

CARBON EMISSION DISCLOSURE, COMPETITION AND COMPANY'S CHARACTERISTICS

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Abstract— One of the most important issues of this twenty-first century is climate change. A crucial role of firms is driving the global transition from a high to a low carbon economy. Carbon emission disclosures (CED hereafter), through which companies respond to climate change by presenting and disclosing of standard information about their carbon emissions. This research aims to find empirically evidence of the effect of firm age, industry type, environmental performance, profitability, and board of commissioners on CED with competition as moderating variable. The sample of this research is companies listed on the Indonesia Stock Exchange for the period of 2016-2018. Based on purposive sampling, the total sample used in this research model is 73 samples. The research method used is Moderated Regression Analysis (MRA). The research results show profitability, board of commissioners, and competition positively affect CED. While firm age, industry type, environmental performance do not affect CED. Competition strengthens the effects of board of commissioners on CED. However, competition does not moderate the effect of firm age, industry type, environmental performance, and profitability on CED.

Index Terms— Competition, Carbon Emission Disclosure, firm age, environmental performance and profitability .

1 INTRODUCTION

THE National Oceanic and Atmospheric Administration in February 2019 stated that the last five years (2014-2018) became the hottest temperature since the recording of temperatures that began in the late 1800s. The earth has experienced an increase in global temperature above the average for forty-two years in a row since 1977. This is due to industrial growth accompanied by increased production of carbon dioxide emissions that trap heat. The issue of climate change is causing countries in the world to make various efforts to reduce greenhouse gas emissions. Indonesia ratified the Kyoto Protocol on June 28, 2004 through Law No. 17 of 2004 in the context of carrying out sustainable development and participating in efforts to reduce global greenhouse gas emissions. The implications of the Kyoto Protocol give rise to carbon accounting, which is a requirement for companies to make recognition, measurement, recording, presentation and disclosure of carbon emissions. Specific studies examining carbon emissions disclosures also have mixed results. The extent of disclosure is significantly affected by PROPER ranking and company size, while profitability and leverage do not have a significant effect [1]. In contrast, the extent of disclosure of emissions was significantly affected by profitability, leverage, but not significantly affected by environmental performance (PROPER ranking) [2]. Older companies can be considered that the company has more experience and knows the needs of its constituents for information about the company [3]. Aged companies may prove that a company can survive with a variety of stakeholder demands and government regulations. By disclosing carbon emissions, the company hopes to have a positive impact and create a good image in order to continue operating. Industries with intensive emissions will face stricter controls from the public

and government, and this is often used as a sensitive political issue in a country that causes companies with intensive emissions tend to provide voluntary disclosures including carbon emissions disclosures [4]. Universitas Trisakti human or financial resources needed for voluntary disclosure [5] and better disclosure of carbon emissions to withstand external pressures. Companies with high profitability and disclosure of information will get a good signal from stakeholders that the company acts well under environmental pressure effectively and is willing to solve problems quickly.

Companies with good financial performance have the financial ability to make decisions related to the environment, namely disclosure of environmental responsibility [6]. Competition causes pressure on other companies in the same industry. CED is one form of corporate pressure on a competent environment [7]. While competition is an ongoing effort made between companies to achieve comparative advantage in resources that will produce a competitive advantage in the market and most importantly, achieve good financial performance [8]. In this case, there is a relationship between competition and the age of the company, which is getting older and continuing to exist until now means that the company continues to compete in order to stay superior, one of the advantages that can be created is to reveal the company's carbon emissions. Industries with intensive emissions will get tighter supervision from the government compared to non-intensive emission companies [9] and are often used as a sensitive political issue in a country that makes companies tend to make voluntary disclosures including carbon emissions disclosure [4]. Companies with superior environmental performance have proactive environmental strategies [10]. This encourages companies to inform investors and other stakeholders through voluntary disclosure about the environment. This has the potential to increase the value of the company [2]. The issue of global warming makes modern companies to be able to innovate to become a company that cares about the surrounding environment. In accordance with stakeholder theory, competition makes companies not only focus on good financial performance, but also care about the

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environment and surrounding stakeholders [11]. One of the company's efforts in the midst of the competition is to reveal carbon emissions in the company's activities. CED is provided so that companies can have a good image and can continue to survive in the competition. There are some differences in this study with the research of [5] in Australia. Figure 1 shows the conceptual framework of the research to find empirically evidence of the effect of firm age, industry type, environmental performance, profitability, and board of commissioners on CED with competition as moderating variable.

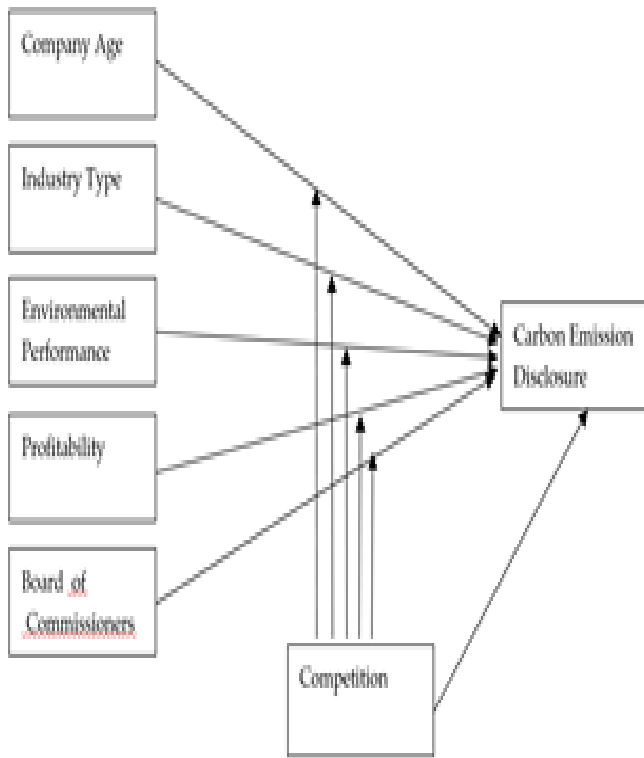


Fig.1 Conceptual framework

2 RESEARCH METHODS

2.1 Operational Definition and Variable Measurement

The dependent variable is CED which is one example of environmental disclosure as is part of voluntary disclosure that has been stated in the PSAK. Environmental disclosure includes the intensity of greenhouse gas (GHG) emissions and energy use, corporate governance and strategies in relation to climate change, performance of targets for reducing greenhouse gas emissions, risks and opportunities related to climate change impacts. Independent variables of this study are company age, type of industry, environmental performance, profitability, board of commissioners' size, and competition. The age of the company is calculated from the year of establishment of the company from the date of establishment until the company is sampled in the study [13]. Industry type is measured using a dummy variable which is giving a score of 1 if the company is included in the high profile industry and a score of 0 if the company is included in the low profile industry [14]. Table 1 explain CED index [12] calculation:

TABLE 1
CARBON EMISSION DISCLOSURE INDEX

CATEGORY	ITEM
Climate change: risks and opportunities	Cc-1: assessment / description of risks (specific or general regulations / regulations) related to climate change and actions taken or actions to be taken to address risks
	Cc-2: current (and future) assessment / description of the financial implications, business implications, and opportunities of climate change
Greenhouse gas emissions (GHG)	GHG-1: description of the methodology used to calculate (calculate) greenhouse gas (ghg) emissions
	GHG -2: existence of verification from external parties in measuring the amount of ghg emissions
	GHG -3: total ghg emissions produced
	GHG -4: disclosure of scope 1 and 2, or scope 3 of ghg emissions
	GHG -5: disclosure of ghg emission sources
	GHG -6: disclosure of facilities or segments of GHG.
	GHG -7: comparison of ghg emissions with the previous year
(Ec/ energy consumption)	Ec-1: total energy consumed
	Ec-2: quantification of energy used from renewable sources
	Ec-3: disclosures by type, facility, or segment
GHG reduction and costs (rc/ reduction and cost)	Rc-1: detailed plan or strategy to reduce ghg emissions
	Rc-2: specifications of level and level targets for reducing ghg emissions
	Rc-3: reduction of emissions and cost or savings achieved today as a result of the carbon emission reduction plan
	Rc-4: costs of future emissions costs calculated in capital expenditure planning
Accountability of carbon emissions (aec))	Acc-1: indication of the committee of the committee responsible for actions related to climate change
	Acc-2: description of the mechanism by which the board reviews the company's progress on climate change

In this study, it will be measured in dummy variables. Score 1 for high profile includes: agriculture, forestry, fishing, mining and mining services, construction, food and beverages, tobacco manufacturers, paper and allied products, chemical and allied products, plastic and glass products, automotive and allied products, pharmaceuticals, consumer goods, telecommunication. While a score of 0 is given to companies in the low profile industry including: animal feed, husbandry, textile mills products, apparel and other textile products, lumber and wood products, adhesives, cement, metal and allied products, fabricated metal products, stone, clay, glass, and concrete products, cables, electronic, and office equipments, photographic equipments, transportation services, wholesale and retail trade, and others [14]. Environmental performance is measured using the Company Performance Rating Program (PROPER) [15]. PROPER is an activity of supervision and program of providing incentives and / or disincentives from the State Ministry of Environment to the person in charge of the business and / or activity. Profitability ratios are measured using Return on Assets (ROA), which is a measurement of how efficient a company is in managing its assets to generate profits in a period.

2.2. Method of collecting data

The population of this study was all manufacturing companies listed on the Indonesia Stock Exchange in 2016-2018. Then the sample selection is done using a purposive sampling method with the aim of getting a representative sample in accordance with specified criteria. The sample criteria to be used are: (1) Manufacturing companies listed on the Indonesia Stock Exchange in 2016-2018, (2) Companies that publish financial reports in a row in 2016-2018, (3) Companies that issue annual reports or sustainability reports successively in 2016-2018 (5) Companies included in the Performance Rating Assessment Program (PROPER) held by the State Ministry of Environment of the Republic of Indonesia in the 2016-2018 period, (4) Companies that implicitly or explicitly disclose carbon emissions (include at least one policy related to carbon / GHG emissions or disclose at least one carbon emission disclosure item).

2.3. Data analysis method

This research is a quantitative study and uses the Moderated Regression Analysis (MRA) method which uses interaction variables in the multiple linear regression equation.

3. RESULTS AND DISCUSSION

3.1 Statistic descriptive

Based on the sample selection criteria, Table 2 provides information about the sample used in this study. List of companies used in this study are presented in Table 2 below:

TABLE 2
RESEARCH SAMPLING

SAMPLING CRITERIA	TOTAL
Manufacturing companies listed on the Indonesia Stock Exchange in 2016-2018	173
Companies that do not publish continuous financial statements	(48)
Companies that do not publish annual reports or sustainability reports	(18)
Companies that are not included in the Performance Rating Assessment Program (PROPER)	(63)
Companies that do not implicitly or explicitly disclose carbon emissions	(1)
Company total	43
Total research sample (43 x 3 tahun)	129
Outlier samples	(56)
Number of Research Samples	73

Table 3. presents the descriptive statistic of variables.

TABEL 3.
DESCRIPTIVE STATISTICS

	N	MIN	MAX	MEAN	STD. DEV
AGE	73	7,00	87,00	42,328	15,983
TYPE	73	0,00	1,00	0,520	0,503
EP	73	2,00	4,00	2,931	0,535
ROA	73	-0,18	0,53	0,068	0,112
DK	73	2,00	8,00	4,342	1,538
COM	73	-0,01	0,00	-0,001	0,002
CED	73	0,06	0,67	0,194	0,136

Source: Data processed

The following table 4 is frequency table for measuring dummy variable of industry type variable:

TABLE 4
DUMMY VARIABLE FREQUENCY

TYPE	DUMMY = 1		DUMMY = 0	
	n	%	n	%
	38	52%	35	48%

From table 4 above, it can be concluded that 52% (38 companies) of samples is in the high profile industry while 48% of the company is included in the low profile industry

3.2. Hypothesis testing

The assumption of the existence of multicollinearity may be ignored if in the initial regression results, there is at least one independent variable that has a significant effect on the dependent variable [16]. The adjusted R Square is 0.871 which indicates that 87.1% of variations or changes in CED can be explained by variations in the board of commissioner's variables, environmental performance, company age, industry type, profitability. While the remaining 12.9% is explained by other factors not included in the research model. From the ANOVA test or F test, it is obtained that significance level of $0,000 < 0.05$. So it can be said that the independent variables simultaneously affect the dependent variable. The results of testing the hypothesis using the t test can be seen in the following table 3.4:

TABLE 5
RESULTS OF THE T-TEST (PARTIAL TESTING).

	PRED.	B	SIG (1-TAILED)	DECISION
(Constant)		0,043	0,367	
AGE	(+)	0,000	0,497	H ₁ rejected
TYPE	(+)	0,008	0,311	H ₂ rejected
EP	(+)	-0,107	0,011	H ₃ rejected
ROA	(+)	0,941	0,000	H ₄ accepted
DK	(+)	0,162	0,000	H ₅ accepted
COM	(+)	86,383	0,016	H ₆ accepted
AGE.COM	(+)	7,287	0,199	H ₇ rejected
TYPE.COM	(+)	-52,574	0,000	H ₈ rejected
EP.COM	(+)	-26,068	0,101	H ₉ rejected
ROA.COM	(+)	24,125	0,241	H ₁₀ rejected
DK.COM	(+)	15,343	0,02	H ₁₁ accepted
F test		0,000		
adj R ²		0,871		

Source: Data processed

3.3. Discussions

Effect of Company Age on CED

Based on the test results in table 5, the company age variable (AGE) has a regression coefficient of 0,000 and a significance level of 0.497. The significance value is greater than the significance level $\alpha = 0.05$, then H₁ is rejected. This means that the age of the company does not have a significant positive effect on company value. The result of this study does not support with the theory of legitimacy which states that the longer a company can survive, the company will increasingly disclose environmental information as a form of responsibility to remain accepted by the public and it is expected that with the disclosure, the public can continue to accept the company, so that survival guaranteed company. The results of this study are

in line with research conducted by [17].

Effect of Industry Type on CED

Based on the test results in Table 5, the industry type (TYPE) has a regression coefficient of 0.008 with a significance of 0.311. Significance value is greater than the probability value of 0.05, or $0.311 > 0.05$, then H_2 is rejected. This means that the type of industry does not have a positive effect on firm value. This is because environmental disclosure such as carbon emissions disclosure in Indonesia is still voluntary disclosure and does not look at the type of industry of a company, so that causes the type of industry does not affect the disclosure of carbon emissions. The results of this study are not consistent with and [5]. The results of this study are supported by research of [18] who found that the type of industry does not affect CED.

Effect of Environmental Performance on CED

Based on the test results in table 5, environmental performance (EP) has a regression coefficient of -0.107 with a significance of 0.011. Significance value is smaller than the probability value of 0.05 or $0.011 < 0.05$, then H_3 is rejected because the relationship is opposite to the hypothesis. This means that environmental performance has no positive effect on CED. This means that companies with good environmental performance will not always disclose carbon emissions. This result does not support the theory of legitimacy and stakeholder theory. Stakeholder theory states that companies will always reveal the good news they have in order to maintain harmonious relationships with stakeholders [19], [20]. This is consistent with the research of [2] and [21] that the better environmental performance of companies in the PROPER rating does not affect CED in companies in Indonesia. Increasing PROPER rating can reduce the motivation of companies to disclose CED [1], because the rating itself has proven the company's real performance by the government namely the Ministry of Environment which has automatically added value to the company without having to disclose carbon emissions that will incur additional costs.

Effect of Profitability on CED

Based on the test results in table 5, the profitability (ROA) has a regression coefficient of 0.941 with a significance of 0,000. Significance value is smaller than the probability value of 0.05 or $0,000 < 0.05$, then H_4 is accepted. This means that profitability has a positive effect on CED. This is in line with the research of [12] that profitability has a positive effect on CED. The results of this study are consistent with research conducted by and [12] and [22]. This study successfully support the theory of legitimacy which states that the community always puts pressure on companies to care about environmental problems. Companies with low profitability prefer to focus on productive matters rather than making social environmental disclosure. Companies with high profitability would be more likely to reveal "good news" to the financial markets [23].

Board of Commissioners' Influence on CED

Based on the test results in table 5, board of commissioners (DK) has a regression coefficient of 0.162 with a significance of

0,000. Significance value is smaller than the probability value of 0.05 or $0,000 < 0.05$, then H_5 is accepted. This means that the board of commissioners has a positive effect on CED. In other words, the more boards of commissioners in a company will make CED more widespread. This is in line with the statement of [3], [24] that the greater the number of members of the board of commissioners, the easier and more effective in terms of control and supervision. The authority of the board of commissioners can encourage companies to carry out CEDs and can influence the extent of disclosure made, with the aim of enhancing the company's image that brings the trust of the public and the government. The results of this study are in accordance with the theory of legitimacy which states that companies are getting pressure from the public to care about the environment, so the role of the board of commissioners is here to encourage management to disclose their carbon emissions so that there is no legitimacy gap in the company.

Effect of Competition on CED

Based on the test results in table 5, the competition (COM) has a regression coefficient of 86.383 with a significance of 0.016. Significance value is smaller than the probability value of 0.05 or $0,000 < 0.05$, then H_6 is accepted. This means that competition has a positive effect on CED. Competition between companies actually encourages companies to do CED. Inter-company competition will encourage companies to disclose carbon emissions that are still voluntary disclosure in order to get added value and legitimacy from the community, which will have an impact on increasing sales and profits of the Company.

Effect of Company Age on CED with Competition as a Moderating Variable

It can be seen from table 5, AGE.COM has a regression coefficient of 7.287 with a significance of 0.199. Significance value is greater than the probability value of 0.05 or $0.199 > 0.05$, then H_7 is rejected. This means that competition does not strengthen the influence of the company's age on CED. The results of this study conclude that competition in the business environment does not encourage companies that have long stood to disclose carbon emissions, because carbon emissions disclosure is still voluntary disclosure, so that companies tend to choose not to incur large costs for disclosure. This study is not in line with the statement of [8] that the company will make a continuous effort to achieve excellence compared to other companies, in this study the company does not consider disclosure of carbon emissions as an effort that be done in order to remain a superior company.

Effect of Industry Type on CED with Competition as Moderating Variable

Based on the test results in table 5, TYPE.COM has a regression coefficient of -52,574 with a significance of 0,000. Significance value is smaller than the probability value of 0.05 or $0,000 < 0.05$, then H_8 is rejected. This means that competition does not strengthen the influence of industry types on CED. The result shows that competition does not strengthen the influence of industry types on CED. This is because the nature of CED itself is still voluntary disclosure so that competition cannot strengthen the industry type factor to

disclose carbon emissions, but companies are more motivated to make disclosures if there are factors of the board of commissioners, profitability, government regulations, and others.

Effect of Environmental Performance on CED with Competition as a Moderating Variable

Based on the test results in table 3.4, EP.COM has a regression coefficient of -26.068 with a significance of 0.101. Significance value is greater than the probability value of 0.05 or $0.101 > 0.05$, then H_9 is rejected. It can be concluded that companies that already have good environmental performance feel no need to disclose carbon emissions because they assess their performance is good in the framework of reducing emissions GHG and carbon [21]. With the existence of competition among companies, this will not encourage companies that have good environmental performance to disclose carbon emissions, because the company feels that by getting a high rating in PROPER, the company has excelled in its contribution to the environment

Effect of Profitability on CED with Competition as a Moderating Variable

ROA.COM has a regression coefficient of 24.125 with a significance of 0.241. Significance value is greater than the probability value of 0.05 or $0.241 > 0.05$, then H_{10} is rejected. This means that competition does not strengthen the effect of profitability on CED. This might be due to the competition factor causing companies that have good financial performance not to disclose carbon emissions, but the company feels that it must focus more on the financial side of the company in order to survive in an inter-company competition, that is to obtain a profit of it, rather than doing disclosure of carbon emissions, such as providing marketing promos to increase sales.

Board of Commissioners' Influence on CED with Competition as Moderating Variable

DK.COM has a regression coefficient of 15,34 with a significance of 0.02. Significance value is smaller than the probability value of 0.05 or $0.02 < 0.05$, then H_{11} is accepted. This means that competition strengthens the influence of the board of commissioners on CED. This is possible because the competition causes the board of commissioners try to make the company can look superior compared to other companies, hoping to continue to compete with companies that are well known to the public because of their environmental responsibilities by disclosing CED. This is in accordance with the statement of [25], an effort made by the board of commissioners for the company has a good image from the public.

4. RESULTS AND DISCUSSION CONCLUSIONS, LIMITATIONS AND IMPLICATIONS

4.1 Conclusions

Results of the study concludes as follows; profitability has a positive effect on CED, which is in line with research by [12]. The board of commissioners has a positive effect on CED,

the results of this study are in line with research, [3], [26], Competition has a positive effect on CED which in line with [27]. However, Age of the company has no positive effect on CED, the results of this study are in line with the research of [17]. Industry type does not have a positive effect on CED, the results of this study are in line with research. Environmental performance has no positive effect on CED, the results of this study are in line with [1],[2], and [17].

4.2 Limitation

Limitations in this research are: (1) there maybe a subjectivity of the author in assessing the extent of CED. This happens because of different points of view in assessing the disclosure. (2) there are dummy variable, namely the type of industry that results in the amount of data being outlier. (3) The data of this study does not pass the multicollinearity test due to the moderating variable. (4) This study uses a disclosure measurement method, the method developed by [13] based on the information request sheet that may be biased.

4.3 Implication

The existence of this study provides conclusions about how CED is influenced by profitability, the board of commissioners, competition, and the board of commissioners which are strengthened by competition. For investors, the results of this study are expected to be used as consideration in making investment decisions, by using information that the Annual Report does not always reveal the entire disclosure by the company, but by paying attention to profitability ratios, the number of boards of commissioners, and the competition index. For Regulators, it can be seen that CED is very important for all stakeholders and the environment. The Ministry of Environment and the President are expected to issue policies so that CED can become mandatory disclosures, especially for manufacturing companies, in order to encourage companies to pay attention to their environment due to the limited supply of natural resources and the greater impact of losses. For further research; adding more recent research periods, adding or using other research variables such as company size, leverage, media exposure, public ownership, etc. to better explain the company's characteristics of CED.

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