Dharma, Fitra; Marimutu, Maran; Alvia, Liza

Article

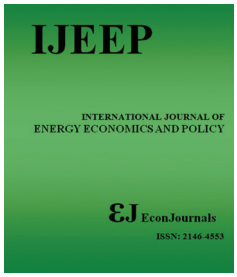
Profitability and market value effect on carbon emission disclosures : the moderating role of environmental performance

International Journal of Energy Economics and Policy

Provided in Cooperation with:
International Journal of Energy Economics and Policy (IJEEP)

Reference: Dharma, Fitra/Marimutu, Maran et. al. (2024). Profitability and market value effect on carbon emission disclosures : the moderating role of environmental performance. In: International Journal of Energy Economics and Policy 14 (3), S. 463 - 472. https://www.econjournals.com/index.php/ijeep/article/download/15915/7898/36982. doi:10.32479/ijeep.15915.

This Version is available at:
http://hdl.handle.net/11159/653661



International Journal of Energy Economics and Policy

ISSN: 2146-4553

available at http: www.econjournals.com

International Journal of Energy Economics and Policy, 2024, 14(3), 463-472.

Profitability and Market Value Effect on Carbon Emission Disclosures: The Moderating Role of Environmental Performance

Fitra Dharma[1]*, Maran Marimutu[2], Liza Alvia[1]

[1]Univeristy of Lampung, Indonesia, [2]Universiti Teknologi Petronas, Malaysia. *Email: fitra.dharma@feb.unila.ac.id

Received: 22 January 2024 **Accepted:** 07 April 2024 **DOI:** https://doi.org/10.32479/ijeep.15915

ABSTRACT

Climate change is an issue that is of concern to the global public and scientific community. There is a close relationship between climate change and carbon emissions, which are the primary cause of global warming. Reporting on carbon emissions is essential for corporate accountability to stakeholders when evaluating a company's financial and non-financial performance. Good management of carbon emissions will enhance the company's reputation. This study analyses the impact of company profitability and market value on the disclosure of carbon emissions, with environmental performance serving as a moderating variable in the context of Indonesian public companies. This study concludes that: (1) There is no significant impact on profitability, as measured by Return on Assets, on Carbon Emission Disclosure; (2) The study finds that there is a statistically significant positive relationship between market value, measured by Tobin's Q, and the level of carbon emission disclosure. This relationship is significant at a 5% significance level; (3) The moderating effect of environmental performance on the relationship between profitability, as measured by return on assets, and carbon emission disclosure is found to be insignificant; (4) The significance level of 10% indicates that the relationship between environmental performance, as a measure of a company's environmental practices, and market value, as represented by Tobin's Q, is strengthened concerning the disclosure of carbon emissions. This research can contribute to developing accounting knowledge to close gaps in the body of knowledge regarding the disclosure of carbon emissions in developing nations, particularly Indonesia.

Keywords: Carbon Emission Disclosure, Market Value, Oil and Gas Industry, Public Listed Company, Profitability
JEL Classifications: G14, M14, O16, Q56

1. INTRODUCTION

Currently, climate change is a global issue that people are concerned about. Global warming causes climate change, which continues to increase. Global warming can result in melting ice sheets, rising sea levels, and higher global temperatures, all of which significantly impact climate change. There is a close relationship between climate change and carbon emissions, which are the primary cause of global warming. Excessive carbon emissions from fossil fuel combustion, land reclamation, agriculture, and other human activities cause this condition. According to (Sullivan and Gouldson, 2013), the rise in carbon emission gas levels can be attributed to the activities of numerous industries.

In 2021, global energy-related carbon emissions will increase by 6% to 36.3 billion tonnes. This score is the highest level ever due to the global economy's recovery from COVID-19 and the industry's reliance on coal to fuel economic development (International Energy Agency, 2022). Since 1970, CO_2 emissions have increased by approximately 90%, with consuming fossil fuels and industrial emissions accounting for about 78% of the total increase in greenhouse gas emissions (EPA, 2022). However, in international discourse, the distribution of responsibility for producing carbon emissions among regions, countries, and individuals has been the subject of never-ending debate. Cormier and Beauchamp (2021) assert that reporting on carbon emissions is essential for corporate accountability to

stakeholders when evaluating a company's financial and non-financial performance.

All stakeholders must actively address climate change to preserve community continuity and quality of life. All stakeholders must actively adapt to climate change to ensure the community's continuity and quality of life. With the adoption of the Kyoto Protocol to the United Nations Framework Convention on Climate Change, efforts were made to address the rising carbon emissions problem. The Kyoto Protocol is an international agreement that attempts to resolve global climate change's threat to human survival by holding each nation accountable for reducing carbon emissions. The Kyoto Protocol is supervised by the UNFCCC (United Nations Framework Convention on Climate Change), a particular agency of the United Nations that addresses climate change. Similarly, the mandate of RI Law No. 17 of 2004 to ratify the Kyoto Protocol demonstrates the government's active involvement in Indonesia.

On the other hand, global climate change necessitates initiatives for various parties to discuss non-financial accounting issues and carbon emission reporting. According to (Alsaifi et al., 2020), climate change has become an essential factor in corporate decision-making and a challenge for corporate leadership. Increased public awareness and concern about global climate change have led to increased demands for companies to disclose the risks associated with climate change and their strategies for mitigating its effects (Dutta and Dutta, 2021). This result is consistent with a finding that businesses are pressured to disclose more information regarding their plans to reduce greenhouse gas emissions (Alsaifi et al., 2020).

Good management of carbon emissions will enhance the company's reputation with stakeholders, increase consumer loyalty, and reduce risk (Jacobs et al., 2010). On the other hand, Lee et al. (2015) found that the market is likely to react negatively to the disclosure of corporate carbon emissions; this suggests that investors tend to view the disclosure of carbon emissions as negative news. They indicate that the market will be concerned about the potential costs businesses will incur in addressing global warming. According to (Depoers et al., 2016), managers adapt their carbon emission disclosure strategies to meet the information requirements of various stakeholder groups.

Beauchamp and Cormier (2022) demonstrate that disclosing information regarding carbon emissions depends on Return on Assets (ROA). Moreover, it was argued that these results could influence managers' decisions to disclose or withhold environmental information voluntarily. Saraswati et al. (2021) show that the availability of company financial resources, as measured by ROA, can increase the disclosure of carbon emissions in Indonesian firms. However, Purwanti et al. (2022) stated that ROA does not significantly affect the scope of carbon emission information disclosure in Indonesian state-owned enterprises. Ratmono et al. (2021) pointed out that ROA has a negative impact on carbon emission disclosure.

Companies with high market-based performance, as measured by Tobin's Q, can disclose more non-financial information to meet stakeholder requirements. However, the study indicates that the market value of the United States' oil and gas industry, as measured by Tobin's Q, is unrelated to carbon emission disclosure (Beauchamp and Cormier, 2022). Laksani et al. (2020) and Ratmono et al. (2021) indicate that Tobin's Q value does not significantly impact carbon emission disclosure. Therefore, there is no uniformity in how the market evaluates the value of disclosing carbon emissions to Indonesian companies.

According to the voluntary disclosure theory predictions, there is a positive relationship between environmental disclosure and carbon emission disclosure (Clarkson et al., 2008). In accordance with this, environmental performance as a benchmark for complying with relatively stringent environmental regulations increases the negative assessment effect of carbon emissions (Choi and Luo, 2021). Based on the findings of Beauchamp and Cormier (2022), carbon emissions will result in a significant decrease in market value, making valuable information for analyzing environmental hazards in terms of market value. Their study shows that the company's environmental performance demonstrates its commitment to developing an effective environmental management system.

Previous empirical studies on the factors influencing the disclosure of carbon emissions have yielded conflicting results. This study examined the impact of company profitability and market value on the disclosure of carbon emissions in the context of Indonesian companies. This study will also investigate the effect of environmental performance on the profitability and market value of companies that disclose carbon emissions. No research has been discovered in the area of disclosing carbon emissions that uses environmental performance as a moderating variable between the relationship between profitability and market value of companies in Indonesia.

Indonesia is not an exception to the fact that the activities of its companies generate carbon emissions. By passing RI Law No. 17 of 2004, the government ratified the Kyoto Protocol. This policy was developed to assist companies in anticipating carbon emissions generated by their operations.

Public firms listed on the Indonesia Stock Exchange are required by this rule to declare carbon emissions in their annual reports. Asmaranti and Lindrianasari (2014) examined 96 manufacturing companies' annual reports for 2000–2011. The study shows that before the passage of RI Law No. 17 of 2004, no companies in Indonesia acknowledged their carbon emissions. It was further noted that following the law's passage, companies included information on their carbon emissions in their annual reports from 2005 to 2011. However, there were relatively few disclosures.

Nevertheless, according to the World Population Review (an organization that evaluates information on population, demographic, and environmental development), Indonesia ranked sixth in the world in 2011 regarding its contribution to carbon emissions. This information indicates that Indonesia is the Southeast Asian country that emits the most carbon dioxide. The Indonesian government has addressed the country's high carbon

emissions by issuing Presidential Regulation No. 11 of 2011 (concerning the national action plan for reducing greenhouse gas emissions) and Presidential Regulation No. 71 of 2011 (regarding implementing a national greenhouse gas inventory).

The corporation complies with this government regulatory policy in response to the carbon emissions effect caused by the disposal of carbon emissions that contribute to global warming. The most recent WRI report reveals that Indonesia ranks tenth in 2020 (WRI, 2023). This report indicates that Indonesia has fallen four positions in the last 9 years. However, Indonesia is still the Southeast Asian nation with the highest carbon emissions.

This study will investigate the influence of company profitability and market value on the disclosure of carbon emissions, with environmental performance as a moderating variable, in the context of Indonesian public companies.

2. LITERATURE REVIEW

2.1. Signaling Theory

Signaling Theory was developed by Ross (1977). She mentioned that company executives with superior knowledge would share this information with potential investors, increasing the company's stock price. The positive aspect of the signaling theory is that companies that provide quality information will send "good news" to the market as a signal. This signal will distinguish them from competitors with no "good news" to share about their circumstances. The market will not rely on indications of a company's future financial performance if it has a poor track record.

The assumption underlying signal theory is that the information received by each participant is distinct. In other terms, information asymmetry is the focus of signaling theory. The Signaling theory illustrates an information asymmetry between company management and interested parties. For this reason, managers must provide interested parties with financial reports, the signal containing pertinent information. The theory of signaling describes how a company should provide financial statement consumers with signals. This signal contains information about management's actions to fulfill the proprietor's desires. Signals can take the form of advertisements or other information claiming that the company is superior to its competitors.

2.2. Legitimation Theory

Gray et al. (1995) state that legitimacy is a pro-community company management system. As a community-oriented system, the company's operations must be consistent with the expectations of the community and the adjacent environment. In order to improve a company's image in the minds of society, it is possible to enhance its legitimacy through environmental activities by disclosing carbon emissions.

Regarding legitimacy, mandatory accounting disclosures play a role in the relationship between organizations and society (Mobus, 2005). Mandatory disclosure limits the ability of organizations only to exhibit symbols of their environmental performance, which may not be a good indicator of how well they perform in reality, by explaining tangible results to the appropriate individuals. While companies may continue to use positive symbolic representations to gain legitimacy, the study results indicate that companies are more likely to adhere to environmental regulations if required to inform the public of violations.

Most research on why companies include environmental information in their annual reports suggests that legitimacy theory is one of the most plausible explanations for increased environmental disclosure (O'Donovan, 2002). It is anticipated that legitimacy theory will ensure that the company's activities and performance are acceptable to society. The company's annual report illustrates its commitment to minimizing the carbon emissions it produces so society can accept it. It can increase investor confidence to invest in the company if the community trusts it.

2.3. Agency Theory

Jensen and Meckling (1979) first introduced agency theory. They explain that information asymmetry can exist between parties (principals) who provide authority (shareholders) and agents played by company management. In agency theory, asymmetric information can arise from differences between proprietors and agents seeking to maximize their respective profits relative to firm profits.

Conflicts between principals and agents arise due to information asymmetries. According to Healy and Palepu (2001), to avoid agency conflicts of interest, contracts are optimized to be profitable for agents but do not supersede the principals' interests. The purpose of contract proposals is to motivate agents to work more effectively and efficiently for the company and to provide agents with incentives, compensation, and commissions. It is anticipated that voluntary disclosure will reduce conflicts caused by divergent interests. For external parties to believe that the company's management is operating effectively and efficiently, management makes voluntary disclosures. Disclosure of carbon emissions allows agents to maintain their principals' trust. Disclosure of information serves as a means of communication between principals and agents, allowing company management to respond to stakeholders' desires. Disclosure of information can take the form of disclosure of carbon emissions to stakeholders by company management.

2.4. Carbon Emissions Disclosure

Disclosure of the company's environmental technology, practices, and performance satisfies the requirements of the company's stakeholders, including regulators, employees, and customers. Disclosure is generally advantageous because it reduces information asymmetry between companies and outsiders, thereby facilitating the efficient allocation of finite resources (Healy and Palepu, 2001). Disclosure of carbon emissions is one example of environmental disclosure that may be included in a supplemental report, as stated in PSAK No.1 (Revised 2009), paragraph twelve, which states that an entity may present, in addition to its financial statements, environmental reports, and value-added statements, particularly for industries where environmental factors and employees who may become users of the report play a significant role.

Carbon disclosure is a compilation of quantitative and qualitative information regarding a company's past and projected levels of carbon emissions, its exposure to and financial implications of risks and opportunities associated with climate change, and its past and future actions. Disclosure of Carbon Emissions was measured in this study by adopting several items from Bae Choi et al. (2013), devised by the Carbon Disclosure Project (CDP). There are five broad categories relevant to climate change and carbon emissions: climate change risks and opportunities (CC/Climate Change), greenhouse gas emissions (GHG), energy consumption (EC/Energy Consumption), reduction of greenhouse gases and costs (RC/Reduction and Cost), and carbon emission accountability (AEC/Accountability of Carbon Emission).

2.5. Market Value

James Tobin first introduced Tobin's Q. Tobin's Q is the ratio of a company's value to the value of its assets; if the ratio is greater than the previous year's ratio, it indicates that the company may have managed its assets more effectively and efficiently. Whether the company can increase profits or not is favorable. Tobin's Q is a valuation method or tool that compares a company's market capitalization and debt to its total assets. Tobin's Q is a method or measurement instrument for evaluating a company's performance, which exposes asset management efficiency. To calculate Tobin's Q, total market capitalization, total debt, and total assets are compared. This ratio represents the current or market estimate of the return per invested rupiah. Tobin has advantages and disadvantages.

Tobin's qualities include his capacity to list all company assets. Tobin's Q can also characterize market sensitivity, such as an analysis based on an organization's expectations or forecasts. Third, Tobin's Q can reflect the intellectual capital of a company. Tobin's Q can also circumvent the issues that arise when profit rates are considered. Due to the difficulty in estimating replacement costs, advertising expenditures, and research and development expenditures, Tobin's Q can be misleading when measuring market power despite its benefits.

2.6. Environment Performance

Environmental performance is the company's performance in creating a good (green) environment. Law Number 32 of 2009 requires corporate environmental responsibility concerning the Creation of New Jobs as amended by Law Number 11 of 2021. Stakeholders can check a company's environmental performance through Regulation of the Minister of Environment Number 03 of 2014, which relates to the Company Performance Rating Program in Environmental Management, amended by Regulation of the Minister of Environment and Forestry Number 1 of 2021. When a company performs well in environmental matters, it will disclose this information in its annual report.

Environmental performance is achieved through various activities to encourage business actors to comply with laws and regulations and encourage business actors with good environmental performance to apply cleaner production methods. A PROPER assessment can be used to measure a company's environmental performance. To increase company compliance with environmental management best practices, the State Ministry of Environment created PROPER, a program to assess companies' environmental performance ratings.

2.7. Profitability and Carbon Emissions Disclosure

Disclosure of carbon emissions in Indonesia is voluntary, and only a few companies have disclosed this information. Several studies demonstrate that disclosure of social and environmental activities can provide capital market investors with investment certainty and security. Companies will use various methods to gain legitimacy from the general public, including transparently communicating information.

Beauchamp and Cormier (2022) analyzed 264 industrial oil and gas companies listed on US and Canadian stock exchanges. According to their research, return on assets (ROA) is positively correlated with managers' decisions to disclose information about carbon emissions. Moreover, it is hypothesized that these findings may influence managers when deciding whether to disclose environmental information voluntarily. Saraswati et al. (2021) researched Indonesia and found that the availability of a company's financial resources as measured by ROA can increase the disclosure of a company's carbon emissions.

The hypothesis tested in this research is:
Ha_1: Profitability has a significant positive effect on carbon emission disclosure.

2.8. Market Value and Carbon Emissions Disclosure

Companies with high market-based performance, as measured by Tobin's Q, can disclose more non-financial information to satisfy the requirements of various stakeholders (Beauchamp and Cormier, 2022). Griffin et al. (2017) argued that the market imposes costs on carbon-emitting activities.

This study tested the following hypothesis:
Ha_2: Market value has a significant positive effect on carbon emission disclosure.

2.9. Environmental Performance as a Moderator of Profitability on Carbon Emissions Disclosure

As indicated by the PROPER rating, companies that have demonstrated a proactive level of environmental concern are motivated to make voluntary carbon emission disclosures to demonstrate to investors and other external parties the success of their environmental strategy (Ratmono et al., 2021). Businesses must enhance their environmental performance to satisfy various stakeholders' requirements (Cormier and Beauchamp, 2021). Regarding the disclosure of carbon emissions, stakeholders must have faith in the results of environmental performance in order to strengthen the relationship between profitability and corporate value. In order to satisfy the demands of diverse stakeholders, businesses must enhance their environmental performance. When a company receives a high rating, the public feels the need for concrete evidence of the company's actions so that the company obtains legitimacy in accordance with applicable norms and laws. This condition is where the theory of legitimacy comes into play.

This study tested the following hypothesis:
Ha_3: Environmental performance strengthens the relationship between profitability and carbon emissions disclosure.

2.10. Environmental Performance as a Moderator of Market Value on Carbon Emissions Disclosure

As indicated by the PROPER rating, companies that have demonstrated a proactive level of environmental concern are motivated to make voluntary carbon emission disclosures to demonstrate to investors and other external parties the success of their environmental strategy (Ratmono et al., 2021). Businesses must enhance their environmental performance to satisfy various stakeholders' requirements (Cormier and Beauchamp, 2021). Regarding the disclosure of carbon emissions, stakeholders must have faith in the results of environmental performance in order to strengthen the relationship between profitability and corporate value. In order to satisfy the demands of diverse stakeholders, businesses must enhance their environmental performance. When a company receives a high rating, the public feels the need for concrete evidence of the company's actions so that the company obtains legitimacy in accordance with applicable norms and laws.

This study tested the following hypothesis:
Ha_4: Environmental performance strengthens the relationship between market value and carbon emission disclosure.

3. RESEARCH METHODS

3.1. Population and Sample

This study's population consists of manufacturing firms listed on the Indonesia Stock Exchange (IDX) between 2012 and 2022. Based on this population, the research sample will be determined. Purposive sampling was used to identify the sample, with the following criteria: (1) Oil and gas companies that have a substantial presence and operate in environmentally sensitive industries (Beauchamp and Cormier, 2022; Cho, 2009); (2) Companies with annual reports and sustainability reports published on the company's website or the Indonesia Stock Exchange for 2012-2022.

3.2. Definition and Operational Research Variables

The definitions and measurements of the dependent, independent, moderating, and control variables are described in Table 1.

3.3. Data Analysis and Hypothesis Testing

Multiple regression analysis was used to analyze the data in this study. The SPSS application will be used as the analysis instrument. The regression model used for assessing hypotheses is:

$$CED_{it}=\alpha+\beta_1 ROA_{it}+\beta_2 TOBIN'SQ_{it}+\beta_3 SIZE_{it}+\beta_4 AGE_{it}+\beta_5 ENV_{it}+\beta_6 ROA*ENV_{it}+\beta_7 TOBIN'SQ*ENV_{it}+\varepsilon$$

Description:
α=Constanta
β=Regression Coefisient
CED=Carbon Emissions Disclosure
ROA=Return on Assets
TOBIN'SQ=Market Value (Tobin's Q)
SIZE=Firm Size
AGE=Firm Age
ROA*ENV=Interaction between ROA and Environment Performance
TOBIN'SQ*ENV=Interaction between Market Value and Environment Performance
ε=Error term

4. ANALYSIS AND DISCUSSION

4.1. Data and Sample

The data utilized in this study was acquired employing the content analysis technique, which involved extracting information from sustainability reports and annual reports sourced from both the company's official website and the BEI website (www.idx.co.id). The dataset encompasses a longitudinal timeframe spanning eleven consecutive years, specifically from 2012 to 2022. Based on pre-established criteria, the sample size consisted of 45 companies, resulting in a cumulative total of 495 observations.

4.2. Results

4.2.1. Statistic descriptive

Carbon Emission Disclosure (CED) refers to the practice of providing comprehensive information pertaining to a company's environmental technology, practices, and performance. This disclosure entails the divulgence of specific details regarding the company's carbon emissions, thereby shedding light on its environmental impact. By engaging in CED, companies aim to enhance transparency and accountability, enabling stakeholders to make informed decisions and fostering a more sustainable business environment. The measurement process involves the utilization of a set of 18 disclosure items that have been meticulously crafted and curated by the esteemed Carbon Disclosure Project (CDP). According to the findings of the Carbon Emission Disclosure (CED) study, it has been observed that companies, on average, tend to disclose their carbon emissions at a rate of 0.15073 (Table 2). This value is accompanied by a standard deviation of 0.268645016, which suggests that there is a certain degree of variability in the reporting practices of these companies. The observed positive values for kurtosis and skewness indicate that the distribution under consideration exhibits heavier tails compared to a normal distribution. This result suggests the presence of potential outliers with higher disclosure rates.

Return on Assets (ROA) pertains to the evaluation of a company's financial performance with regard to its resource management. The analysis of Return on Assets (ROA) reveals an average ROA of 0.403263. However, it is important to note that the high standard deviation of 7.134107721, as well as the positive kurtosis and skewness values, suggest a significant amount of variability in the data. These findings also indicate the presence of potential outliers and a distribution that is skewed to the right, with a few institutions exhibiting exceptionally high ROA values.

Tobin's Q is a financial metric that quantifies the relationship between a company's market value and the value of its assets. Tobin's Q, a metric used to assess market valuation, demonstrates a moderate level with an average value of 1.796752. However, it

Table 1: Definition and operational research variables

Variable	Definition	Measurement	Reference
Dependent Variable Carbon Emission Disclosure	Disclose details regarding the company's environmental technology, practices, and performance. It is measured using 18 disclosure items developed by the Carbon Disclosure Project (CDP).	Eighteen disclosure items were developed by the Carbon Disclosure Project (CDP) as an indicator.	(Bae Choi et al., 2013; Purwanti et al., 2022; Ratmono et al., 2021)
Independent variable			
X1 Profitability	The company's financial performance in managing its resources.	Return On Assets (ROA) $ROA = \frac{Income befor Tax}{Total\ Asset}$	(Beauchamp and Cormier, 2022; Clarkson et al., 2008; Riantono and Sunarto, 2022)
X2 market value	The ratio of company value is measured by the value of its assets.	Tobin's Q	(Beauchamp and Cormier, 2022; Laksani et al., 2020; Wijayani and Ratmono, 2020)
Moderating Variable Environment Performance	Performance of the Firm in establishing a green environment with the Ministry of Environment and Forestry's PROPER program.	The score of the PROPER rating system: 1. Gold=5 2. Green=4 3. Blue=3 4. Red=2 5. Black=1	(Sarumpaet et al., 2017)
Control Variable:			
1. Firm Size	The Size of a firm	Logaritma natural dari Total Aset, Size=Ln Total Aset	(Purwanti et al., 2022; Saraswati et al., 2021)
2. Firm Age	The length of time of the company's establishment is until the observation period.	The amount of time between the date of the observation period and the date of establishment of IDX.	(Ciriyani and Putra, 2016)

Table 2: Statistic descriptive

Variable	Mean	Standard deviation	Variance	Kurtosis	Skewness	Minimum	Maximum
CED	0.15073	0.268645016	0.072170144	1.549844	1.713353	0	1
ROA	0.057497	0.261529567	0.068397714	102.6655	6.62680	−1.5382758	3.9276675
Tobin's Q	1.796752	5.087607691	25.88375202	359.2132	17.84893	0.0689578	105.999876
EP	2.886869	1.119991909	1.254381875	2.522009	-1.3295	0	5
Size	13411369	23725038.31	5.62877E+14	9.111951	2.907145	15101	168473547
Age	32.09022	12.20634424	148.9948398	-0.25346	0.02119	0.2328767	57.6739726

is important to note that the presence of high standard deviation, kurtosis, and skewness values implies a significant degree of variability and the possibility of outliers within the data. Furthermore, the right-skewed distribution indicates a tendency towards higher values on the right side of the distribution.

The Environmental Performance (EP) refers to the evaluation of a company's efforts in creating and maintaining an environmentally sustainable atmosphere, particularly in relation to its participation in the Ministry of Environment and Forestry's PROPER program. The empirical performance (EP) metric exhibits a mean value of 2.886869, accompanied by a standard deviation of 1.119991909. The presence of negative skewness in the data implies a left-skewed distribution, which signifies that a greater number of institutions may possess environmental performance scores that are lower than the mean score.

The Size of the Firm is a significant factor to consider when examining various aspects of organizational behavior and performance. Researchers have found that firm Size can have a profound impact on factors such as decision-making processes, communication channels, and overall the dimension of a business entity. The variable "Size" provides insight into the average size of educational entities, which is estimated to be 13,411,369. However, it is important to note that there is a large standard deviation of 23,725,038.31, indicating significant variability in the data. Additionally, the positive kurtosis and skewness values suggest the presence of potential outliers, particularly on the larger end of the size spectrum.

The concept of firm age refers to the length of time that a particular business entity has been in operation. It is a fundamental variable that is often examined in the field of organizational research, as it can provide valuable insights into the temporal duration of the company's establishment extends until the conclusion of the observation period. The variable "Age" exhibits a mean value of 32.09022, accompanied by a standard deviation of 12.20634424. These statistical measures suggest the presence of variability within the institutional age. The presence of negative kurtosis in the data suggests that the distribution exhibits lighter tails compared to a normal distribution. The result means that extreme values are less likely to occur. Additionally, the skewness value close to zero indicates that the distribution of institutional age is relatively balanced, without a significant deviation towards either the left or right tail of the distribution. In brief, this extensive examination of crucial factors provides significant contributions in terms of

understanding the financial, environmental, and structural aspects of educational institutions.

4.2.2. Stationary test

Conducting a data stationarity test is imperative in order to ascertain the presence of stationarity and absence of unit roots in the data, thereby facilitating the generation of an accurate model estimate. In order to enhance the reliability of the stationary test outcomes, this study employs two distinct types of stationary tests, specifically the Fisher-Augmented Dickey-Fuller (ADF) test and the Levin, Lin and Chu (LLC) test.

The stationarity of data is determined by examining the resulting P-value from the Augmented Dickey-Fuller (ADF) and the Levin, Lin and Chu (LLC) test. If the P-value is found to be less than the conventional significance level of 0.05, the data is considered to be stationary. The findings presented in Table 3 indicate that the stationarity test conducted at level for the variables ROA, Tobin's Q, ROA*EP, and Tobin's Q*EP result in P-values below the significance threshold of 0.05 in both the Augmented Dickey-Fuller (ADF) and the Levin, Lin and Chu (LLC) tests. In the context of our research, it is noteworthy to mention that the stationarity test conducted at level for the variables CED, EP, and Age provided P-values exceeding the significance level of 0.05 in both the Augmented Dickey-Fuller (ADF) and the Levin, Lin and Chu (LLC) tests. Hence, based on the analysis conducted, it can be inferred that the variables ROA, Tobin's Q, ROA*EP, and Tobin's Q*EP exhibit stationarity at level.

Consequently, there is no necessity to proceed with first difference testing. In the present study, it has been observed that the variables CED, EP, and Age exhibit non-stationarity at the level. As a result, additional analysis is warranted to ascertain their stationarity at the first difference.

4.2.3. Variance inflation factor test

Based on the results of the multicollinearity test, as shown in Table 4, it can be observed that the predictor variables consistently exhibit Variance Inflation Factors (VIFs) that consistently remain below an acceptable value of 10. Based on the findings of the estimation procedure, there is a lack of evidence supporting the presence of multicollinearity among any of the predictors.

4.2.4. Analysis regression

Based on Table 5, the observed coefficient of 0.124096 implies a positive correlation between Return on Assets (ROA) and carbon emission disclosure (CED). The statistical significance, a measure indicating the likelihood of independently obtaining the observed results, is determined by the calculated P = 0.2783, surpassing the predetermined significance threshold of 0.05. Consequently, the statistical test results lead to the "rejection" of the null hypothesis. The analysis indicates insufficient evidence supporting the proposition that the variable ROA holds statistical significance in predicting carbon emission disclosure.

The coefficient for Tobin's Q is −0.036821, suggesting a negative correlation with CED. The significance value, recorded at 0.0423, demonstrates a statistically significant relationship. With the P = 0.0423 falling below the conventional threshold of 0.05, the outcome is considered statistically significant at the 5% level. Thus, the findings imply a statistically significant association between Tobin's Q and the prediction of carbon emission disclosure.

For the variable "Size," the coefficient of −0.036821 indicates a negative association with CED. The significance value for the observed data is 0.0498, which is statistically significant at the 5% level. Consequently, the analysis reveals a statistically significant relationship between Size and the prediction of carbon emission disclosure.

Regarding the variable "Age," the coefficient of −0.006416 suggests a positive association with CED. The significance value for the observed data is 0.0661, falling below the common threshold of 0.10. At a confidence level of 10%, the statistically significant result is "Accepted," indicating a significant relationship between Age and the ability to predict carbon emission disclosure.

In exploring the moderating effect of environmental performance on the relationship between ROA and CED, the study findings suggest that environmental performance does not significantly moderate the relationship between the two.

The coefficient of −0.027723, representing the relationship between Tobin's Q*EP and the variable under investigation, indicates the magnitude and direction of the association. The findings suggest a positive association between the interaction of Tobin's Q and EP and the Composite Economic Development (CED) measure. With a significance level of 0.0813 and a P-value below the predetermined threshold of 0.10, the analysis deems the result "Accepted" at a 10% significance level. The result implies a significant relationship between the interaction term Tobin's Q and EP on carbon emission disclosure.

Table 3: Stationary test

Variables	Fisher-ADF (P<0.05)		LLC (P<0.05)		Conclusion
	At Level	First Diff.	At Level	First Diff.	
CED	0.5191	0.0000	0.9891	0.0000	First Diff
ROA	0.0005	-	0.6162	-	At Level
Tobin's Q	0.0000	-	0.0000	-	At Level
EP	0.6702	0.0000	0.6243	0.0000	First Diff
Size	0.0153	-	0.0092	-	At Level
Age	0.2968	0.0411	0.1795	0.0454	First Diff
ROA*EP	0.0015	-	0.0004	-	At Level
Tobin's Q*EP	0.0000	-	0.0000	-	At Level

Table 4: Stationary test

Variable	VIF
CED	5.208917
ROA	9.600891
Tobin's Q	1.882054
EP	1.278993
Size	1.027421
Age	5.262754
ROA*EP	9.624426
Tobin's Q*EP	5.208917

Table 5: Hypothesis test results

Variable	Coefficient	Sig	Result
X_1 ROA	0.124096	0.2783	Rejected
X_2 Tobin's Q	0.095694	0.0423	Accepted*
X_3 Size	−0.036821	0.0498	Accepted*
X_4 Age	−0.006416	0.0661	Accepted**
$Z*X_1$ ROA*EP	0.013991	0.7248	Rejected
$Z*X_2$ Tobin's Q*EP	0.027723	0.0813	Accepted**

4.3. Results

4.3.1. Profitability and carbon emissions disclosure

The finding that there is no statistically significant relationship between profitability, as measured by Return on Assets (ROA), and Carbon Emission Disclosure (CED) raises intriguing concerns regarding the dynamics of environmental disclosure practices. In a comprehensive investigation conducted by Clarkson et al. (2008), the primary focus was to examine the factors influencing voluntary environmental disclosure. The study's findings revealed that there was no significant impact of financial performance, specifically measured by return on assets, on the extent of environmental disclosure.

Similarly, in a study conducted by (Cormier et al., (2005) examine the relationship between financial performance and environmental disclosure. The findings of this analysis were diverse, indicating that a range of factors may influence the association between these two variables.

4.3.2. Market value and carbon emissions disclosure

The statistical findings indicate a significant relationship between a firm's market value, measured by Tobin's Q, and its level of disclosure about carbon emissions. The result shows that there is a link between a company's market valuation and its dedication to promoting transparency in environmental matters. This discovery is consistent with prior research that examines the impact of market pressures on company environmental disclosure. The research conducted by Cho and Patten (2013) examined the correlation between the value of firms and their level of environmental disclosure. The results of the study revealed a positive correlation between the market value of enterprises and their propensity to share environmental information. This assertion is consistent with the notion that a higher market valuation indicates a heightened emphasis on transparency and disclosure in order to fulfill the demands of many stakeholders, including investors with a strong commitment to environmental sustainability.

Moreover, the observed correlation between market value and carbon emission disclosure can potentially be elucidated by the growing significance of environmental accountability in shaping organizations' overall reputation and financial position. According to Dhaliwal et al. (2012), enterprises may be motivated to disclose their carbon emissions due to the potential for investors to assign higher market values to companies that demonstrate a commitment to addressing environmental concerns.

4.3.3. Environmental performance as a moderator of profitability on carbon emissions disclosure

The lack of moderating effect of environmental performance on the relationship between profitability (as measured by Return on Assets) and disclosure of carbon emissions implies that financial success and environmental commitment are tightly connected. Although this discovery may seem contradictory, it is consistent with various research investigations and theoretical frameworks. Patten (2002) conducted a study that investigated the moderating impact of environmental performance on the association between a company's financial performance and its environmental disclosure. The results indicated that there was no significant moderation effect of a firm's environmental performance on the relationship, implying that enterprises with high environmental performance did not necessarily exhibit greater transparency in disclosing their environmental policies.

Similarly, organizations possess strategic autonomy in determining the level of environmental transparency, and this autonomy may not be much impacted by their environmental achievements in relation to the disclosure of carbon emissions (Cho and Patten, 2007). Additionally, it is worth noting that stakeholder pressure and expectations may have a more significant impact on carbon emission disclosure than only relying on the Firm's environmental performance (Gray et al., 1995).

4.3.4. Environmental performance as a moderator of market value on carbon emissions disclosure

The results indicate that there is a positive relationship between environmental performance and the impact of Market Value, as measured by Tobin's Q, on Carbon Emission Disclosure (CED) at a statistically significant level of 10%. The result suggests that companies that prioritize environmental performance may experience enhanced carbon disclosure benefits when their market value is high. This exchange highlights the interconnectedness of financial markets, environmental accountability, and corporate transparency.

Firms that exhibit elevated market values and demonstrate robust environmental performance are likely to exhibit greater responsiveness towards stakeholder expectations pertaining to the disclosure of carbon emissions. There is a growing expectation among stakeholders, such as investors and environmentally conscious consumers, for companies to demonstrate openness in their operations. This expectation applies to companies that possess both a robust financial position and a dedication to sustainable practices (Dhaliwal et al., 2012).

Furthermore, the observed positive moderating impact suggests that companies may intentionally incorporate sustainable measures into their broader company strategy. The research conducted by Stubbs and Higgins (2014) emphasizes the significance of integrated reporting methods, specifically the inclusion of environmental disclosures, in facilitating internal transformation and generating value.

Moreover, companies that exhibit both elevated market valuations and robust environmental performance have the potential to be regarded as more sustainable and responsible entities by investors. According to Clarkson et al. (2011), there is a positive correlation between Tobin's Q and the disclosure of carbon emissions. This association may be particularly strong for enterprises, as investors tend to perceive environmental stewardship as an indicator of long-term value generation.

5. CONCLUSION AND RECOMMENDATION

5.1. Conclusion

Based on the findings obtained from hypothesis testing and subsequent analysis, this research concludes as follows:

1. There is no significant impact of profitability, as measured by Return on Assets, on Carbon Emission Disclosure.
2. The study finds that there is a statistically significant positive relationship between market value, measured by Tobin's Q, and the level of carbon emission disclosure. This relationship is significant at a 5% level of significance.
3. The moderating effect of environmental performance on the relationship between profitability, as measured by return on assets, and carbon emission disclosure is found to be insignificant.
4. The significance level of 10% indicates that the relationship between environmental performance, as a measure of a company's environmental practices, and market value, as represented by Tobin's Q, is strengthened in relation to the disclosure of carbon emissions.

5.2. Research Contribution

This study signifies that companies with greater market valuations exhibit a stronger propensity to report their carbon emissions. This contribution is in line with the increasing significance of environmental factors in investment choices, highlighting the potential influence of market dynamics on promoting corporate transparency. This study further highlights the strategic significance of incorporating sustainability practices within the broader framework of company strategy.

5.3. Implication

The research findings provide practical implications for the development and implementation of company strategies. Companies seeking to improve their carbon disclosure procedures should acknowledge that financial prosperity alone may not serve as a primary motivator. However, the incorporation of market valuation and environmental performance, particularly when combined, could have a significant impact on the determination of disclosure choices. Managers and policymakers can utilize these findings to formulate specific initiatives and guidelines that are in accordance with the identified patterns in company disclosure practices. Moreover, the findings mentioned above include consequences for scholarly discourse surrounding corporate transparency, as well as practical considerations for organizations maneuvering the confluence of financial and environmental obligations.

5.4. Recommendation

To enhance environmental transparency, companies should consider incorporating non-financial indicators or adopting industry-specific disclosure practices. The inability of environmental performance to moderate the relationship between Profitability (ROA) and Carbon Emission Disclosure implies that irrespective of their environmental performance, profitable companies do not show a significant difference in carbon disclosure practices. Organizations should recognize that profitability alone may not drive environmental disclosure initiatives.

Future research could delve deeper into sector-specific nuances to identify factors influencing carbon disclosure beyond financial profitability. Further research could also investigate alternative factors that may moderate the relationship between financial performance and carbon disclosure, shedding light on the complex interplay between financial and environmental considerations. Additionally, it is recommended that future studies focus on investigating the precise processes by which environmental performance enhances the association between market value and carbon emission disclosure. The identification of environmental policies or efforts that contribute to this moderation effect might offer valuable insights for corporations seeking to improve their strategy for carbon disclosure.

REFERENCES

Alsaifi, K., Elnahass, M., Salama, A. (2020), Market responses to firms' voluntary carbon disclosure: Empirical evidence from the United Kingdom. Journal of Cleaner Production, 262, 121377.

Asmaranti, Y., Lindrianasari, L. (2014), Comparation of greenhouse gas emission disclosure before and after enactment of the Indonesia Act No. 17 of 2004. Issues in Social and Environmental Accounting, 8(4), 225-234.

Bae Choi, B., Lee, D., Psaros, J. (2013), An analysis of Australian company carbon emission disclosures. Pacific Accounting Review, 25(1), 58-79.

Beauchamp, C., Cormier, D. (2022), Corporate disclosure of CO_2 embedded in oil and gas reserves: Stock market assessment in a context of global warming. Managerial Finance, 48, 1689-1706.

Cho, C.H. (2009), Legitimation strategies used in response to environmental disaster: A french case study of total SA's Erika and AZF incidents. European Accounting Review, 18(1), 33-62.

Choi, B., Luo, L. (2021), Does the market value greenhouse gas emissions? Evidence from multi-country firm data. British Accounting Review, 53(1), 100909.

Ciriyani, N.K., Putra, I.M.P.D. (2016), Pengaruh ukuran perusahaan, profitabilitas, dan umur perusahaan pada pengungkapan informasi lingkungan. E-Jurnal Akuntansi, 17(3), 2091-2119.

Clarkson, P.M., Li, Y., Richardson, G.D., Vasvari, F.P. (2008), Revisiting the relation between environmental performance and environmental disclosure: An empirical analysis. Accounting, Organizations and Society, 33(4-5), 303-327.

Clarkson, P. M., Overell, M. B., & Chapple, L. (2011). Environmental Reporting and its Relation to Corporate Environmental Performance. Abacus, 47(1), 27-60.

Cormier, D., Beauchamp, C. (2021), Market incidence of carbon information disclosure in the oil and gas industry: The mediating role of financial analysts and governance. Journal of Financial Reporting and Accounting, 19(5), 901-920.

Cormier, D., Magnan, M., & Velthoven, B. V. (2005). Environmental Disclosure Quality in Large German Companies: Economic Incentives, Public Pressures or Institutional Conditions? European Accounting Review, 14(1), 3-39.

Depoers, F., Jeanjean, T., Jérôme, T. (2016), Voluntary disclosure of greenhouse gas emissions: Contrasting the carbon disclosure project and corporate reports. Journal of Business Ethics, 134(3), 445-461.

Dutta, P., Dutta, A. (2021), Impact of external assurance on corporate climate change disclosures: New evidence from Finland. Journal of Applied Accounting Research, 22(2), 252-285.

EPA. (2022), Global Greenhouse Gas Emissions Data. Available from: https://www.epa.gov

Gray, R., Kouhy, R., & Lavers, S. (1995). Corporate social and environmental reporting A review of the literature and a longitudinal study of UK disclosure. Accounting, Auditing & Accountability Journal, 8(2), 47-77.

Griffin, P.A., Lont, D.H., Sun, E.Y. (2017), The relevance to investors of greenhouse gas emission disclosures. Contemporary Accounting Research, 34(2), 1265-1297.

Healy, P.M., Palepu, K.G. (2001), Information asymmetry, corporate disclosure, and the capital markets: A review of the empirical disclosure literature. Journal of Accounting and Economics, 31(1-3), 405-440.

International Energy Agency. (2022), Global Energy Review: CO_2 Emissions in 2021 Global Emissions Rebound Sharply to Highest Ever Level. France: IEA. p1-14.

Jacobs, B., Singhal, V.R., Subramanian, R. (2011), An empirical investigation of environmental performance and the market value of the firm. SSRN Electronic Journal, 28(5), 430-441.

Jensen, M.C., Meckling, W.H. (1979), Rights and production functions: An application to labor-managed firms and codetermination. The Journal of Business, 52(4), 469-506.

Laksani, S.A., Andesto, R., Kirana, D.J. (2020), Carbon emission disclosure Ditinjau dari Nilai Perusahaan, leverage dan media exposure. Studi Akuntansi Dan Keuangan Indonesia, 3(2), 145-164.

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.

Mobus, J.L. (2005), Mandatory environmental disclosures in a legitimacy theory context. Accounting, Auditing and Accountability Journal, 18(4), 492-517.

O'Donovan, G. (2002), Environmental disclosures in the annual report: Extending the applicability and predictive power of legitimacy theory. Accounting, Auditing and Accountability Journal, 15(3), 344-371.

Purwanti, A., Harnovinsah, H., Nugroho, L. (2022), Media of carbon emissions disclosure and return on asset operations in state-owned enterprises public company. International Journal of Energy Economics and Policy, 12(3), 418-424.

Ratmono, D., Darsono, D., Selviana, S. (2021), Effect of carbon performance, company characteristics and environmental performance on carbon emission disclosure: Evidence from Indonesia. International Journal of Energy Economics and Policy, 11(1), 101-109.

Riantono, I.E., Sunarto, F.W. (2022), Factor affecting intentions of Indonesian companies to disclose carbon emission. International Journal of Energy Economics and Policy, 12(3), 451-459.

Ross, S.A. (1977), Determination of financial structure: The incentive-signalling approach. The Bell Journal of Economic, 8(1), 23-40.

Saraswati, E., Puspita, N.R., Sagitaputri, A. (2021), Do firm and board characteristics affect carbon emission disclosures? International Journal of Energy Economics and Policy, 11(3), 14-19.

Sarumpaet, S., Nelwan, M.L., Dewi, D.N. (2017), The value relevance of environmental performance: Evidence from Indonesia. Social Responsibility Journal, 13(4), 817-827.

Stubbs, W., & Higgins, C. (2014). Integrated reporting and internal mechanisms of change. Accounting, Auditing and Accountability Journal, 27(7), 1068-1089.

Sullivan, R., Gouldson, A. (2013), Ten years of corporate action on climate change: What do we have to show for it? Energy Policy, 60, 733-740.

Wijayani, D.R., Ratmono, D. (2020), Fraud hexagon in islamic companies. Turkish Journal of Physiotherapy and Rehabilitation, 32(3), 6137-6149.

WRI. (2023), CO_2 Emissions by Country 2023. Available from: https://worldpopulationreview.com