

Carbon Emission Disclosure: Analysis of Manufacturing Companies in Indonesia

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Abstract

The purpose of this paper is to obtain empirical evidence about the effect of profitability, the diversity of nationalities of the board of directors, and the environmental committee on the disclosure of carbon emissions in manufacturing companies in Indonesia. To measure the level of disclosure of carbon emissions, a checklist is used which is developed based on the information request sheet provided by the Carbon Disclosure Project (CDP). The population of this study is manufacturing companies listed on the Indonesia Stock Exchange (IDX) in 2012-2016. There are 23 companies that met the criteria. The type of data used in this study is panel data. Data analysis uses the Generalized Least Square (GLS) method using E-views as an analysis tool. The results of the study show that the profitability and diversity of the Foreign Board of Directors do not have a significant effect on the level of Carbon Emission Disclosure. Meanwhile, the environmental committee has a significant effect on Carbon Emission Disclosure.

Keywords: Carbon Emissions, Profitability, Diversity of Nationalities Foreign Board of Directors, Environmental committee.

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INTRODUCTION

The increase in carbon emissions globally has become a serious issue. From the results of the Intergovernmental Panel on Climate Change or the IPCC [1], the earth has experienced an increase in temperature from 0.74°C to 0.18°C in the last 100 years. In anticipation of global warming Countries in the world are beginning to regulate the use of carbon emissions, this is evidenced by the signing of the Kyoto Protocol [2]. The purpose of the Kyoto Protocol is to reduce the average emissions from six greenhouse gases such as carbon dioxide, methane, nitrous oxide, sulfur hexafluoride, HFC, and PFC [3, 4]. Indonesia's participation in the issuance of the Kyoto Protocol has the opportunity to encourage the birth of the Bali Action Plan, which also encourages a voluntary awareness spirit to reduce greenhouse gas emissions by 29% from Business as Usual (BAU) for its own efforts and reduce greenhouse gas emissions by 41% with international support in 2030 [5]. This commitment was subsequently established by the Government of Indonesia with the National Action Plan for Reducing Greenhouse Gas Emissions (RAN-GRK) with the issuance of Presidential Regulations No.61 and No.71 of 2011. In Article 4 of Presidential Regulation No. 61 of 2011, it was stated that business actors also took part in efforts to reduce GHG emissions. Efforts to reduce GHG emissions (including carbon emissions) carried out by companies as business actors can be seen from the disclosure of carbon emissions. Carbon Emission Disclosure in Indonesia is still voluntary, so not all companies disclose that information in their reports. Companies that carry out carbon emissions disclosures have several considerations including gaining legitimacy from stakeholders, avoiding threats, especially for companies that produce greenhouse gases such as increasing operating costs, reducing demand, reputation risk, legal proceedings, as well as fines and penalties [6].

Choi *et al.*, [7] examined the factors that influence disclosure of carbon emissions. The measurement of carbon emissions used is a checklist obtained from the CDP (Carbon Disclosure Project). Choi *et al.*, [7] used the independent variable company size, profitability, carbon emission level, industry type, and quality of corporate governance. Based on these studies, further testing of the factors that influence carbon emissions disclosure in companies in Indonesia is conducted. The purpose of this study, to test the Disclosure of Carbon Emissions in manufacturing companies in

Indonesia by using variable measures of Profitability, National Diversity of Foreign Board of Directors, and Environmental committee.

LITERATURE REVIEW

Legitimation Theory

According to [8-10, 6] legitimacy theory is one of the theories underlying the entity to voluntarily disclose social and environmental accountability reports. While Dowling and Pfeffer [11] regard legitimate as a resource for companies, where with the legitimacy of organizations, in this case, the company can depend on survival in the tight competition. According to Donovan [12], the legitimacy of a company is defined as a condition or status where there are similarities between the values adopted by the company and the values of society when there is a difference the position of the business entity is in a threatened position. One activity that is of concern to stakeholders is activities related to carbon emissions as an effort to gain legitimacy and maintain social contracts with the expectations of stakeholders [13]. Meanwhile, according to Kılıç and Kuzey [14], one way to gain legitimacy from the public and stakeholders is to disclose the carbon management practices of the company's business activities with several channels of information including annual reports, sustainable reports, and company websites.

Conceptual Framework and Development of Hypotheses

Effect of Profitability on Carbon Emission Disclosure

Profitability as economic profitability measures a company's ability to generate profits in the past. Profitability is often used as a reference in carrying out social responsibilities. According to Barako and Brown [15], companies that have higher profitability will find it easier to carry out activities related to environmental problems than companies that have low profitability. While Freedman and Jaggi [2] argue that companies with good operating performance will be more likely to make environmental disclosures in more detail because they can produce more reduction in environmental impact than other companies. Similar to Choi *et al.*, [7], companies with good financial conditions are able to pay for additional human or financial resources needed for better voluntary reporting and disclosure of carbon emissions to deal with external pressure on the impact of environmental activities. Profitability in this study is proxied by Return on Assets. Referring to the research [16-18, 7] found a positive relationship between profitability and disclosure of carbon emissions, then this research developed the following hypotheses:

H1: Profitability has a positive effect on Carbon Emission Disclosure.

Effect of the Board of Directors Nationality Diversity on Carbon Emission Disclosure

Some discussions on the board's gender diversity impact on carbon emissions disclosure also apply to the diversity of nationalities of the board of directors [14]. First, diversity brings different perspectives, ideas, and information to the discussion, and therefore enhances the company's ability to achieve better and more effective decisions [19]. Second, "the diversity of the board of directors increases the ability of the board to recognize the needs and interests of various groups of stakeholders" [20].

With its international experience and expertise, foreign directors can help improve the company's ability to carry out the company's operational activities [25]. Meanwhile according to Anderson *et al* [26] the diversity of the board of directors is positively correlated with the performance and value of the company. The existence of foreign nationals on the board of directors according to Branco & Rodrigues [27], can raise the issue of causality in disclosure.

Khan & Adom [28] also found that heterogeneity of individuals in terms of experience, ideas, innovations can have a good impact on company performance.

Estélyi and Nisar [19] determined that shareholder heterogeneity and the company's international market operations were the main determinants of the diversity of nationalities of the board of directors". Therefore, entities with nationally diverse boards have a larger audience and can experience pressure from various stakeholder groups relating to climate change and issues of global warming. In this case, it is expected that entities with diverse nationality councils will succeed in practicing carbon emission reduction and in disclosing information related to carbon emissions.

Based on these considerations, the following hypotheses are formulated;

H2: National Diversity the Board of Directors has a positive effect on Carbon Emission Disclosure

The influence of the Environmental Committee on Carbon Emission Disclosure

The Environment Committee is a committee that serves to provide consideration to prevent the impacts that will arise related to environmental issues. According to research that has been done [13] said that the environmental committee was given the responsibility of providing input on a proactive environmental strategy [21], "this is evident as

confirmed in the results supporting the presence of such committees it will also increase the likelihood of CMS adoption to ensure that the possibility of legitimacy gaps can be avoided" [13]. Likewise according to research Liao *et al.*, [22], if "the environmental committee is not large enough, independent or active, the effect seems insignificant". "The results are consistent with stakeholder theory, suggesting that a diversified and independent board and the existence of a board-level environmental committee can balance the company's financial and non-financial goals with limited resources and moderate the expectations of perhaps different stakeholders who have different interests". This finding should be useful for managers and regulators who are interested in improving corporate governance practices and climate change strategies.

Based on the explanation, the hypothesis is as follows:

H3: The Environment Committee has a positive influence on Carbon Emission Disclosure.

RESEARCH METHODOLOGY

This section describes the population, sample, sampling method, research variable and data analysis methods.

Population, Samples and Sample Methods

The population used in this study includes all manufacturing companies in Indonesia that are listed on the Indonesia Stock Exchange operating in the period 2012-2016, in this case, there are 132 manufacturing sector companies. Sampling using a purposive sampling method, which is a sampling technique that members of the sample are specifically chosen based on certain criteria for research purposes. The criteria used in determining the sample include:

- Manufacturing companies that report performance in the Indonesia Stock Exchange for the period 2012-2016.
- Manufacturing companies that provide annual reports or sustainability reports during 2012-2016 on the Indonesia Stock Exchange.
- Manufacturing companies that explicitly disclose carbon emissions (including at least one policy related to carbon emissions/greenhouse gases or disclose at least one carbon emission disclosure item).

Research Variable

This study uses two variables, namely the dependent variable (independent) (independent). The dependent variable used in this study is carbon emissions disclosure. Below is information related to the variable used:

Table-1: Carbon Emission Disclosure Checklist

Climate Change: Risks and Opportunities		CC-1: Risk assessment/description (both specific and general rules/regulations) relating to climate change and actions taken to manage those risks
		CC-2: Current (and future) assessments/descriptions of the financial, business and opportunities implications of climate change.
Greenhouse Emissions (GHG)	Gas	GHG-1: Description of the methodology used to calculate greenhouse gas emissions (eg GHG protocol or ISO).
		GHG-2: The existence of external verification of the quantity of GHG emissions by whom and on what basis.
		GHG-3: Total greenhouse gas emissions (metric tons of CO ₂ -e) produced.
		GHG-4: Disclosure of scope 1 and 2, or 3 direct GHG emissions.
		GHG-5: GHG emissions disclosure based on origin or source (for example coal, electricity, etc.).
		GHG-6: GHG emissions disclosure based on facilities or segment level.
		GHG-7: Comparison of GHG emissions in previous years.
Energy consumption (EC)		EC-1: The amount of energy consumed (eg tera-joule or PETA-joule).
		EC-2: Quantification of energy used from renewable resources.
		EC-3: Disclosures by type, facility or segment.
Greenhouse Reduction and Costs (RC)	Gas	RC-1: Details/details of plans or strategies to reduce GHG emissions.
		RC-2: Specifications of level/level targets and years of GHG emission reduction.
		RC-3: Emission reductions and costs or savings (costs or savings) achieved today as a result of plans to reduce carbon emissions.
		RC-4: Future emission costs are taken into account in planning capital expenditure.
Accountability of Emission Carbon (AEC)		AEC-1: Indications where the board committee (or another executive body) has responsibility for actions related to climate change.
		AEC-2: Description of the mechanism by which the board (or other executive bodies) reviews the company's progress regarding climate change.

Source: (Choi *et al.*, 2013) [7]

Carbon Emission Disclosure

Disclosure of Carbon Emissions related to this study, the disclosure is proxied by using the Carbon Emission Disclosure Index adopted from the study [23, 7, 22, 18, 16]. The basis of the disclosure index is the request sheet provided by the Carbon Disclosure Project (CDP). “In this disclosure index uses five broad categories relevant to climate change and carbon emissions as follows: climate change risks and opportunities (CC / Climate Change), greenhouse gas emissions (GHG / Greenhouse Gas), energy consumption (EC / Energy Consumption), reduction of greenhouse gases and costs (RC / Reduction and Cost) and carbon emission accountability (AEC / Accountability of Emission Carbon)” [7]. In these five categories, 18 items were identified. Following is the carbon emission disclosure checklist:

The calculation of the Carbon Emission Disclosure index is carried out by the following steps: Give a score on each item disclosure with a dichotomous scale. The maximum score is 18, while the minimum score is 0. Each item has a value of 1 so that if the company discloses all the items in the information in the report then the score of the company is 18. The score for each company is then added up.

Profitability

In this study, Profitability is proxied by Return on Assets (ROA), which is a comparison between earnings before interest and tax with the average total assets of the company.

$$ROA = \frac{\text{Net Profit}}{\text{Total Assets}} \quad (1)$$

National Diversity of the Board of Directors

In this study, National Diversity was measured using the dummy. Where value 1 indicates that there is one foreign board of directors on the board of commissioners and board of directors, number 0 indicates that there is no foreign board of directors in the company.

Environment Committee

The environmental committee is measured using a dummy, value 1 indicates if the company has an environmental committee and number 0 indicates that the company does not have an environmental committee.

Data Analysis Methods and Technical Analysis

Analysis Methods

Data collected were analyzed using a statistical analysis tool that is using the Data Panel Regression model.

Analysis Techniques

In the research panel data analysis technique using Generalized Least Square with the equation model as follows:

$$CED_{it} = \alpha + \beta_1 ROA_{it} + \beta_2 FOREIGN_{it} + \beta_3 ENVCOM_{it} + e. \quad (2)$$

Information

CED	= Carbon Emission Disclosure
α	= Constanta
β_1 - β_4	= Regression Coefficient
i	= entity-i
t	= entity-t
ROA	= Return on Asset
FOREIGN	= National Diversity of the Board of Directors
EN COM	= Environment Committee
e	= Error term

RESULTS AND DISCUSSION

Description of Research sample

The object of this research is companies listed on the Indonesia Stock Exchange (IDX) in 2012-2016. The sample selection in this study used a purposive sampling method. Based on this method, there are 23 companies included in the sample criteria. An explanation of sampling is shown in the table below.

Table-2: Population and Samples for 2012-2016

Criteria Sample	Total Company
Total population	132
Sample selection criteria	

1. Companies that explicitly do not disclose carbon emissions	(99)
2. Not publishing annual reports in 2015	(3)
3. Moving sectors	(2)
4. Delisting	(5)
Total sample	23

Source: Elaborated by authors (2018)

Descriptive statistics in this study are presented in Table-3. The table shows that 115 reports of both annual and sustainability reports were examined in this study period (2012-2016).

Table-3: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
CED	115	5.555556	88.88889	24.10628	20.58921
ROA	115	-8.82	40.38	6.361565	9.730658
FOREIGN	115	0	1	0.591304	0.493744
ENVCOM	115	0	1	0.304348	.46214

Source: Elaborated by authors (2018)

From Table-3, the variable Carbon Emission Disclosure (CED) in the 2012-2016 period has the lowest value of 5.555556, the highest 88.88889 with an average of 24.10628 and the standard deviation value of 20.58921. While the Profitability variable which is proxied by ROA has the lowest value of -8.82, the highest value is 40.38 with an average of 6.361565 and the standard deviation value is 9.730658.

The National Diversity Variable the Board of Directors has the lowest value 0, the highest value 1 with an average of 0.591304 and the standard deviation value is 0.493744. The Environment Committee variable has the lowest value 0, the highest 1 with an average of 0.304348 and the standard deviation value is 0.46214.

Discussion of research results

Results testing are done by Data Panel analysis, with GLS techniques. More detailed results from research results can be shown in table-4.

Table-4: Hypothesis Test Results

Variable	coefficient	t-Statistik	Probability
CED	19.90694	4.446499	0.0000
ROA	-0.090866	-0.546486	0.5858
FOREIGN	-2.464860	-0.419435	0.6757
ENVCOM	20.48602	5.795893	0.0000

Source: Eviews output, modified (2018)

Based on Table-4, the mathematical equations are summarized as follows:

$$CED_{it} = \alpha + \beta_1 ROA_{it} + \beta_2 FOREIGN_{it} + \beta_3 ENVCOM_{it} + e.$$

Based on the output of E-views it was found that the magnitude of the effect between Profitability (ROA) on Disclosure of Carbon Emissions was 0.5858, where $\alpha > 0.05$ which means that this variable does not affect Carbon Disclosure Disclosure, besides the regression coefficients can be seen in table 4.9 t-test value -0.546486, indicating the direction of a negative relationship, different from the legitimacy theory. The results of this study are not in accordance with the research of Choi *et al.*, [7] and Jannah & Muid [16], but this supports the findings of the Prado-Lorenzo *et al.*, [18], Tang & Luo [9], Luo [10], Irwhantoko & Basuki [17].

Based on the results of the E-views the magnitude of the Board of Directors' National Diversity influence on the effect of disclosure of Carbon Emissions is 0.6757, where $\alpha > 0.05$, which means that this variable does not affect carbon disclosure. Regression coefficient shows the value of -0.419435 shows the direction of a negative relationship, different from the hypothesized theory. Thus, H2 in this study was rejected. These results indicate that the diversity of nationalities in manufacturing companies in Indonesia has not been able to show the effect of carbon emissions disclosure in Indonesia. So the results of this study are not in line with the research of Estélyi & Nisar [19] which states that the board which contains various nationalities is positively and significantly related to shareholder heterogeneity and international market operations. The diversity of nationalities is also positively related to operating performance. This opinion is also related to the Kılıç & Kuzey [14] study of the diversity of nationalities of the board of directors having a significant influence on carbon emission policies and disclosures.

Based on the results of the E-views, the magnitude of the influence of the environmental committee on the disclosure of carbon emissions is 0.0000, where $\alpha = 0.05$, which means that this variable affects the disclosure of carbon emissions. Meanwhile, the regression coefficient from the results of the t-test shows the value of 5.795893 showing the direction of a positive relationship in accordance with the hypothesized theory. This means that the Environment Committee has a positive and significant effect on Disclosure of Carbon Emissions. This study is in line with the study [22, 13, 24]. According to Peters and Romi [24], the GHG disclosure and transparency of GHG disclosures are positively related to the existence of environmental committees on the board of directors and company sustainability officials (CSOs). In line with legitimacy theory, according to Liao *et al.*, [22], the existence of an environmental committee shows how proactive a company is related to environmental issues". As with Liao and Peter, Yunus *et al.*, [13] revealed that companies that adopt CMS are more likely to voluntarily implement an EMS, have an environmental committee, have a larger council and have greater independence of the board.

CONCLUSIONS AND RECOMMENDATIONS

More Based on the results of analysis and testing that examined the effect of Profitability, National Diversity of the Board of Directors, and the Environment Committee on Disclosure of Carbon Emissions in manufacturing companies listed on the Indonesia Stock Exchange in the 2012-2016 observation period. Then the empirical results obtained where Profitability has no effect on the Disclosure of Carbon Emissions. Nationality Diversity the Board of Directors has no influence on the Disclosure of Carbon Emissions. Meanwhile, the Environment Committee has an influence on the Disclosure of Carbon Emissions.

Suggestions that can be conveyed, namely for further research, are expected to be able to examine companies that are not only in companies in manufacturing but can research other companies. And researchers are expected to increase the number of company samples to a lot so that this study can better present how the implementation of carbon emission disclosure in Indonesia. It is expected that further research can use a newer year so that this research is more up to date with the research background. Future studies are expected to be able to add other independent variables that are not found in this study so that they can explain other factors that can affect carbon emission disclosure.

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