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Determinant of Carbon Emission Disclosure at Mining Companies Listed in Indonesia Stock Exchange

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Abstract

This study aims to examine and obtain empirical evidence on determinants of carbon emissions disclosure at mining companies listed in Indonesia Stock Exchange. Several factors involved in this study, there are leverage, profitability, firm size, and institutional ownership. In addition, population of this study is 41 mining companies listed in Indonesia Stock Exchange. Meanwhile, sample is selected using purposive sampling technique which produced 56 unit of analysis. This study also uses content analysis techniques on annual reports and/or sustainability reports in 4 years to measure carbon emission disclosure. Data collection is conducted by documentation technique. Moreover, multiple rank regression with SPSS version 23 applications is executed to analyze the data. Results indicate that leverage, profitability, firm size, and institutional ownership have significant and negative effect on carbon emission disclosure. Therefore, it can be concluded that the higher leverage, profitability, firm size, and institutional ownership of the company, carbon emission disclosure which is reported by mining companies in Indonesia will be lower.

Keywords: Carbon Emission Disclosure; Firm's Size; Institutional Ownership; Leverage; Profitability

1. Introduction

Global warming and public concerns about disasters caused by global warming that could endanger living creatures remains an international hot topic [5]. Based on observations by National Aeronautics and Space Administration (NASA), earth temperature has continuously increased and in January to September 2016, earth temperature reached out the hottest level for 35 years [28]. Specifically, global warming is a phenomenon of increasing global temperature due to greenhouse gas effect produced by

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increased emissions of gases such as carbon dioxide (CO_2), methane (CH_4), dinitrooksida (N_2O), and chlorofluorocarbons (CFC) which cause solar energy is being trapped in the atmosphere (Riebeek 2010, in [4]).

This increasingly dangerous global warming is driven by greenhouse gas emissions produced by human actions. The most dangerous increase in greenhouse gases is caused by CO_2 emissions released through human activities, such as deforestation, fossil fuel use, increased industrial quantities and natural processes including respiration and volcanic eruptions. Unfortunately, our planet capacity to process this waste has been greatly weakened by widespread and more destruction of the world's forests [32].

World Resources Institute (WRI) on its official website stated that Indonesia ranks 6th world largest contributing country of carbon emissions in 2014, after United States, European Union, China, India and Russia. The amount of carbon emissions contributed by Indonesia in 2014 amounted to 2.05 billion Mt CO_2e. Furthermore, world's concern about climate change due to increased concentrations of greenhouse gases has prompted the emergence of an international agreement called Kyoto Protocol in 1997. Indonesia ratified the first Kyoto Protocol on 28 June 2004 through Law no. 17 in 2004. Then in 2011, Indonesia also issued presidential regulations as legal basis for the implementation of greenhouse gas emission

reduction. There are Presidential Regulation No. 61 on National Action Plan for Greenhouse Gas Emission Reduction (RAN-GRK) and Presidential Regulation No. 71 of 2011 on the Implementation of National Greenhouse Gas Inventory (Supriadi et al., 2016).

Existing regulations lead Indonesian entities that contribute to carbon emissions in the air participate in supporting the government to achieve its goal of reducing carbon emissions by 2030. Their participation is reflected in information disclosure of carbon emissions through annual report and sustainability report. However, currently carbon emissions disclosure practices in Indonesia is voluntary disclosure [25]. Non-financial companies in Indonesia Stock Exchange which disclose carbon emission during 2010-2012 is 37 from 339 companies and 32 companies from 332 total companies in the period of 2012-2014 [1, 19].

Previous research on carbon emission disclosure showed inconsistent results, thus researchers interested to elaborate more. For instance, research by Bae Choi et al.,

(2013) on carbon emissions disclosure in Australian companies showed that leverage and profitability do not affect carbon emissions disclosure, while firm size, industry type, carbon emission level, and quality of corporate governance have significant effect on carbon emission disclosure.

Jannah & Muid (2014) analyzed factors that influence Carbon Emission Disclosure in Indonesian companies. They found that leverage has significant and negative effect to carbon emission disclosure, whereas firm size, profitability, media exposure and industry type have significant and positive impact. Moreover, environmental performance in their study demonstrated no significant effect on carbon emissions disclosure.

In addition, Akhiroh & Kiswanto (2016) executed a research entitled Determinant of Carbon Emission Disclosure. Results indicated that profitability, organizational visibility, managerial ownership and audit committee have significant and positive impact, while environmental performance, financial distress, institutional ownership, and independent commissioners have no effect on carbon emission disclosure.

Jaggi et al., (2017) also conducted a study entitled The Factors Motivating Voluntary Disclosure of Carbon Information: Evidence Based on Italian Listed Company which showed that environmental committees, institutional ownership and emission treding scheme significantly and positively affect carbon information disclosure. Meanwhile, proportion of independent directors found to not have any effect.

Based on the backrgound and previous research that show inconsistencies results, researcher wants to re-examine the factors that affect carbon emission disclosure. Basically, this study is conducted by referring to previous researches on carbon emission disclosure. The study aims to analyze the effect of leverage, profitability, firm size, and institutional ownership. Originality of this research lies in its research object, which is mining company listed in Indonesia Stock Exchange (BEI) during the period of 2013-2016. Throughout the researcher's knowledge, no research has been executed on factors affecting carbon emission disclosure at mining companies listed in BEI during the period of 2013-2016.

There are three theories supporting this study. First, theory of legitimacy. Dowling & Pfeffer (1975) provided a view of the theory of legitimacy that an organization strives to build harmony between the social values associated with their activities and acceptable behavioral norms on a larger social system in which their organization exists. Organizational legitimacy can be obtained if these two value systems are aligned. Therefore, company will disclose carbon emissions in its annual report or sustainability

report to aware the public that its operation is consistent with surrounding community values.

Stakeholder theory said that a company is not an entity that operates for its own business only but it should provide benefits to its stakeholders. The existence of a company is strongly influenced stakeholders supports to the company (Ghozali & Chariri, 2007 in [19]). Thus, when stakeholders take control of important economic resources, companies will seek to meet the needs of stakeholders (Ullman, 1985 in [36]).

Jensen & Meckling (1976) defined agency relationships as contracts between one or more principal with agents to perform services (ex.: managing companies) including providinge the agents of authority as decision makers. There is, however, a strong reason that agents will not always act in the best interests of the principal. This condition could trigger information asymmetry.

Information asymmetry occured when management has information on a company that is not owned by an outsider [10]. Therefore, companies are expected to make voluntary disclosures about company information, such as environmental issues which in this case is carbon emissions disclosure. By doing this, it is expected to minimize information asymmetry between agents and principals.

Leverage describes company's assets and financial risks that become expense in the future [27]. Greater leverage ratio reflects higher company's debt value [3]. According to stakeholder theory, creditor is one of stakeholders who has power to influence the company. If the leverage ratio is greater, creditor will give more pressure to the company. Research conducted by Irwhantoko & Basuki (2016) and Peng et al., (2014) showed that leverage has significant and negative effect on carbon emission disclosure. Thus, firms with high leverage tends to concentrate more on repaying their debts by making non-mandatory disclosures. Based on this, the hypothesis is:

H_1: Leverage has significant effect on Carbon Emisssion Disclosure.

Profitability is a ratio to determine the effectiveness and efficiency of a company in managing all its assets to generate profit [16]. Profitability reflects company's financial performance. Companies with poor financial performance will give extra focus on achieving financial goals and improving their performance, and thus cause their capabilities in preventing and reporting carbon emissions become limited [30]. This study uses ROA ratio to calculate profitability. ROA is chosen because it can describe efficiency of the company in using its asset to gain profit.

According to the theory of legitimacy, society requires company to conduct social responsibility to the surrounding environment. Good corporate performance will affect how fast company responses to the issue. Companies with better performance will have greater ability for disclosure and having more details disclosure area as well (Roberts, 1992 in [17]).

There are three different results of previous research. Cahya (2016) and Jannah & Muid (2014) found that profitability affects carbon emission disclosure. However, Bae Choi et al., (2013) showed that carbon emission disclosure is not affected by profitability. Moreovre, Yanto & Muzzammil (2016) also found the difference, that is, there is a negative relationship between profitability to environmental disclosure. It means that greater level of profitability will cause more limited disclosure for environmental information od the company.

Based on the theory and results of previous research, it can be concluded that companies with good profitability will be able to provide additional employee or financial resources for voluntary disclosure. Therefore, companies with good financial performance are expected to engage in carbon emissions disclosure. So, the hypothesis is as follows:

H_2: Profitability has significant effect on carbon emission disclosure.

Firm size represents company's resources, means the larger the company's size the greater its resources [7]. People have higher expectations about carbon management practices by large companies. Therefore, large companies are more responsive in meeting disclosure demands (Freedman & Jaggi, 2005 in [23]). Based on the theory of legitimacy, large firms have a greater tendency to disclose information about carbon emissions. Larger companies are getting higher pressure from the community and stakeholders. In addition, large company also avoid huge cost due to community demands in the future [26].

Jannah & Muid (2014) showed that firm size has significant and positive effect on carbon emission disclosure. Nevertheless, Dibia & Onwuchekwa (2015) found negative and significant relationship between firm size and oil and gas environment disclosure in Nigeria. Based on the findings and theories above, the researchers concluded that larger firm size driven company to disclose more about its carbon emissions. Below is the hypothesis:

H_3: Firm size has significant effect on carbon emission disclosure.

Relationship between institutional ownership and carbon emissions disclosure may come into debates. According to agency theory, in the positive side, institutional ownership can be an effective control mechanism in every decision taken by management [31]. As a result, managers are under pressure to always meet the information needs of investors, including carbon information [18]. On the other hand (from a negative perspective), high institutional ownership can influence companies to reduce the disclosure of voluntary corporate information or manipulate disclosures to maximize their personal benefits. This kind of conflict is known as the principal agency which produce an agency problem between majority and those minority shareholder [13].

Previous studies also found contrary results. Chang & Zhang (2015) stated that companies with a large proportion of institutional ownership will voluntarily disclose more environmental information. Whereas, Akhiroh & Kiswanto (2016) showed that institutional ownership has no effect on carbon emissions disclosure. Furthermore, Alhazaimeh et al. (2014) found that there is significant and negative relationship between block holder ownership (which is proxied by institutional ownership) with voluntary disclosure. Thus, hypothesis that can be formulated by is as follows:

H_4: Institutional ownership has significant effect on Carbon Emission Disclosure.
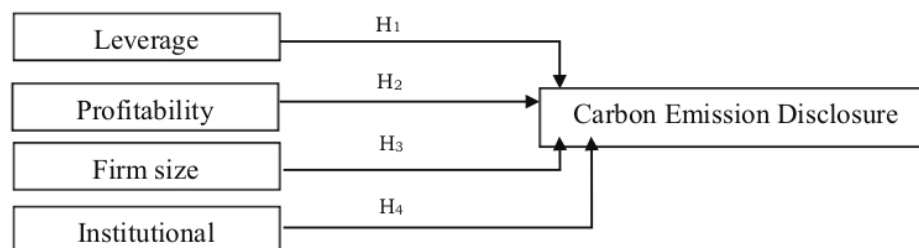

Figure 1: Research Model.

2. Research Methodology

This is a quantitative study with mining industry companies as research object. Population of this research is 41 mining companies listed in Indonesia Stock Exchange (IDX) and purposive sampling technique with defined criteria is employed to obtain the sample (Table 1). There are 14 companies that meet the criteria with 4 years observation period (2013-2016), thus there are 56 unit analysis. In addition, this study specifically examine carbon emission disclosure, leverage, profitability, firm size, and institutional

ownership. Data is collected using documentation techniques from secondary data, including annual report and/or sustainability report from mining company listed in Indonesia Stock Exchange (BEI) during the period of 2013-2016.

TABLE 1: Criteria on Sample Selection.

Description	No	Yes
Total mining companies listed in Indonesia Stick Exchange		41
Listed in Indonesia Stock Exchange during the period of 2013-2016.	(2)	39
Company publishes annual report and/or sustainability report during the period of 2013-2016.		39
Company which does not disclose indicator to measure carbon emission disclosure.	(25)	14
Sample based on the criteria		14
Year of observation		4
Total unit of analysis during the period of 2013-2016		56
Source: Processed secondary data, 2018		

Data analysis methods used is descriptive statistical analysis, consists of maximum value, minimum value, mean, and standard deviation and inferential statistics by using multiple regression analysis with SPSS version 23. Regression testing is also conducted for classical assumption test, there are normality test, autocorrelation test, multico-linearity test, and heteroscedasticity test. Operational definition of each variable is demonstrated in table 2.

TABLE 2: Operational Definition of Variables.

Variable	Definition	Indicator
Carbon Emission Disclosure	The extent of environmental responsibility information by company which in this case related to carbon emission [7].	Total item disclosed based on research indicator by [7]
Leverage	Ratio to measure how much company's liability pays the asset [21].	$DAR = \dfrac{Total\ Liability}{Total\ Asset}$
Profitability	Company liability to gain profit from business activity [6].	$ROA = \dfrac{Net\ Income\ After\ Tax}{Total\ Asset}$
Firm size	Firm size reflects company's resources, bigger firm size represents greater resources [7].	Firm size = Ln (Total Asset)
Institutional Ownership	Concentrated ownership which is measured by stock percentage of institutional shareholder [15].	$KI = \dfrac{Stock\ owned\ by\ institution}{Outstanding\ stock}$
Source: Researcher Summary, 2018		

Checklist index for carbon emission disclosure is presented in Table 3.

TABLE 3: Carbon Emission Disclosure Checklist.

Category	Item
1 – Climate change: risks and opportunities	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 opportunities of climate change
2 – GHG emissions accounting	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 tonnes CO_2-e emitted
	GHG4 – disclosure of Scopes 1 and 2, or Scope 3 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
3 – Energy consumption Accounting	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
4 – GHG reduction and cost	RC1 – detail of plans or strategies to reduce GHG emissions RC2 – specification of GHG emissions reduction target level and target year
	RC3 – emissions reductions and associated costs or savings achieved to date as a result of the reduction plan RC4 – cost of future emissions factored into capital expenditure planning
5 – Carbon emission accountability	ACC1 – indication of which board committee (or other executive body) has overall responsibility for actions related to climate change
	ACC2 – description of the mechanism by which the board (or other executive body) reviews the company's progress regarding climate change

Source: Bae Choi *et al.,* 2013

3. Results and Discussion

Descriptive statistical results describe data of research variable, there are carbon emission disclosure (CED), leverage, profitability, firm size, and institutional ownership. Here is the description of each variable:

TABLE 4: Descriptive Statistic.

	N	Min.	Max.	Mean	Std. Deviation
CED	56	0,06	0,67	0,2414	0,17302
LEV	56	0,10	1,90	0,5093	0,35831
PROF	56	-0,64	0,39	0,0260	0,14984
KI	56	29,18	97,00	66,5303	18,76690
SIZE	56	15,25	32,08	24,3280	5,33097

Source: SPSS Output, 2018

Based on Table 4, Carbon Emission Disclosure (CED) has minimum value of 0.06, maximum value of 0.67, 0.2414 in average with standard deviation of 0.17302. However, standard deviation value is under the mean value, thus data deviation is relatively small. This means that the variable is great because the sample is in the average area of the calculation.

In addition, leverage has minimum value of 0.10, maximum value of 1.90, an average value of 0.5093 with a standard deviation of 0.35831. As CED, standar deviation in leverage is smaller that the average. Therefore, data deviation is considerably small. Meanwhile, profitability -0.64, 0.39, and 0.0260 in its minimum, maximum and average respectively. Mean value of 0,0260 demonstrated that most mining companies in Indonesia has profit at 2,6% of its total asset. Furthermore, the standar deviation of profitability is 0,14984 which is higher than the average value. This data indicated that there is significant diffences among the data.

Data showed that firm size has minimum value of 15.25, maximum value of 32.08, while the average value is 24.3280 with a standard deviation of 5.33097. Standard deviation which is below the average value means that discrepancies among data is relatively small. Moreover, institutional ownership has minimum value of 29.18, maximum value of 97.00, 66.5303 in mean with standard deviation of 18.76690 which indicates that data deviation is considerably insignificant.

This study also run inferential statistical analysis including classical assumption test and multiple regression analysis with SPSS 23rd version. On classical assumption test, it is found that the data is not normally distributed, but other assumptions have been fulfilled. Even though various ways such as changing the data to another form are taken, normality test produce similar result. Therefore, this study employs multiple rank regression that goes into non-parametric domain. Furthermore, hypothesis is examined by observing significance value magnitude. If the value is less than 0.05,

hypothesis will be accepted. Table 5 demonstrates the results summary. However, regression equation in this study is:

$$RCED = 73,541 - 0,376 RLEV - 0,346 RPROF - 0,495 RSIZE - 0,363 RKI + \epsilon$$

TABLE 5: Summary of Hypotheses Testing.

No.	Hypotheses	Beta Coefficient	Sig.	Description
1.	H_1: Leverage has significant effect on carbon emission disclosure	-0,376	0,002	Accepted
2.	H_2: Profitability has significant effect on carbon emission disclosure	-0,346	0,004	Accepted
3.	H_3: Firm size has significant effect on carbon emission disclosure	-0,495	0,000	Accepted
4.	H_4: Institutional ownership has significant effect on carbon emission disclosure	-0,363	0,003	Accepted

Source: Processed secondary data, 2018

3.1. The effect of leverage on carbon emission disclosure

First hypothesis examines the effect of leverage on carbon emission disclosure. Results showed that leverage has significant effect on carbon emission disclosure, thus hypothesis 1 is accepted. In addition, negative effect is found on the relation of these two. It means that higher leverage in Indonesian mining companies leads to lower carbon emissions disclosure by the company.

This finding supports stakeholder theory which states that the higher the level of corporate leverage, company will obtain great pressure from creditors to carry out its obligations that is paying off debt lent by creditors. Consequently, company

undertakes cost management by reducing carbon emissions disclosure. This cost management is conducted due to limited economic resources owned, hence company is required to choose between paying the obligation or performing voluntary disclosure [19]. This finding is in line with the results of researches by Jannah & Muid (2014); Luo et al., (2013); Peng et al., (2014) who stated that leverage negatively affects carbon emission disclosure.

3.2. The effect of profitability on carbon emission disclosure

Second hypothesis examines the effect of profitability on carbon emission disclosure. Results indicated that profitability has significant effect on carbon emission disclosure.

The relationship is found to be negative. It means that higher level of profitability of mining companies in Indonesia directs to lower carbon emissions disclosure by the company.

This results does not support the theory of legitimacy which states that better company performance encourage company to expose more of its voluntary disclosure, including carbon emissions disclosure. Moreover, this finding is also in contrary to Akhiroh & Kiswanto (2016); Cahya (2016); Jannah & Muid (2014) who demonstrated that profitability has positive effect on carbon emission disclosure. However, the results of this study is consistent to Yanto & Muzzammil (2016) finding that profitability has negative and significant impact on environmental disclosure.

Yanto & Muzzammil (2016) argued that there are reasons for negative impact of profitability on environmental disclosure. First, environmental disclosure in Indonesia is voluntary. In addition, Monitory Agency for Capital Market and Financial Institutions (BAPEPAM-LK) does not determine environmental disclosure as one of the requirements in Indonesia Stock Exchange. Second, companies with low profitability take advantage of environmental disclosure for legitimacy purposes. Conversely, companies with high profitability do not need to expand their environmental disclosure as it may disrupt financial achievement of the company [17].

3.3. The effect of firm size on carbon emission disclosure

Third hypothesis investigates the effect of firm size on carbon emission disclosure. It is found that firm size affects carbon emission disclosure, therefore hypothesis 3 is accepted. Specifically, the effects between these two is negative. This finding indicated that bigger firm of Indonesian mining companies tends to disclose more limited information of its carbon emission disclosure.

This finding conctradicts the theory of legitimacy which states that companies with larger size have a greater tendency to disclose information about carbon emissions. However, the results support Dibia & Onwuchekwa (2015) who showed that there is negative relationship between firm size and disclosure of oil and gas companies in Nigeria. There are several argument regarding this finding. First, big companies become more vulnerable to political attacks such as pressure for social responsibility implementation, as well as subject to larger regulations such as price controls and high corporate taxes. Therefore, company reacts to not being attention center related to its published information. That is why large company tends to disclose less detailed

information in annual reports (Wallace & Nasser, 1995 in [24]). Second, smaller companies among others in the same industry will have huge motivation to compete. Hence, those companies may produce more information including voluntary disclosure to attract potential investors.

3.4. The effect of institutional ownership on carbon emission disclosure

Fourth hypothesis examines the effect of institutional ownership on carbon emission disclosure. Results showed that institutional ownership has significant effect on carbon emission disclosure. In addition, the impact is found to be negative. Therefore, higher institutional ownership in Indonesian mining company encourage company to reduce its carbon emission disclosure. This means that the higher the

level of presentation of institutional ownership in mining companies in Indonesia, the lower disclosure of carbon emissions by companies.

The results do not support agency theory which states that institutional ownership can be an effective control mechanism in every decision taken by management. However, this study is consistent with studies by Ezhilarasi & Kabra (2017) and Lakhal (2005) who found that there is negative relationship between institutional ownership and to the extent its company's environmental disclosure. Furthermore, Alhazaimeh et al. (2014) also demonstrated that there is negative relationship between institutional ownership and voluntary disclosure. This condition occurred due to low pressure of institutional owner to make voluntary disclosure. Institutional owners as majority shareholder have great authority to encourage company not to make voluntary disclosures as they want to maximize their profits. Nevertheless, according to agency theory, such action will lead to agency issues between the majority shareholder and minority shareholder due to unknown corporate information by minority shareholders.

4. Conclusion

Results indicated that leverage, profitability, firm size, and institutional ownership significantly affect carbon emission disclosure. Hence, all hypotheses are accepted. Moreover, further researchers is recommended to measure carbon emission disclosure using other indicators which have been adapted into Indonesian conditions, such as those indicators used by Jaggi et al. (2017) in his research entitled The Factors

Motivating Voluntary Disclosure Of Carbon Information: Evidence Based On Italian Listed Companies. In addition, determination coefficient of the study is less than 50%, thus future research may investigates other factors that affect carbon emission disclosure, such as environmental performance, firm age, media exposure, and growth opportunity.

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