the environment, including reducing carbon emissions. In addition, the company also gets benefits related to aspects of external financing and the company's rate of return.

The cost of debt is the interest rate given as a requirement from creditors for the rate of return on debt made by the company. Based on the pecking order theory, when a company needs external financing, the company must prioritize debt financing, then equity financing. This is because equity financing often sends overvaluation signals to outside investors which can have a negative impact on financial performance. In addition, compared to equity financing, debt financing costs are relatively low.

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With increasing company transparency, the company's risk is assessed by creditors will be lower. Then, the creditor will charge a lower interest rate, because the rate of return requested by the creditor is the company's risk. The results of this study are relevant to research by Goss & Roberts (2011); Ge & Liu (2015); Hasan et al., (2017); Eliwa et al., (2019); Fonseka et al., (2019); Yang et al., (2021) found the disclosure of environmental information has a negative effect on the cost of debt.

Kleimeier & Viehs (2018); Palea & Drogo (2020); Wang et al., (2022) found the disclosure of corporate climate and carbon information has a negative effect on the cost of debt. Talbi & Omri (2014); Guidara et al., (2014) found the company's voluntary disclosure has a negative effect on the cost of debt.

Robustness Test

Carbon Emission Disclosure and Financial Performance (ROE) Period of Ratification Presidential Regulation No.98

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

Table 3. Analysis Results of Carbon Emission Disclosure and ROE Period of Ratification Presidential Regulation No. 98

Variable	ROE					
	2017	2018	2019	2020	2021	2022
Regulation Period	0.987	1.112	0.886	0.764	1.710	1.633
Carbon Emission Disclosure (CDV)	2.330**	2.412**	2.004**	2.157**	2.110**	2.178**
Interaction of Regulation Period and CDV	3.217**	3.101**	2.455**	2.312**	2.065**	2.322**
Firm Size	1.874	2.103**	2.266**	1.150	2.151**	2.371**
Firm Leverage	-0.917	-0.985	-1.123	-2.313**	-2.122**	-2.453**
Media Exposure	0.717	0.840	0.935	-0.861	-0.771	-0.821
Industry	1.671	1.556	1.431	1.652	0.912	1.033
Intensity of Capital	3.122**	2.643**	2.786**	2.713**	3.106**	2.919**
Growth of Company	2.447**	2.569**	2.078**	2.012**	2.856**	2.667**

The robustness results with 2023 as the baseline period show quite consistent results. Especially for carbon emission disclosure, interaction of regulation period and CDV, intensity of capital, and growth of company variables. These results indicate that the ratification of Presidential Regulation No.98 played a role in influencing the relationship between carbon emissions disclosure and return on equity (ROE) in Indonesian companies. Ratification of Presidential Regulation No. 98 can strengthen the relationship between carbon emissions disclosure and return on equity (ROE).

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Carbon Emission Disclosure and Financial Performance (Tob's Q) Period of Ratification Presidential Regulation No.98

The results of the robustness test for carbon emission disclosure and Tobin's Q period of ratification Presidential Regulations No.98 are stated in table 4.

Table 4. Empirical Results of Carbon Emission Disclosure and Tob's Q Period of Ratification Presidential Regulation No.98

Variable	Tob's Q					
	2017	2018	2019	2020	2021	2022
Regulation Period	1.032	0.848	1.337	0.951	1.175	0.821
Carbon Emission Disclosure (CDV)	2.671**	2.355**	2.422**	2.540**	2.177**	2.458**
Interaction of Regulation Period and CDV	1.431	1.547	1.330	1.251	1.556	1.471
Firm Size	0.677	0.923	1.104	0.905	1.574	1.233
Firm Leverage	-3.103**	-3.006**	-2.763**	-2.458**	-2.557**	-2.461**
Media Exposure	0.938	0.962	1.212	1.102	1.633	1.402
Industry	-2.221**	-2.217**	-2.341**	-2.550**	-3.114**	-2.761**
Intensity of Capital	0.882	0.655	0.425	0.564	0.772	1.108
Growth of Company	1.202	0.746	0.884	0.958	1.104	0.845

The robustness results with 2023 as the baseline period show quite consistent results. Especially for carbon emission disclosure, firm leverage, and industry variables. These results indicate that the ratification of Presidential Regulation No.98 has no impact on the relationship between carbon disclosure emissions and Tobin's Q in Indonesian companies.

Carbon Emission Disclosure and Green Innovation (GI) Period of Ratification Presidential Regulation No.98

The results of the robustness test for carbon emission disclosure and green innovation period of ratification Presidential Regulations No.98 are stated in table 5.

The robustness results with 2023 as the baseline period show quite consistent results. Especially for carbon emission disclosure, regulation period, interaction of regulation period and CDV, industry, and intensity of capital variables. These results indicate that the ratification of Presidential Regulation No.98 played a role in influencing the relationship between carbon emissions disclosure and green innovation in Indonesian companies. Ratification of Presidential Regulation No. 98 can strengthen the relationship between carbon emissions disclosure and green innovation.

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Table 5. Analysis Results of Carbon Emission Disclosure and GI Period of Ratification Presidential Regulation No. 98

Variable	GI					
	2017	2018	2019	2020	2021	2022
Regulation Period	2.207**	2.116**	2.341**	2.008**	2.146**	2.477**
Carbon Emission Disclosure (CDV)	2.871**	2.921**	3.217**	2.662**	3.165**	2.865**
Interaction of Regulation Period and CDV	3.544**	3.127**	2.717**	2.931**	3.125**	2.711**
Firm Size	1.126	1.871	1.776	1.901	0.848	1.005
Firm Leverage	-1.632	-1.883	-1.267	-1.326	-1.447	-1.211
Media Exposure	-0.771	-0.912	-0.977	-0.898	-1.885	-1.753
Industry	2.723**	2.781**	2.665**	2.460**	2.202**	2.662**
Intensity of Capital	3.110**	3.651**	2.718**	2.880**	2.600**	2.203**
Growth of Company	0.716	0.737	0.678	0.515	0.785	1.109

Carbon Emission Disclosure and Cost of Debt (COD) Period of Ratification Presidential Regulation No.98

The results of the robustness test for carbon emission disclosure and cost of debt period of ratification Presidential Regulations No.98 are stated in table 6.

Table 6. Empirical Results of Carbon Emission Disclosure and COD Period of Ratification Presidential Regulation No.98

Variable	COD					
	2017	2018	2019	2020	2021	2022
Regulation Period	0.818	0.952	0.933	0.896	1.230	0.906
Carbon Emission Disclosure (CDV)	-2.467**	-2.616**	-2.320**	-2.718**	-3.252**	-2.775**
Interaction of Regulation Period and CDV	1.873	1.765	1.620	1.434	1.515	1.113
Firm Size	-1.257	-1.212	-0.733	-0.810	-0.719	-1.207
Firm Leverage	2.545**	2.818**	2.829**	3.121**	3.210**	2.517**
Media Exposure	-2.101**	-2.156**	-2.414**	-2.192**	-2.010**	-2.336**
Industry	3.157**	3.010**	2.210**	2.314**	2.211**	2.515**
Intensity of Capital	0.650	0.357	0.477	-0.833	-0.795	-1.011
Growth of Company	-2.311**	-2.006**	-2.128**	-2.054**	-1.998**	-2.103**

The robustness results with 2023 as the baseline period show quite consistent results. Especially for carbon emission disclosure, firm leverage, media exposure, industry, and growth of company variables. These results indicate that the ratification of Presidential Regulation No.98 has no impact on the relationship between carbon disclosure emissions and cost of debt in Indonesian companies.

Further Analysis

The results of the robustness test show period of ratification Presidential Regulation No.98 can strengthen the relationship between voluntary carbon disclosure and financial performance as measured by return on equity (ROE). These findings prove that the regulations and standards set by the government can affect the activities of company management and the perspective of company stakeholders. Efforts to mitigate carbon emissions and provide adequate carbon information can be a marketing tool for companies to improve company performance, such as achieving maximum economic performance because consumers will only be interested in using products and services from an green company.

The ratification of Presidential Regulation No.98 has proven to have a significant impact on the relationship between voluntary carbon disclosure and short-term financial performance as measured by return on equity (ROE). However, it has no a significant impact on the relationship between voluntary carbon disclosure and long-term financial performance as measured by Tobin's q. This is due to the implementation of Presidential Regulation No. 98 is still new and only regulates the application of carbon economic values to achieve contribution NDC targets nationally and control greenhouse gas emissions in national development.

The regulation does not regulate the company's obligation to disclose carbon according to certain rules and standards. Thus, regulations made by the Indonesian government are not sufficient to strengthen the relationship between disclosure of carbon emissions and financial performance in the long term.

Then, robustness test results show the period of ratification of Presidential Regulation No.98 can strengthen the relationship between carbon emissions disclosure and green innovation. This finding indicates that Indonesian companies also consider the rules made by the government in making decisions and carrying out business activities. The government through its regulations can intervene business entities in carrying out activities and making decisions. Thus, it is very necessary to have adequate regulations and standards to control business entities.

The findings in this study prove that Indonesian companies actually have the awareness to mitigate carbon emissions, but current regulations in Indonesia are not sufficient to support companies to carry out their responsibilities in environmental aspects. Further regulations are needed to ensure companies can carry out carbon emission mitigation and achieve national NDC targets.

The robustness test results also show the period of ratification of Presidential Regulation No. 98 has no impact on the relationship between voluntary carbon disclosure

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and the cost of debt. This indicates that any circumstances and situations during the observation period did not change creditor’s perceptions in assessing company risk.

Companies that actively implement carbon emission mitigation and disclose carbon information can increase stakeholder confidence, especially creditors because they are considered green companies with a low level of risk. Green companies are also considered as companies that prioritize sustainability. Thus, the company's risk assessed by creditors will be lower. Then, the creditor will charge a lower interest rate, because the rate of return requested by the creditor is the company's risk.

Conclusion

Empirical evidence shows that carbon emissions disclosure has a significant effect on the company's financial performance and cost of debt. This indicates that stakeholders are interested in green companies, because they are considered companies that prioritize sustainability. The government must pay attention to this situation and need to consider adequate regulations to protect stakeholders. This study also finds that carbon emission disclosure has a positive effect on green innovation. Indonesian companies that have implemented adequate carbon information disclosure techniques this year will most likely make efforts to mitigate carbon emissions through green innovation in the following year. This shows that the majority of Indonesian companies have the awareness to contribute to improving the quality of the environment. This company awareness needs to be supported by adequate standards and regulations from the Indonesian government. Relevant to previous research, this research also supports the need for further and adequate regulations regarding environmental damage to overcome the problem of greenwashing and provide guarantees for stakeholder protection, especially in decision making. It is hoped that future research can improve the limitations of this research which only focuses on companies in Indonesia, thereby limiting the generalizability of these findings to other countries or regions. This research also has the potential to have weaknesses in the research method and can cause bias, so future research can look for alternative methods to overcome this. This research only examines the relationship between carbon disclosure and financial performance, without considering other potential factors that can influence company performance. Future research needs to consider these potential factors. The consequences of carbon disclosure can have an impact on other variables not analyzed in this research, so further analysis is needed regarding the consequences of carbon disclosure involving other variables.

References

Akpalu, W., Abidoye, B., Muchapondwa, E., & Simbanegavi, W. (2017). Public disclosure for carbon abatement: African decision-makers in a PROPER public good experiment. *Climate and Development*, *9*(6), 548–558. https://doi.org/10.1080/17565529.2016.1174664

Bimha, A., & Nhamo, G. (2017). Sustainable Development, Share Price and Carbon Disclosure Interactions: Evidence From South Africa’s JSE 100 Companies. *Sustainable Development*, *25*(5), 400–413. https://doi.org/10.1002/sd.1670

Blanco, C., Caro, F., & Corbett, C. J. (2017). An inside perspective on carbon disclosure. *Business Horizons*, *60*(5), 635–646. https://doi.org/10.1016/j.bushor.2017.05.007

Borghei, Z., Leung, P., & Guthrie, J. (2018). Voluntary greenhouse gas emission disclosure impacts on accounting-based performance: Australian evidence. *Australasian Journal of Environmental Management*, *25*(3), 321–338. https://doi.org/10.1080/14486563.2018.1466204

Calel, R., & Dechezlepretre, A. (2016). Environmental policy and directed technological change: evidence from the European carbon market. *Review of Economics and Statistics*, *98*(1), 173–191. https://doi.org/10.1162/REST

Choi, B. B., Lee, D., & Psaros, J. (2013). An analysis of Australian company carbon emission disclosures. *Pacific Accounting Review*, *25*(1), 58–79. https://doi.org/10.1108/01140581311318968

Donaldson, T., & Preston, L. E. (1995). The Stakeholder Theory of The Corporation: Concepts, Evidence, and Implications. *Academy of Management Review*, *20*(1), 65–91. http://www.jstor.org/stable/258887

Egels-zanden, N. (2004). Reframing Instrumental Stakeholder Theory. *Sustainable Business Studies*, *01*(2004), 1–14.

Eliwa, Y., Gregoriou, A., & Paterson, A. (2019). Accruals quality and the cost of debt: the European evidence. *International Journal of Accounting and Information Management*, *27*(2), 333–351. https://doi.org/10.1108/IJAIM-01-2018-0008

Fischer, C., & Newell, R. G. (2008). Environmental and technology policies for climate mitigation. *Journal of Environmental Economics and Management*, *55*(2008), 142–162. https://doi.org/10.1016/j.jeem.2007.11.001

Fonseka, M., Rajapakse, T., & Richardson, G. (2019). The effect of environmental information disclosure and energy product type on the cost of debt: Evidence from energy firms in China. *Pacific Basin Finance Journal*, *54*, 159–182. https://doi.org/10.1016/j.pacfin.2018.05.001

Francis, J., LaFond, R., Olsson, P., & Schipper, K. (2005). The market pricing of accruals quality. *Journal of Accounting and Economics*, *39*(2), 295–327. https://doi.org/10.1016/j.jacceco.2004.06.003

Franco, F., Urcan, O., & Vasvari, F. P. (2016). Corporate diversification and the cost of debt: The role of segment disclosures. *Accounting Review*, *91*(4), 1139–1165. https://doi.org/10.2308/accr-51325

Ganda, F. (2018). The effect of carbon performance on corporate financial performance in a growing economy. *Social Responsibility Journal*, *14*(4), 895–916. https://doi.org/10.1108/SRJ-12-2016-0212

Ge, W., & Liu, M. (2015). Corporate social responsibility and the cost of corporate bonds. *Journal of Accounting and Public Policy*, *34*(6), 597–624. https://doi.org/10.1016/j.jaccpubpol.2015.05.008

Goss, A., & Roberts, G. S. (2011). The impact of corporate social responsibility on the cost of bank loans. *Journal of Banking and Finance*, *35*(7), 1794–1810. https://doi.org/10.1016/j.jbankfin.2010.12.002

Griffin, P. A., & Sun, Y. (2013). Going green: Market reaction to CSR newswire releases. *Journal of Accounting and Public Policy*, *32*(2), 93–113. https://doi.org/10.1016/j.jaccpubpol.2013.02.002

Griffin, P., H.Lont, D., & Y.Sun, E. (2017). The relevance to investors of greenhouse gas emission disclosures. *Contemporary Accounting Research*, *38*(1), 42–49. https://doi.org/10.1111/ijlh.12426

Guidara, A., Khlif, H., & Jarboui, A. (2014). Voluntary and timely disclosure and the cost of debt: South African evidence. *Meditari Accountancy Research*, *22*(2), 149–164.

Haigh, M., & Shapiro, M. (2011). Carbon Reporting: Does it Matter? *Accounting, Auditing & Accountability Journal*, *25*(1), 105–125.

Hardiyansah, M., Agustini, A. T., & Purnamawati, I. (2020). The Effect of Carbon Emission Disclosure on Firm Value: Environmental Performance and Industrial Type. *Journal of Asian Finance, Economics and Business*, *8*(1), 123–133. https://doi.org/10.13106/jafeb.2021.vol8.no1.123

Harmes, A. (2011). The limits of carbon disclosure: Theorizing the business case for investor environmentalism. *Global Environmental Politics*, *11*(2), 98–119. https://doi.org/10.1162/GLEP_a_00057

Hasan, I., Jackowicz, K., Kowalewski, O., & Kozłowski, Ł. (2017). Do local banking market structures matter for SME financing and performance? New evidence from an emerging economy. *Journal of Banking and Finance*, *79*, 142–158. https://doi.org/10.1016/j.jbankfin.2017.03.009

Hong, M., Drakeford, B., & Zhang, K. (2020). The impact of mandatory CSR disclosure on green innovation: evidence from China. *Green Finance*, *2*(3), 302–322. https://doi.org/10.3934/gf.2020017

Horbach, J., Rammer, C., & Rennings, K. (2012). Determinants of Eco-innovations by Type of Environmental Impact: The Role of Regulatory Push/Pull, Technology Push and Market Pull. *SSRN Electronic Journal*, *11*. https://doi.org/10.2139/ssrn.1805765

Kim, E. H., & Lyon, T. P. (2011). Strategic environmental disclosure: Evidence from the DOEs voluntary greenhouse gas registry. *Journal of Environmental Economics and Management*, *61*(3), 311–326.

https://doi.org/10.1016/j.jeem.2010.11.001

Kleimeier, S., & Viehs, M. (2018). Carbon Disclosure, Emission Levels, and the Cost of Debt. *SSRN Electronic Journal*, 1–42. https://doi.org/10.2139/ssrn.2719665

Knox-Hayes, J., & Levy, D. L. (2011). The politics of carbon disclosure as climate governance. *Strategic Organization*, *9*(1), 91–99. https://doi.org/10.1177/1476127010395066

Krishnamurti, C., & Velayutham, E. (2018). The influence of board committee structures on voluntary disclosure of greenhouse gas emissions: Australian evidence. *Pacific Basin Finance Journal*, *50*(September 2016), 65–81. https://doi.org/10.1016/j.pacfin.2017.09.003

Kurnia, P., Darlis, E., & Putra, A. A. (2020). Carbon Emission Disclosure, Good Corporate Governance, Financial Performance, and Firm Value. *Journal of Asian Finance, Economics and Business*, *7*(12), 223–231. https://doi.org/10.13106/JAFEB.2020.VOL7.NO12.223

Laplume, A. O. (2021). From Instrumental Stakeholder Theory to Stakeholder Capitalism. *Oxford Research Encyclopedia of Business and Management*, *March*. https://doi.org/10.1093/acrefore/9780190224851.013.319

Lee, S. Y., Park, Y. S., & Klassen, R. D. (2015). Market responses to firms' voluntary climate change information disclosure and carbon communication. *Corporate Social Responsibility and Environmental Management*, *22*(1), 1–12. https://doi.org/10.1002/csr.1321

Lemma, T. T., Feedman, M., Mlilo, M., & Park, J. D. (2019). Corporate carbon risk, voluntary disclosure, and cost of capital: South African evidence. *Business Strategy and the Environment*, *28*(1), 111–126. https://doi.org/10.1002/bse.2242

Li, Q.-C., & Long, Y. (2019). Research on the Carbon Performance Evaluation in the New Era—Based on the Full Life-Cycle Perspective. *International Conference on Economics and Management*, 278–282. https://doi.org/10.12783/dtem/icem2019/31188

Li, S., Li, X., Zhao, Q., Zhang, J., & Xue, H. (2022). An Analysis of the Dimensional Constructs of Green Innovation in Manufacturing Enterprises: Scale Development and Empirical Testing. *Sustainability (Switzerland)*, *14*(24). https://doi.org/10.3390/su142416919

Liesen, A., Figge, F., Hoepner, A., & Patten, D. M. (2017). Climate Change and Asset Prices: Are Corporate Carbon Disclosure and Performance Priced Appropriately? *Journal of Business Finance and Accounting*, *44*(1–2), 35–62. https://doi.org/10.1111/jbfa.12217

Liesen, A., Hoepner, A. G., Patten, D. M., & Figge, F. (2015). Information & Computer Security Article information : To cite this document : *Emerald Insight*.

Liu, Y. S., Zhou, X., & Yang, J. H. (2016). Corporate Carbon Emissions and Financial Performance: Does Carbon Disclosure Mediate the Relationship in the UK? *Discussion Paper*, *ICM-2016–0*, 1–35. https://doi.org/10.2139/ssrn.2941123

Lu, W., Zhu, N., & Zhang, J. (2021). The impact of carbon disclosure on financial performance under low carbon constraints. *Energies*, *14*(14). https://doi.org/10.3390/en14144126

Marzucchi, A., & Montresor, S. (2017). Forms of knowledge and eco-innovation modes : Evidence from Spanish manufacturing fi rms. *Ecological Economics*, *131*(2017), 208–221. https://doi.org/10.1016/j.ecolecon.2016.08.032

Matisoff, D. C. (2013). Different rays of sunlight: Understanding information disclosure and carbon transparency. *Energy Policy*, *55*, 579–592. https://doi.org/10.1016/j.enpol.2012.12.049

Matsumura, E. M., Prakash, R., & Vera-Muñoz, S. C. (2014). Firm-value effects of carbon emissions and carbon disclosures. *Accounting Review*, *89*(2), 695–724. https://doi.org/10.2308/accr-50629

Ministry of Environment and Forestry. (2021). Laporan Inventarisasi Gas Rumah Kaca dan Monitoring, Pelaporan, Verifikasi. In *Direktorat Jenderal Pengendalian Perubahan Iklim*. http://ditjenppi.menlhk.go.id/reddplus/images/adminppi/dokumen/igrk/LAP_igrk2020.pdf

Motoshita, M., Sakagami, M., Kudoh, Y., Tahara, K., & Inaba, A. (2015). Potential impacts of information disclosure designed to motivate Japanese consumers to reduce carbon dioxide emissions on choice of shopping method for daily foods and drinks. *Journal of Cleaner Production*, *101*, 205–214. https://doi.org/10.1016/j.jclepro.2015.04.005

Palea, V., & Drogo, F. (2020). Carbon emissions and the cost of debt in the eurozone: The role of public policies, climate-related disclosure and corporate governance. *Business Strategy and the Environment*, *29*(8), 2953–2972. https://doi.org/10.1002/bse.2550

Pellegrino, C., & Lodhia, S. (2012). Climate change accounting and the Australian mining industry : exploring the links between corporate disclosure and the generation of legitimacy. *Journal of Cleaner Production*, *36*(2012), 68–82. https://doi.org/10.1016/j.jclepro.2012.02.022

Qian, W., Hörisch, J., & Schaltegger, S. (2018). Environmental management accounting and its effects on carbon management and disclosure quality. *Journal of Cleaner Production*, *174*, 1608–1619. https://doi.org/10.1016/j.jclepro.2017.11.092

Rohani, A., Jabbour, M., & Abdel-Kader, M. (2021). Carbon performance, carbon disclosure, and economic performance: the mediating role of carbon (media) legitimacy in the UK. *International Journal of Accounting and Economics*

Studies, *9*(1), 8. https://doi.org/10.14419/ijaes.v9i1.31494

Saka, C., & Oshika, T. (2014). Disclosure effects, carbon emissions and corporate value. *Sustainability Accounting, Management and Policy Journal*, *5*(1), 22–45. https://doi.org/10.1108/SAMPJ-09-2012-0030

Schiemann, F., & Sakhel, A. (2019). Carbon Disclosure, Contextual Factors, and Information Asymmetry: The Case of Physical Risk Reporting. *European Accounting Review*, *28*(4), 791–818. https://doi.org/10.1080/09638180.2018.1534600

Silvia, M., & Guo, F. (2023). Determinants of Voluntary Carbon Disclosure in Indonesian Company : Greenwashing Risks. *International Journal of Management, Accounting and Economics*, *10*(8), 551–573. https://doi.org/10.5281/zenodo.8419436

Soewarno, N., Tjahjadi, B., & Hanifah Firdausi, R. (2018). The Impacts of Carbon Emission Disclosure, Environmental Performance, and Social Performance on Financial Performance (Empirical Studies in Proper Participating Companies Listed in Indonesia Stocks Exchange, Year 2013–2016). *KnE Social Sciences*, *3*(10), 957–971. https://doi.org/10.18502/kss.v3i10.3439

Sullivan, R., & Gouldson, A. (2012). Does voluntary carbon reporting meet investors' needs? *Journal of Cleaner Production*, *36*(January), 60–67. https://doi.org/10.1016/j.jclepro.2012.02.020

Talbi, D., & Omri, M. A. (2014). Voluntary disclosure frequency and cost of debt : an analysis in the Tunisian context. *International Journal Managerial and Financial Accounting*, *6*(2), 167–174.

Tang, S., & Demeritt, D. (2018). Climate Change and Mandatory Carbon Reporting: Impacts on Business Process and Performance. *Business Strategy and the Environment*, *27*(4), 437–455. https://doi.org/10.1002/bse.1985

Tang, Y., Shen, Y., Yang, Q., & Zhao, Z. (2019). Evaluation and Effect of Carbon Disclosure Quality in China: Based on the Perspective of Investor Protection. *Emerging Markets Finance and Trade*, *57*(9), 1–16. https://doi.org/10.1080/1540496X.2019.1680539

Upham, P., Dendler, L., & Bleda, M. (2011). Carbon labelling of grocery products: Public perceptions and potential emissions reductions. *Journal of Cleaner Production*, *19*(4), 348–355. https://doi.org/10.1016/j.jclepro.2010.05.014

Wang, G., Lou, X., Shen, J., Dan, E., Zheng, X., Shao, J., & Li, J. (2022). Corporate Carbon Information Disclosure and Financing Costs : The Moderating Effect of Sustainable Development. *Sustainability*, *14*(9159), 1–16.

Wu, W., An, S., Wu, C. H., Tsai, S. B., & Yang, K. (2020). An empirical study on green environmental system certification affects financing cost of high energy consumption enterprises-taking metallurgical enterprises as an example. *Journal of Cleaner Production*, *244*(xxxx), 118848. https://doi.org/10.1016/j.jclepro.2019.118848

Xiang, X., Liu, C., Yang, M., & Zhao, X. (2020). Confession or justification: The effects of environmental disclosure on corporate green innovation in China. *Corporate Social Responsibility and Environmental Management*, *27*(6), 2735–2750. https://doi.org/10.1002/csr.1998

Yang, Y., Wen, J., & Li, Y. (2021). The impact of environmental information disclosure on the cost of debt: evidence from China. *Research Square*, 1–20.

Zhang, Y.-J., & Liu, J.-Y. (2020). Overview of research on carbon information disclosure. *Frontiers of Engineering Management*, *7*(1), 47–62. https://doi.org/10.1007/s42524-019-0089-1

Zhou, Z., Zhou, H., Peng, D., Chen, X. hong, & Li, S. hui. (2018). Carbon Disclosure, Financial Transparency, and Agency Cost: Evidence from Chinese Manufacturing Listed Companies. *Emerging Markets Finance and Trade*, *54*(12), 2669–2686. https://doi.org/10.1080/1540496X.2018.1428796

Zhu, J., Fan, Y., Deng, X., & Xue, L. (2019). Low-carbon innovation induced by emissions trading in China. *Nature Communications*, *10*(1), 1–8. https://doi.org/10.1038/s41467-019-12213-6

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