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# DETERMINANTS OF CARBON EMISSION DISCLOSURE AT NON-FINANCIAL COMPANIES IN INDONESIA

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## KeyWords

Carbon Emission, Green House Gas, Voluntary Disclosure, Carbon Emission Disclosure, Firm Size, Profitability, Leverage, Types of Industry

## ABSTRACT

This study aims to examine the factors that influence the carbon emission disclosure. Several factors, company size, profitability, leverage and type of industry. To measure the extent of carbon emission disclosure used checklist that was developed based on the information request sheets provided by the carbon disclosure project (CDP). The population of this study was all companies listed in Indonesia Stock Exchange in 2017-2019. Sample of this study was non-financial companies listed in Indonesia stock exchange for the period 2017-2019. This research applied purposive sampling method to obtain 40 companies listed in Indonesia Stock. The data used is secondary data from Indonesia Stock Exchange website. The classical assumption was used for data analysis and regression analysis for testing hypothesis. The result of this study showed that firm size, leverage and type of industry significantly influence to the extent of carbon emission disclosure. Meanwhile profitability had no significantly influence to the extent of carbon emission disclosure.

## INTRODUCTION

The development of world technology brings us to a new century in which social, economic and industrial changes are developing rapidly. The consequence of technological development is the emergence of environmental problems or pollution which has a major impact on human life. These problems led to an agreement between world countries to reduce global pollution by holding an Earth Summit on 3–14 June 1992 in Rio de Janeiro, Brazil. One of the environmental issues discussed at the Earth Summit is the issue of climate change caused by increasing greenhouse gas emissions. The conference resulted in an agreement from 114 countries regarding international environmental treaties known as the United Nations Framework Convention on Climate Change (UNFCCC).

The agreement arose out of the concern of countries in the world over the conditions of development which are currently only trying to achieve the highest economic growth, even though it has been proven that it will impede the sustainability of development growth itself. However, in 1995, concerns were growing that the agreement already reached might not work. To prevent greater economic losses, the UNFCCC created an international amendment known as the Kyoto Protocol in 1997 and the Kyoto Protocol Period 2 in 2012.

Indonesia's commitment to reducing GHG can be seen from participation in the Earth Summit in Rio de Janeiro. As well as Indonesia's commitment to reducing GHG, it can be seen from the laws and regulations that have been made by the Indonesian government. Efforts from the realization of the issuance of a law and proof of Indonesia's commitment to reducing greenhouse gases certainly require support from many parties, especially industry players who have contributed a lot to greenhouse gas emissions in their operational activities. Business actors must carry out their social responsibility as a response to reducing emissions, namely by disclosing carbon emissions as the company's contribution to environmental change. After all, the existence of business activities cannot be separated from the community environment where the company is located, so the company must show good faith from its existence. Environmental legitimacy can be obtained by companies by disclosing carbon emissions as a form of corporate social

responsibility implementation (Akhroh and Kiswanto, 2016).

Disclosure of carbon emissions in Indonesia is still a voluntary disclosure and in practice it is rarely carried out by business entities. Companies that disclose carbon emissions have several considerations, including gaining legitimacy from stakeholders, avoiding threats, especially for companies that produce greenhouse gases (greenhouse gases) such as increased operating costs, reduced demand, and reputation risk, legal proceedings, as well as fines and penalties (Berthelot and Robert, 2011). The disclosure of carbon emissions by companies is of course driven by factors that can affect the disclosure of carbon emissions. Several studies have been conducted regarding the factors that can affect the disclosure of carbon emissions

Findings of Borghei-Ghomi and Leung (2013), Choi et al. (2013), Hermawan et al (2018) show a relationship between company size and disclosure of greenhouse gas emissions in financial statements. Several researchers also analyzed the effect of profitability on disclosure of carbon emissions, where Luo et al (2013) found evidence that profitability affects the disclosure of carbon emissions and research by Halimah and Yanto (2018) shows that profitability has a negative effect on disclosure of carbon emissions. Meanwhile, different results were shown by Choi et al (2013) and Eleftheriadis and Anagnostopoulou (2014) who found no effect of profitability on disclosure of carbon emissions. Another factor that can influence disclosure of carbon emissions is leverage, but research results are conflicting. The results of research by Luo, et al (2013) show that leverage does not affect the disclosure of carbon emissions, whereas in the research of Jannah and Muid (2014) and Halimah and Yanto (2018) leverage has a significant negative relationship to disclosure of carbon emissions. Choi et al (2013) examined the relationship between type of industry and disclosure of carbon emissions and found empirical evidence that the type of industry has an effect on disclosure of carbon emissions. Meanwhile, research conducted by Borghei-Ghomi and Leung (2013) and Zhang et al (2013) did not find any influence between type of industry and disclosure of carbon emissions. This study aims to examine the factors that influence the disclosure of carbon emissions in non-financial companies in Indonesia including company size, profitability, leverage, and type of industry.

## LITERATURE REVIEW AND HYPOTHESIS

Carbon Emission Disclosure is a starting issue developing in various countries regarding the impact of climate change on sustainability organization is no exception in Indonesia. Disclosure of carbon emissions by the company can be seen from the annual report and sustainability report. Several theories explain regarding the disclosure of carbon emissions which is included in environmental disclosure, namely theory legitimacy and stakeholder theory.

Legitimacy theory focuses on the relationship between companies and communities through regulations made by the government. Legitimacy theory says that when viewed from the perspective of organizational systems, disclosure has an important role in bridging the relationship between corporate organizations, companies and community groups (Gray et al., 1996). The important thing of legitimacy for organizations according to Ghozali and Chariri (2007) is as a driving force for organizational analysis of boundaries, social norms and the reactions of community groups that are emphasized on companies so that in the end they create activities that pay more attention to the environment.

Stakeholder theory says that a company is not an entity that only operates for its own interests but must provide benefits for its stakeholders (shareholders, creditors, consumers, suppliers, government, society, analysts and other parties). Thus, the existence of a company is strongly influenced by the support provided by stakeholders to the company (Ghozali and Chariri, 2007).

### Effect of Company Size on Carbon Emission Disclosure

In accordance with the legitimacy theory that large companies will be in the spotlight of the community, because the activities carried out by companies have an impact on the environment. So that large companies get greater public pressure to show their environmental social responsibility than small companies. Large companies are assumed to be capable in terms of the availability of resources to meet the costs associated with disclosing carbon emissions, while smaller companies tend not to disclose carbon emissions. This is because small companies have limited funds which are an obstacle for companies to disclose information related to carbon emissions.

There have been many studies on the effect of company size on disclosure of carbon emissions. One of them was done by Choi et al (2013), Zhang et al (2013), Jannah and Muid (2014), Hermawan et al (2018) which stated that there was a positive influence between size and disclosure of carbon emissions.

H1: Company size has a significant effect on carbon emission disclosure.

### Effect of Profitability on Carbon Emission Disclosure

Based on the theory of legitimacy, the community always exerts pressure For companies to care about environmental problems, companies with high profitability are easier to respond to these pressures because they have more resources that can be used to disclose carbon emissions than companies with low profitability. This causes companies with high profitability to disclose more than companies with low profitability. Environmental disclosure can make it easier for companies to gain legitimacy from the community.

According to Choi, et al (2013) companies with poor financial conditions both are able to pay for the additional resources required for voluntary reporting and better disclosure of carbon emissions to gain legitimacy from communities and to reduce negative external image. Based on this description, the proposed hypothesis is in accordance with research conducted by Choi et al

(2013) and Jannah and MUI (2014), Hermawan et al (2018). Based on these considerations, the following hypothesis was formulated.

H2: Profitability has a significant effect on carbon emission disclosure.

### Effect of Leverage on Carbon Emission Disclosure

Stakeholder theory states that the higher the leverage of the company, the greater the company's responsibility to creditors, forcing companies to use available sources of funds to pay off these debts rather than to disclose carbon emissions because disclosing will result in greater costs and can be a burden for company (Choi, et al 2013). Luo et al (2013) argue that companies with high leverage have little funds to implement a proactive carbon reporting system because of their large debt burden. In developing this hypothesis, there is a negative direction between the level of leverage and the level of disclosure of carbon emissions. The higher leverage the company, the lower the disclosure of carbon emissions, and vice versa, the smaller the company's leverage, the greater the disclosure of carbon emissions. Research conducted by Luo, et al (2013) and Zhang, et al (2013) found that leverage affects the disclosure of carbon emissions.

The description above is supported by the results of research by Bhorgei-Ghomi and Leung (2013), Lou et al (2013), Zhang et al (2013) and Jannah and Muid (2014) which state that leverage affects the disclosure of carbon emissions. On the basis of the above considerations, the following hypothesis is formulated.

H3: Leverage has a significant effect on disclosure of Carbon Emissions

### Effect of Type of Industri on Carbon Emission Disclosure

In legitimacy theory, carbon intensive companies tend to get greater pressure from the community so that the company must provide carbon disclosure reports to match demands and get legitimacy from the community. Research conducted by Choi, et al (2013), and Jannah and Muid (2014) found evidence that the type of industry has an effect on the disclosure of carbon emissions. Based on the explanation above, the following hypothesis is formulated.

H4: Type of industry affects the disclosure of carbon emissions.

## METHOD

### Research Variable

In this study, Carbon Emission Disclosure was measured using several items adopted from the research of Choi et al (2013). To measure the extent of carbon disclosure, Choi et al developed a checklist based on the information request sheet provided by the CDP (Carbon Disclosure Project). Choi et al defined five broad categories relevant to climate change and carbon emissions. Within these five categories, 18 items were identified. The following is a checklist for carbon emission disclosure:

**Tabel 1**  
**Carbon Emission Disclosure Checklist**

<b>Climate Change: risks and opportunities</b>	CC1- Assessment/description of the risks (regulatory, physical or general) relating to climate change and actions taken or to be taken to manage the risks
	CC2- Assessment/description of current (and future) financial implications, business implications and oportunities of climate change
<b>GHG Emission</b>	GHG1- Description of the methodology used to calculate GHG emissions (e.g. GHG protocol or ISO)
	GHG2- Existence external verification of quantity of GHG emission- if so by whom and on what basis
	GHG3- Total GHG Emissions – metric tones CO <sub>2</sub> -e emitted
	GHG4- Disclosure of scopes 1 and 2, or scope direct GHG emissions
	GHG5- Disclosure of GHG emissions by sources (e.g. coal, electricity, etc.)
	GHG6- Disclosure of GHG emissions by facility or segment level
	GHG7- Comparison of GHG emissions with previous years
<b>Energy Consumption</b>	EC1- Total energy consumed (e.g. tera-joules or peta-joules)
	EC2- Quantification of energy used from renewable sources
	EC3- Disclosure by type, facility or segment
<b>GHG Reduction and-Cost</b>	RC1- Detail of plans or strategies to reduce GHG emissions
	RC-2- Specification of GHG emissions reduction target level and target year
	RC3- Emissions reductions ad associated costs or savings
	RC4- Cost of future emissions factored into capital expenditure planning
<b>Carbon Emission Accountability</b>	AEC1- Indication of which board committee (or other executive body) has overall responsibility for actions related to climate change
	AEC2- Description of the mechanism by which the board (or other executive body) reviews the company's progress regarding climate change

Source: Choi et al (2013)

The calculation of the carbon emissions' disclosure index is carried out by the following steps: Giving a score for each item of disclosure with a dichotomy scale is in line with research conducted by Choi et al (2013), Jannah and Muid (2014) and Hermawan et al (2018). The maximum score is 18, while the minimum score is 1. Each item has a value of 1 so that if the company discloses all the items in the information in its report, the company's score is 18. The scores for each company are then added up.

Company size is measured from the company's total assets. Profitability is measured by using ROA (Return on Assets). Leverage is measured using the DER (debt to equity ratio). Type Industry is measured using a dummy variable where the value of 1 for the company is included in industries that are intensive in producing emissions (Firms in emission intensive industries) which includes energy, transportation, raw materials (materials) and utilities based on Global Industry Classification Standard (GICS), while the value 0 is the opposite.

### Sample Determination

The population in this study is non-financial companies listed on the Indonesia Stock Exchange. The sample in the study was determined using a sampling technique. The technique used in this research is purposive sampling technique. The criteria set in determining this sampling are:

1. Non-financial companies listed on the IDX for the 2017-2019 period.
2. Non-financial companies that provide financial reports or sustainability reports for the 2017-2019 period.
3. Companies that explicitly disclose carbon emissions (covering at least one policy related to carbon / greenhouse gas emissions or disclosing at least one emission disclosure item).

### Analysis Method

The data that has been collected were analyzed using statistical analysis tools, namely multiple regression analysis with the equation model as following:

$$CE\_Disc = \alpha + \beta_1Size + \beta_2Pro + \beta_3Lev + \beta_4Tipe + e$$

Explanation

CE\_Disc = Carbon Emission Disclosure

$\alpha$  = Constanta

$\beta_1 - \beta_4$  = regression Koefisien

$\beta_1Size$  = company size

$\beta_2Pro$  = Profitability

$\beta_3Lev$  = Leverage

$\beta_4Tipe$  = Type of industri

e = error

## RESULT AND DISCUSSION

### Research Sample Description

This research was conducted on companies listed on the Indonesia Stock Exchange (IDX) for three years in the 2017-2019 period, sourced from the company's annual report or sustainability report through the website [www.idx.co.id](http://www.idx.co.id) and the company's official website. This study uses purposive sampling technique, which is a sampling technique with certain considerations. The focus of this research is on companies that meet the sample selection criteria, which can be seen in the table below:

**Tabel 2**  
**Criteria Sample**

Explanation	total
Non-financial companies listed on the IDX for the 2017-2019 period	578
Companies that provide annual reports / sustainability reports for the 2017-2019 period.	543
The total number of companies that do not disclose explicitly disclosing information about carbon emissions in their annual / sustainability reports.	(503)
Research sample based on criteria	40

Source: Secondary data processed, 2020

Descriptive statistics in this study are presented in the table below. The table shows that 120 reports, both annual and sustainability reports, were studied in this research period (2017-2019).

**Tabel 3**  
**Descriptive Statistic**

Variabel	N	Minimum	Maksimum	Mean	Std. Deviation
Company Size	120	28,717	33,495	30,89097	1,046411
Profitability	120	-0,286	0,447	0,06588	0,090962
Leverage	120	0,145	7,036	1,18938	1,192345
Type of Industri	120	0,000	1,000	0,92500	0,264496
CED	120	1	16	7,89	3,69

Source: Secondary data processed, 2020

Based on table 3, it can be seen that the maximum value of the company size variable is 33.495 which comes from PT Astra International while the minimum value is 28.717 owned by PT Total Bangun Persada. While the average value of the company size variable is 30.89097 with a standard deviation of 1.046411.

Based on table 3 it can be seen that the maximum value of the variable profitability of 0, 447 from PT Unilever while the minimum value of -0.286 is owned by PT Bumi Resources. While the average value of the profitability variable is 0.06588 with a standard deviation of 0.090962.

Based on table 3 it can be seen that the maximum value of the variable leverage of 7,036 which comes from PT Tower Bersama Infrastruktur while the minimum value of 0, 145 is owned by PT Vale Indonesia. While the average value of the leverage variable is 1.18938 with a standard deviation of 1.192345.

Based on table 3 it can be seen that the maximum value of the variable type of industry is 1, while the minimum value is 0. While the average value of the industrial type variable is 0.92500 with a standard deviation of 0.264496.

Based on table 3 it can be seen that the maximum value of the variable disclosure of carbon emissions of 16 items from PT Indocement Tunggul Prakasa while the minimum value of 1 item is owned by PT Indo Tambangraya Megah and PT Telekomunikasi Indonesia. Meanwhile, the average value of the carbon emission disclosure variable is 7.89 with a standard deviation of 3.69.

## Discussion of Research Results

The results were tested by using multivariate analysis using regression analysis multiple linear. A clearer picture of the regression results will be described in table 4.

**Table 4**  
**Summary of Hypotheses Testing**

Variable	Unstandardized Coefficients	Sig ( $\alpha = 5\%$ )
(Constant)	-22.852	.015
Company Size	.913	.003
Profitability	-4.520	.217
Leverage	-.625	.045
Type of Industri	3.789	.005

Source: Secondary data processed, 2020

From the results of the above calculations, it can be concluded that 4 (four) independent variables influence on ECD, namely: company size (X1), Leverage (X3), type of industry (X4); and 1 (one) The independent variable has no effect on the ECD variable, namely Profitability (X2). Based on table 4, concluded the mathematical equation as follows:

$$CED = -22.852 + 0.913 \text{ Company Size} - 0.625 \text{ Leverage} + 3.789 \text{ Type of Industry} - 4.520 \text{ Profitability}$$

Based on the spss output, company size has a positive effect on carbon emission disclosure. The results of this study are in accordance with the legitimacy theory that large companies will be the main focus of society, because the activities carried out by the company have an impact on the environment. So that large companies get greater public pressure to show their environmental social responsibility than small companies. The results found in this study are in line with several previous studies such as Choi et al (2013), Lou et al (2013) and Hermawan et al (2018). Larger companies are encouraged to provide quality voluntary disclosures to gain legitimacy.

Based on the spss output, ptofitability doesn't have effect on carbon emission disclosure. The results of this study are not in

accordance with the research results of Jannah and Muid (2014) and Nisak and Yuniarti (2018) but support the research of Choi et al. (2013), Luo et al. (2013), Eleftheriadis and Anagnostopoulou (2014). The difference between the results of this study and those of Jannah and Muid (2014) can be due to the nature of the sample used. The companies that are the samples of Jannah and Muid's (2014) research are companies listed on the Indonesia Stock Exchange (IDX), 35 companies were observed in 2010, and 37 companies were observed in 2011 and 2012. The description of the research sample shows a mean profitability of 11.13 is greater than the standard deviation of 9.34, the mean value of carbon emission disclosure is 7.49, which is greater than the standard deviation of 3.42, which means that the companies studied have a high profit on average and disclose quite a lot of carbon emissions, especially when involve high profile companies such as mining companies which of course have higher profits and pressure on the environment. The difference between the results of this study and previous research can be caused by the nature of the companies being sampled in this study, namely there are companies that have the highest profitability but do not broadly convey carbon emission disclosures and there are companies that have low profitability but convey more carbon emission disclosure points. So it can be said that the amount of profitability does not move along with disclosure of carbon emissions. The insignificance of the profitability function on the disclosure of carbon emissions because the benefits and costs of disclosure are not relevant.

Based on the spss output, leverage has a negative effect on carbon emission disclosure. The results of this study are in accordance with stakeholder theory which states that the higher the leverage of the company, the greater the company's responsibility towards creditors, forcing the company to use available sources of funds to pay off these debts rather than to disclose carbon emissions because disclosing it will result in greater costs and can be a burden for the company (Choi, et al 2013). The results found in this study are in line with several studies by Bhorgei-Ghomi and Leung (2013), Lou et al (2013), Zhang et al (2013) and Jannah and Muid (2014), Nisak and Yuniarti (2018), Hermawan et al. (2018) which states that leverage affects the disclosure of carbon emissions.

Based on the spss output, type of industry has a positive effect on carbon emission disclosure. The results of this study are in accordance with the theory of legitimacy, carbon-intensive companies tend to get greater pressure from the community so that companies must provide carbon disclosure reports in order to comply with demands and gain legitimacy from the community. The results found in this study are in line with several previous studies such as Choi et al (2013) that companies that are more intensive in producing carbon from their operational activities have an effect on the disclosure of carbon emissions. Likewise, the research that has been conducted by Jannah and Muid (2014), the type of industry affects the disclosure of carbon emissions, and the companies that most disclose are companies engaged in mining, manufacturing and agriculture.

## CONCLUSION

Based on the analysis and discussion that has been carried out using a sample of 40 companies listed on the Indonesia Stock Exchange the 2017-2019 then the following conclusion can be drawn:

1. Company size has a significant effect on carbon emission disclosure in non-financial companies in Indonesia. Thus, large companies are more encouraged to provide voluntary quality disclosures to gain legitimacy and disclose detailed information related to pollution.
2. Profitability has no significant effect on disclosure of carbon emissions in non-financial companies in Indonesia. This means that the level of profitability does not affect the level of disclosure of carbon emissions by the company.
3. Leverage has a significant effect on the disclosure of carbon emissions in non-financial companies in Indonesia. The higher the leverage of the company, the smaller the company will disclose its carbon emissions because the company prioritizes its responsibilities to creditors.
4. Type of industry affects the disclosure of carbon emissions (carbon emission disclosures) in non-financial companies in Indonesia. Companies that are intensive in producing carbon such as energy, transportation, materials and utilities tend to disclose information related to environmental aspects compared to companies that are not intensive in producing carbon from their operational activities such as financial companies.

## IMPLICATION & LIMITATION

The theoretical implication, this research is a form of theory development which is the theoretical basis of this research. The results of this study can provide benefits in the form of additional literature / research references regarding the effect of company size, profitability, influence and type of industry on carbon emission disclosures. This research can be used as reference material for further research.

Practical research implications, the results of this study can be used by investors, brokers and capital market analysts as a consideration in making the right investment in companies that care more about the environment in order to preserve nature. This is due to the problem of climate changes, global transactions have become an increasingly widespread issue and have attracted international reactions. So that by prioritizing investment in environmentally friendly companies, it will be able to increase the number of companies that care more about nature, more and more environmentally friendly products will be produced, and in the end the balance between the three basic pillars of business which includes profit, society, and the planet is achieved.

This study has limitations in conducting research such as there are several other variables that have not been included in this

study that affect the disclosure of carbon emissions. and the research method used in the form of an index developed by Choi et al. (2013) based on a request sheet obtained from the Carbon Disclosure Project (CDP). With these limitations, it is hoped that further research can improve these limitations. First, Adding variables that can explain the effect of the effect on the extent of disclosure of carbon emissions in companies in Indonesia such as carbon emission levels, quality of corporate governance, media exposure, environmental performance and so on. Second, the researchers can then develop measurements for disclosure of carbon emissions in accordance with conditions in Indonesia and to avoid the subjectivity of researchers in assessing the extent of disclosure of carbon emissions.

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