

# Determinants of Carbon Emission Disclosure

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## ABSTRACT

This research aims to analyze the determinants of carbon emission disclosure. These determinant factors consist of family ownership, financial slack, social reputation, and industry regulation. The study used 537 observations from 179 samples of public companies in natural resource and manufacturing industries in Indonesia for the year 2012- 2014. The result of this research shows that the average level of carbon emission disclosure is only 6, 25%, which indicates that the awareness about carbon emission issues is still low. The regression result shows that financial slack, social reputation, and industry regulation have a significant positive effect on the carbon emission disclosure level, whereas the family ownership has an insignificant effect on the carbon emission disclosure level. This research can be used as a reference by the regulators and companies for creating regulations and policies to reduce and disclose the companies' carbon emission in order to achieve the national emission target.

## ABSTRAK

Penelitian ini memiliki tujuan untuk menganalisis faktor-faktor yang memengaruhi pengungkapan emisi gas karbon. Faktor-faktor determinan ini terdiri dari kepemilikan keluarga, kelonggaran finansial, reputasi sosial, dan regulasi industri. Penelitian ini menggunakan 537 observasi dari 179 sampel perusahaan publik yang bergerak dalam industri sumber daya alam dan industri manufaktur di Indonesia selama periode tahun 2012-2014. Hasil penelitian menunjukkan bahwa di Indonesia, rata-rata tingkat pengungkapan emisi gas karbon masih tergolong rendah yaitu sebesar 6,25%. Hal tersebut menandakan bahwa kesadaran dan kepedulian terhadap isu tersebut masih rendah. Hasil regresi menunjukkan bahwa tingkat financial slack, reputasi sosial, dan regulasi industri berpengaruh positif terhadap tingkat pengungkapan emisi gas karbon, sedangkan kepemilikan keluarga tidak berpengaruh signifikan terhadap tingkat pengungkapan emisi gas karbon. Penelitian ini dapat dijadikan acuan oleh para regulator dan perusahaan dalam merumuskan regulasi dan kebijakan khusus yang bertujuan untuk menurunkan emisi gas karbon dari sisi perusahaan serta kewajiban untuk melaporkannya agar terkontrol dan sesuai dengan target emisi nasional.

## 1. INTRODUCTION

Climate change has been an interesting issue recently and becomes a global problem. The increase of the Earth's surface temperature, the melting of polar ice caps, the rising sea levels, and extreme weather are some of the real impacts of climate change. NASA (2016) mentions that 2015 was the year with the highest average temperature of the Earth's surface since 1880. The same source also mentions that the surface area of the ice in the Arctic continent continues to decline with a decreasing percentage of 13.4% per decade while the Antarctica continent has also experienced an ice mass loss of 134 gigatonnes per year since 2002.

The topic of greenhouse gases is very closely related to the issue of climate change and global warming because greenhouse gases have a very big contribution in raising the temperature of the Earth's surface (IPCC, 2006). The gases which are included in these greenhouse gases are carbon dioxide gas (CO<sub>2</sub>), methane (CH<sub>4</sub>), dinitrogen oxide (N<sub>2</sub>O), hydrofluorocarbon (HFC), perfluorocarbon (PFC), and sulfur hexafluoride (SF<sub>6</sub>). Based on the data from NASA, the world's carbon emissions increase each year consistently. The data from NASA also complies with the data from the World Resource Institute in 2015 that mentions that there has been an

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increase in greenhouse gas emissions very significantly from 1990 to 2012. From 187 countries in the list of countries producing greenhouse gas emissions, Indonesia ranks the 10th country with the highest total of greenhouse gas emissions.

Moorhead and Nixon (2015) stated that large companies contribute more than 10% of the total carbon emissions in the world and increase each year by 1% on a consistent basis. It also results in business lately many hard criticisms from various parties because it often does not concern about the environmental impact of its business activities the companies do. Therefore, it takes awareness and solutions from the business to reduce the environmental impact. One effort that can be done is to look at the environmental impact of its business activities on the business surrounding.

The increasing awareness of the importance of business concepts of sustainability makes the stakeholders of the company interested in knowing the role of companies in sustainability, so the disclosure regarding sustainability becomes a piece of important information and required by the stakeholders of the company (Gurvitch & Sidorova, 2012). It is according to the theory of stakeholders and the theory of legitimacy where the theory of legitimacy argues that there is a concept of the social contract between the company and the society. One of the things that a company can do to gain legitimacy and recognition from the public and stakeholders is through a related disclosure of sustainability; one of them is the disclosure environment.

One of the important aspects of environmental disclosure is a disclosure related to climate change and greenhouse gas emissions. Research on disclosure of carbon emissions and environmental disclosure has been widely done during the past decade. The focus of the research was factors that affect the disclosure of carbon emissions (Akrouf & Othman, 2013; Chithambo & Tauringana, 2014; Choi, Lee, & Psaros, 2013; Liao, Luo, & Tang, 2015; Rankin, Windsor, & Wahyuni, 2011). Some of the studies are conducted since disclosure of carbon emissions is voluntary disclosure. The company certainly needs more costs for voluntary disclosure, such as direct costs, energy, and time. Therefore, it is interesting to examine these factors that can influence the company to conduct a voluntary disclosure of related carbon emissions. Zheng, Balsara, and Huang (2014) stated that there are two general factors that become the catalyst company to do voluntary disclosure specifically related to the disclosure of sustainability, which is the factor of

pressure from within the company (internal factor) and the factor of pressure from outside the company (external factors).

Claessens, Djankov, and Lang (2000) studied in 2000 found that 67.1% of total companies in Indonesia, used as the research sample are the companies with their ownership structure is concentrated on the family. Related to the research by Young, Peng, Ahlstrom, Bruton, and Jiang (2008), the condition that was discovered by (Claessens et al., 2000) gave the signal that the agency issue which happens to companies in Indonesia is a matter of Agency between the majority shareholder (controlling) shareholder and minority (non-controlling).

In the case of companies that have ownership structures that occurred like the majority of companies in the United States and Europe, there is high asymmetry information between the shareholders (the principal) and the management (agent). One way to minimize the asymmetric information is to improve the disclosure of information, including doing a voluntary disclosure so that the information received by the principal becomes more comprehensive. On the contrary, in the family company, asymmetric information that occurs between the controlling shareholder and management is very small because the family as controlling shareholder has a great role in the formation of policy management and optimal monitoring (Chen, Chen, & Cheng, 2008). It implies that the disclosure made by the management will be less, and it does not include any voluntary disclosure of related sustainability and the environment. This is confirmed by the research of Akrouf and Othman (2013), which found a negative relationship between family ownership and the level of environmental disclosure.

The family as a controlling shareholder is likely to have a long-term orientation and protect the reputation of the company as it has the intention to bequeath good companies for the next generations of the family (Brigham, Lumpkin, Payne, & Zachary, 2014). Based on that explanation, the family company tends to keep its own reputation and their company's reputation by running the practice of sustainability and social responsibility that are higher than those of the non-family companies. It is also done to keep the continuity of the company so that in the long term, the company could be handed down to subsequent generations of the family.

The company resource becomes one of the internal factors for consideration in the company's management for doing the disclosure of carbon

emissions. Disclosure of carbon emissions, which is a voluntary disclosure, certainly requires costs and greater resources. In the concept of a company's resources, it is known as a concept called slack. Financial slack is defined as the excess cash that belongs to the organization after being used to meet the needs of operational activities, which has been determined (Mishina, Pollock, & Porac, 2004). Lewis (2013) stated that the existence of the financial slack in the company has a positive impact on the company and their innovation activities. This argument is supported by Kock, Santaló, and Diestre (2012), stating that the financial slack could be used to fund the company's activities mainly related the activities of social responsibility and the company's sustainability, including the company's efforts to keep environmental conditions and also such disclosure.

Based on the theory of legitimacy and the theory of stakeholders, the company would likely try hard to meet both the stakeholders' interests and seek to get their legitimacy. An organization that has a reputation and a high level of visibility will get greater pressure from stakeholders in sustainability issues related, especially environmental and social issues (Choi et al., 2013). Legitimacy theory states that a company does environmental disclosure as a form of reaction against the corporate interest group pressure (as the pressure of environmental, social, and political) of outside parties (Choi et al., 2013).

In Indonesia itself, there is a government regulation that encourages companies to do the disclosure related to activities of social responsibility and sustainability, including the disclosure regarding carbon emissions. The mining industry in Indonesia is very tightly regulated by government regulation and sustainability practices associated with such disclosure. According to the existing regulations, the mining industry is expected to have a level of information disclosure of sustainability and high carbon emissions, so the factor of regulation on mining industry becomes an important factor in carbon-emissions disclosure.

Based on the explanation above, it is interesting to conduct research about the factors that affect the disclosure of carbon emissions in Indonesia. It can be done by looking at the conditions of Indonesia, who was ranked 10 for countries with the most carbon emissions in the world based on the publication of World Resource Institute in 2015.

## **2. THEORETICAL FRAMEWORK AND HYPOTHESES**

### **Theories Related to Voluntary Disclosure**

Agency theory and signaling theory are the theories that can be used to describe voluntary disclosure about companies where their management will improve the disclosure of information as the effort to minimize the information asymmetry that occurs between the company's internal and external factors (Jenson & Meckling, 1976; Shehata, 2014).

Again, the theory of legitimacy and that of stakeholders have also been widely used to explain the disclosure of the corporate environment. Legitimacy theory tells us that there is a concept of a social contract that links between the company and the public widely. A social contract is a contract whereby the society gives the right and authority to the company to conduct the management of resources such as natural resources and humans (Mathews, 1993). Therefore, the company should always try to meet the expectations of the public to get legitimacy from the community according to the concept of the social contract.

In the theory of stakeholders, Freeman (2001) stated that in carrying out its activities, the company must be able to identify each stakeholder. Business people should be better at paying attention to stakeholders and manage them, so the company should not just focus on shareholders, but also of the entire stakeholder that they own. One of the efforts that the company has to do for keeping the stakeholders' interests and expectations is by disclosing the factors related to the company's sustainability.

### **Carbon Emissions and Greenhouse Gases**

Based on the United States Environmental Protection Agency (EPA), the greenhouse gas is the gas that may be the trapping heat in the Earth's atmosphere so that the heat of the sun reflected by the Earth's surface is caught by the gas and cannot get out of the atmosphere. The buildup of these gases makes the rising rays infrared reflected Earth and lead to a rise in temperature of the Earth's surface. These gases include carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), dinitrogen oxide (N<sub>2</sub>O), hydrofluorocarbon (HFC), perfluorocarbon (PFC), and sulfur hexafluoride (SF<sub>6</sub>). Based on the source, the carbon emissions are distinguished into two, namely the natural carbon gas and the carbon gas, which comes from human activities, or also called the carbon gas industry.

Human activities that emit carbon emissions are mainly activities related to the combustion of fossil

fuels (coal, natural gas, and petroleum) to produce energy and electricity. The burning up of fossil fuels significantly brings out carbon dioxide gas into the atmosphere. The business industries that are intensively burning up fossil fuels are the mining industry and the manufacturing industry. In addition, based on the EPA website, the agriculture industry is an industry that has a high level of emissions of methane (CH<sub>4</sub>) are from fertilizers used in agriculture and industry as well as from mammalian livestock. There were also some mentioned that methane gas is one of the greenhouse gases that is more dangerous than carbon gas. This signifies that companies and industries have a big impact on greenhouse gases emission since their operations emit not only carbon dioxide but also other greenhouse gases.

### **Voluntary Disclosure**

Voluntary disclosure is a disclosure that is done unlimitedly in the type of disclosure that is required by regulators or an existing standard (Lan, Wang, & Zhang, 2013)). Some types of corporate disclosure are compulsory and regulated by the regulation, such as the disclosure of the financial statements, management discussion and analysis, and some other disclosure are mandatory. In addition, the company can also make the disclosure more than required, which is voluntary (Healy & Palepu, 2001).

The company will be making a lot more sacrifice when disclosure is voluntary because preparing and reporting need more cost and time. Therefore, it has been a lot of researches in the field of accounting, which is researching the motivation of management to conduct a voluntary disclosure. (Kansal, Joshi, & Batra, 2014) stated that one of the motives of the company management to perform voluntary disclosure is to gain the legitimacy of stakeholders that have a focus on specific issues (such as environmental issues), and there are also hopes that in the future there will be an increase in cash flow so that it can boost the stock price.

Several studies have also found some of the profits obtained by the company in making this voluntary disclosure such as decreasing the asymmetry of information between the owner of the company and the management of the company because the management does the disclosure more than just limited disclosure which is mandatory; increasing the liquidity of shares, because by doing a voluntary disclosure, the company will reduce the asymmetry of information between the owner of the shares and the management of the company. The existence of voluntary disclosure of the company's

management will make shareholders and potential investors believe that stock transactions in the market occurred at a reasonable price, so it will increase the liquidity of the stock (Healy & Palepu, 2001); and increasing the trust of outsiders and investors of the company so that it can decrease the cost of agency and that of capital (Leventis & Weetman, 2000).

### **Hypothesis Development**

#### **The Influence of Family Ownership on Carbon Emissions Disclosure**

Iyer and Lulseged (2013) stated that the ownership structure of the company that is concentrated on the family would have higher awareness and orientation against the practice of sustainability and corporate social responsibility. A family company will tend to avoid activities that could have a negative impact on the company's reputation to maintain the excellent reputation of the company (Iyer & Lulseged, 2013). Therefore, the ownership of the family will increase the activity of social responsibility and also the disclosure related to it. On the contrary, in the case of a family company, information asymmetry between controlling shareholders and management is very little worth because of the controlling shareholder has intensive surveillance and control to management. This condition makes the management less inclined to do a voluntary disclosure. It is supported by research conducted by Akrouf and Othman (2013)) which indicates that the ownership of the family has a negative relationship toward the level of disclosure of corporate environment that is voluntary.

In addition, family companies tend to focus more on personal wealth (self-interest) so that their main purpose is to protect the company's assets and the family's ownership. Social responsibility activity conducted by the company will reduce assets and lowering the profit the company earned. Therefore, Morck and Yeung (2004) stated that the family company tends to be less socially responsible because the family, as the majority shareholder, wants to protect its assets. Thus, the ownership of the family has a negative relationship against the practice of sustainability and such disclosure, according to the research conducted by Morck and Yeung (2004), showing that family ownership has a negative relationship with the practice of sustainability and social responsibility. From the explanation above, the proposed hypothesis is:

***H1: Family ownership affects the rate of carbon emissions disclosure***

**The Influence of Financial Slack against Carbon Emissions Disclosure**

With the increasing issues regarding the environment and sustainability, the organizations that have a high level of financial slack allegedly will disburse excess financial resources with the related activities of environmental and climate change, as well as in the event such disclosure (Kock et al., 2012). Moreover, the company will conduct carbon emissions due to the current issue of climate change has become a very important strategic issue that will be considered by stakeholders (Chithambo & Tauringana, 2014). Chithambo and Tauringana (2014) also stated that the availability of the financial slack would make the company be able to meet the needs of cost for things related to the administrative decision do voluntary disclosure; one of them is the disclosure of related carbon gas. Chithambo and Tauringana (2014) found that there is a positive relationship between the levels of financial disclosure of the company and the slack greenhouse gas emissions. From that explanation, the proposed hypothesis is as follows:

***H2: The level of financial slack has a positive effect on carbon emissions disclosure levels***

**The Influence of Social Reputation against Carbon Emissions Disclosure**

The company which has had a good reputation will get a good impression of trust from its stakeholders, including employees, investors, consumers, and society. A good reputation should be guarded well by communication with stakeholders so that they can maintain a good relationship. One of the ways of communication with stakeholders is through disclosure of related sustainability activities of the company, including the related disclosure of greenhouse-gas emissions so the company's reputation could be preserved.

One of the studies that examine the relationship between these two factors above is Choi et al. (2013), who used a proxy measure of the companies as the size of the organization's reputation. According to Choi et al. (2013), the larger the size of the organization, the higher the pressure they obtain from stakeholders regarding environmental issues because the larger the size of the company. The company will be more visible and have a reputation in the public eye. It also makes the company increasingly care about and respond to the environmental issues surrounding its business

activities and make the disclosure over the matter. Choi et al. (2013) concluded that the reputation of the organization, as measured from the size of the company, has a significant positive relationship with the disclosure of carbon emissions.

Research by Choi et al. (2013) was related to the positive effect of social reputation against the disclosure of the company's carbon emissions. The company with a good reputation will be more sensitive to social issues and the environment. They are aware of the effort for doing a disclosure as a tool of communication to stakeholders and keeping the reputation (Michelon & Parbonetti, 2012). Based on that explanation, the proposed hypothesis is stated as follows:

***H3: The corporate social reputation has a positive effect on carbon emissions disclosure levels***

**The Influence of the Regulation of the Industry against Carbon Emissions Disclosure**

The type of industry has its own influence in the disclosure of sustainability, particularly the disclosure related to carbon emissions. The type of industry which is sensitive or energy-intensive and has been examined by Choi et al. (2013). They concluded that there is a positive relationship between the level of disclosure and carbon emissions.

In this study, the influence of the type of industry is viewed based on the regulation that governs the industry. The company in a particular industry receives higher pressure from external parties, namely regulator related issues regarding disclosure of carbon emissions. The company then will attempt to gain legitimacy by following the existing regulation. In Indonesia, the mining industry is an industry that has strict regulation of related practices of sustainability, including sustainability practices related environment and climate change. Therefore, the mining industry has a level of disclosure of carbon emissions that is higher than those of other industries. From that explanation, the proposed hypothesis is as follows:

***H4: The regulation of the industry has a positive effect on carbon emissions disclosure levels***

**3. RESEARCH METHOD**

This research used a model based on previous studies by Choi et al. (2013) and Chithambo and Tauringana (2014). The model of the research is a multiple regression model, and this is used to test the hypothesis of research investigating the

influence of the variables such as independent of the dependent variables. This research model is as follows:

$$CDISC_{it} = \alpha_0 + \alpha_1FAM_{it} + \alpha_2FSLACK_{it} + \alpha_3REP_t + \alpha_4INDST_{it} + \alpha_5SIZE_{it} + \alpha_6ROA_{it} + \alpha_7LEV_t + \varepsilon_{it}$$

Where:

CDISC	= the rate of carbon emissions disclosure
$\alpha_0$	= Intercept
$\alpha_{1-7}$	= The regression coefficient
FAM	= A dummy variable indicating a family company where a value of 1 is given if a company includes a family company, and the value is 0 if it is otherwise
FSLACK	= the level of the financial slack of the company
REP	= A dummy variable that indicates the level of the company's social reputation where a value of 1 is given if the company is included in the list of index SRI-KEHATI and the value is 0 if it is otherwise
IND	= A dummy variable where a value of 1 is given if the company is included in the mining industry and the value is 0 if it is otherwise
SIZE	= Natural logarithm of total company assets
ROA	= the level of profitability of the company
LEV	= the company's debt level

### Variable Operationalization

The definition and measurement of each variable can be seen in Table 1 below.

Table 1  
Variable Operationalization

No	Variables	Definition and Measurement	Researchers
1	<b>Carbon Emissions Disclosure Level (CDISC)</b>	The level of disclosure of carbon emissions measured using the percentage of carbon-based gas emissions disclosure index scoring, which is adopted from research Choi et al. (2013) which is a modification of the CDP questionnaire.	Chen et al. (2008)
2	<b>Family Ownership (FAM)</b>	Family ownership is defined as the percentage of the shares of the company by using the definition of family members using the definition of Arifin (2003). After that, it is used a value of 1 for the dummy company with a percentage of ownership of the family above 20%, and the value is 0 if it is otherwise.	Arifin (2003)
3	<b>Financial Slack Level (FSLACK)</b>	The level of the financial slack is defined as excess resources after fulfilling the basic needs of the company. This variable was measured using the ratio between cash and cash equivalents with a fluent liability of the company.	Chithambo and Tauringana (2014); Greve (2003)
4	<b>Social Reputation (REP)</b>	A social reputation of the company is measured using a dummy variable where a value of 1 will be given to the companies listed in the index to the SRI-KEHATI, and the value is 0 if it is otherwise.	Choi et al. (2013)

5	<b>Industry Regulation (IND)</b>	Regulation of the industry is measured using a dummy variable where a value of 1 is given to the company in the mining industry, and the value is 0 if it is otherwise.	Choi <i>et al.</i> (2013)
6	<b>Company Size (SIZE)</b>	Company size is measured by calculating the natural logarithm of the total of company assets.	Liao <i>et al.</i> (2015); Choi <i>et al.</i> (2013)
7	<b>Profitability (ROA)</b>	The level of profitability is measured using the Return on Assets (ROA). ROA is calculated by comparing the company's net income by an average total of company assets.	Choi <i>et al.</i> (2013)
8	<b>Leverage (LEV)</b>	The leverage level is measured by calculating the ratio of total debt to the total assets.	Choi <i>et al.</i> (2013)

**Dependent Variable**

**The Level of Carbon Emissions Disclosure (CDISC)**

The dependent variable in the study was the rate of carbon emissions related disclosure on companies in Indonesia, and this was measured using the method of content analysis of the annual report and sustainability report on the company. In conducting the content analysis, the researchers used a checklist that lists the research adopted by Choi *et al.* (2013).

The checklist is the development of questions to the Carbon Disclosure Project (CDP), a non-profit organization which is independent which focuses on carbon emissions related disclosure of the existence of climate change. In the list of checklist developed by Choi *et al.* (2013). There are 18 points of assessment that were divided into five categories. A complete list of indexes developed by Choi *et al.* is shown in Table 2.

Table 2  
Scoring Index of Carbon Emissions Disclosure

Category	Index of Greenhouse Gas Emissions Disclosure
1. <b>Climate Change Risk and Opportunity (CC)</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 opportunities of climate change.
2. <b>GHG Emissions Accounting (GHG)</b>	GHG 1 - The description of the methods used in calculating greenhouse gas emissions. GHG2 - existence external verification of quantity of GHG emission- if so by whom and on what basis GHG 3 - The amount of greenhouse gas emissions in units of MtCO <sup>2</sup> e ( <i>metric ton CO<sup>2</sup> emitted</i> ). GHG 4 - The disclosure of Scope 1, Scope 2, Scope 3, or related to the direct greenhouse gas emissions. GHG 5 - The disclosure of greenhouse gas emissions based on the source of emissions. GHG 6 - The disclosure of greenhouse gas emissions based on facilities or the level of the segment. GHG 7 - The comparison of the amount of greenhouse gas emissions in the current and past year.

3. <b>Energy Consumption Accounting (EC)</b>	<p>EC 1 - The amount of energy consumption.</p> <p>EC 2 - The amount of energy that is sourced from renewable sources.</p> <p>EC 3 - The disclosure based on the types, facilities, or segments.</p>
4. <b>GHG Reduction and Cost (RC)</b>	<p>RC 1 - The detailed explanation of the strategies and plans to reduce greenhouse gas emissions.</p> <p>RC 2 - The target number of reductions of greenhouse gas emissions specifically.</p> <p>RC 3 - The magnitude of the reduction of emissions and the associated costs or savings of the magnitude of the reduction plan related to greenhouse gas emissions up to the date of reporting.</p> <p>RC 4 - The magnitude of the costs related to future greenhouse gas emissions as the cost is included in the company's capital expenditure planning.</p>
5. <b>Carbon Emissions Accountability (ACC)</b>	<p>ACC 1 - The explanation of who is the Committee or the Special Director that is solely responsible for policies related to climate change.</p> <p>ACC 2 - The explanation of the mechanism of review upon the attainment of company related to climate change by the Committee or the Board of Directors.</p>

The calculation of the index is the disclosure of greenhouse gas emissions based on the checklist list done with these steps:

1. Giving a score for each index was done by using a scale of disclosure dichotomy, where a value of 1 is given for each index, which is disclosed in the annual report or sustainability report, and the value is 0 if there is no disclosure.
2. Scoring each aggregated index for each company so that the total score obtained.
3. We are computing the index of such disclosure by dividing the total score with the overall amount of disclosure index score of 18 indices.

### Independent Variable

#### Family Ownership (FAM)

Family ownership is defined as a percentage of the company's shares that are owned by family members. The higher the percentage shows the higher interest the family has to the company (Wang, 2006). This variable is measured by calculating family ownership percentage based on Arifin (2003).

Arifin (2003) created four definitions of family. One definition used in this research is that a family is all individuals and companies whose ownership is recorded on their own names. It includes local and foreign individuals and companies but excludes public companies, government, financial institutions, and the public. This definition covers the fact that many foreign companies are ultimately owned by the same individual and families, thus still

belong to the same family group, which is also stated in La Porta, Lopez-de-Silanes, Shleifer, and Vishny (2000). Dummy score 1 is given to companies with the family owning more than 20 per-cent of total shares and 0 for the contrary. The 20 percent limit is used based on La Porta et al. (2000) because the ownership of 20% is expected to have enough control of a company. It is also consistent with PSAK 15 in which it states that investment amounting to 20% and higher is considered having a significant influence.

#### Financial Slack (FSLACK)

Financial slack shows excess cash after the company has fulfilled all its basic needs. This research refers to financial slack researches Greve (2003) by comparing cash and cash equivalents to current liabilities. This measurement is used because it is more appropriate to represent excess cash in a company.

#### Company's Social Reputation (REP)

This variable is measured by using a dummy where 1 is given to companies that are listed in the SRI-KEHATI index and 0 otherwise. SRI-KEHATI index is an index made by *Yayasan Keanekaragaman Hayati* (Kehati), and Indonesia Stock Exchange in which companies listed in this index are those that are considered to have a concern on the environment, corporate governance, community involvement, and business conducts as well as business ethics that are accepted globally.



**Industry Regulation**

This variable is a dummy used to see the effect of the industry on the level of emission and strict regulations on sustainability and carbon emission. Considering the difference of regulations applied across industries, the researchers gave a score of 1 to the companies that are classified into the mining industry and 0 otherwise. The mining industry has strict regulations regarding companies' sustainability activities and emission monitoring, which are mostly greenhouse gasses.

**Control Variables**

**Company Size**

Referring to Liao et al. (2015) and Choi et al. (2013), company size has a positive effect on carbon emission disclosure. Company size is measured by calculating the natural log of the company's total assets. Natural log varies highly. The bigger the company, the more it will be on the public's eyes, thus pushing it to bring more effort in maintaining its reputation. One of the ways is to voluntarily disclose its carbon emission. Based on this fact, it is expected that the company size will have a positive coefficient.

**Profitability**

Profitability is measured using Return on Asset (ROA) based on Choi et al. (2013). ROA is a ratio to measure a company's asset's abilities to generate profit. In general, ROA is measured by comparing profit to the company's total assets. But in this research, ROA is measured by comparing profit to the company's average total assets. Companies with excellent financial performance tend to voluntarily disclose information better than companies with bad financial performance. Thus, in reference to Choi et al. (2013), this variable is expected to have a negative coefficient.

**Leverage Level**

Based on Choi et al. (2013), the leverage level ratio is measured by comparing the company's total liabilities to its total assets. A higher ratio creates a higher risk of financial distress. Choi et al. (2013) and Liao et al. (2015) found that the higher the risk of financial distress, the tendency that the company will disclose and do sustainable activities will be lower. Thus, the leverage ratio is expected to have an adverse effect on the carbon emission disclosure rate.

**Population and Sample**

This research used secondary data of companies that are classified into those in natural resources industries and manufacturing industries, which are listed in the Indonesia Stock Exchange for the period of 2012-2014. This research focuses on these industries because both have business activities that create a high rate of greenhouse gas emission and direct impacts on climate change and the environment. Based on EPA's web-site (2015), it is stated that the agriculture industry has high methane (CH4) emission in which methane is one of the more dangerous greenhouse gasses compared to carbon. Moreover, it is also stated that activities in the mining and manufacturing industries have a high rate of carbon emission coming from fossil fuel and electricity usage. This research will also use companies' financial data from Thomson Reuters. The disclosure of carbon emission will be obtained from companies' annual reports and/or sustainability reports that are available on the Indonesia Stock Exchange or each company's website.

The population in this research is all companies listed in the Indonesia Stock Exchange from 2012 to 2014. This research used a purposive sampling in which the sample was chosen based on specific criteria such as public companies in the natural resources industries (agriculture and mining) and manufacturing industries (basic and petrochemical, various industry, and consumer goods) which are listed in Indonesia Stock Exchange from January 1, 2012 to December 31, 2014; companies with positive equities; and companies that present all required data to measure the variables used in this research. Table 3 shows the results of sample selection:

Table 3  
Research Sample

Description	Total
Initial Sample	205
Annual Report and/or Sustainability Report is Not Available	(6)
Incomplete Financial Data	(4)
Negative Equity	(5)
Total Company Sample	179
<b>Total Observation (Balanced Panel)</b>	<b>537</b>

#### 4. DATA ANALYSIS AND DISCUSSION

##### Statistic Descriptive

Based on table 4, it shows that the average rate of carbon emission disclosure is still low at 6.25%. This figure points out that from 18 score points on the CDP checklist, the sample only discloses 1-2 points on average. The low average rate shows that companies in the natural resources and manufacturing industries have not had sufficient

awareness of carbon emission issues arising from their business activities.

The family ownership variable shows that the majority of companies in the primary and secondary industries in Indonesia are dominated by family owners, totaled to 79.6%. This is in accordance with La Porta et al. (2000) and Claessens et al. (2000), who found that the majority of companies in Indonesia are family companies.

Table 4  
Descriptive Statistics

Variable	Minimum	Maximum	Mean	Std. Dev
CDISC	0,0000	0,5389	0,0625	0,1413
FSLACK	0,0005	12,3894	0,6890	1,3853
SIZE (IDR million)	10.582	236.027.000	8.247.174	20.156.215
ROA	-0,3216	0,7983	0,0593	0,1048
LEV	0,0000	0,9375	0,2533	0,2046

Dummy Variable			
Variable	% Value 1	% Value 0	Total %
FAM	79,70%	20,30%	100%
REP	6,52%	93,48%	100%
IND	19,55%	80,45%	100%

**CDISC** = Level of carbon emission disclosure; **FSLACK** = Financial slack level (measured by cash and cash equivalent compared to current liabilities); **SIZE** = Total assets in a million rupiah; **ROA** = Profitability level (Net Income compared to Average Total Assets); **LEV** = Leverage level (measured by total debt compared to total assets); **FAM** = Dummy variable for family companies, 1 for a family company, 0 otherwise; **REP** = Dummy variable for social reputation, 1 for companies which are in SRI-KEHATI index, 0 otherwise; **IND** = Dummy variable for industry regulation, 1 for mining companies, 0 otherwise.

The average rate of financial slack of primary and secondary companies in Indonesia shows a rate of 68.90%. Although this rate is considered high, it also ranges widely. It shows that financial slack rates between companies vary significantly. The data describes that many companies with a low financial resource can be related to low carbon emission disclosure rates. The financial resource is expected to have a positive effect on the disclosure rate, and the data supports these findings.

For social reputation, 6.52% of samples are listed in SRI-KEHATI index or equivalent to 35 out of 537 companies. This relatively small percentage is because only 25 public companies that can be listed in SRI-KEHATI index each period. Generally, there are only small changes of companies listed on the index in each period. Few companies that are consistently listed in the index for three consecutive years are PT Astra Inter-national, Tbk; PT Aneka Tambang, Tbk;

PT Tambang Batubara Bukit Asam, Tbk; and PT Unilever Indonesia, Tbk.

For the industry variable, there is 19.55% of samples belong to the mining industry. As shown in Table 4, there are 35 companies in the mining industry each year, so that 105 firm-year samples out of 537 firm-year samples belong to the mining industry and are required to comply with the regulation.

##### Average Rate of Carbon Emission Disclosure

In general, the average rate of carbon emission in Indonesia is low. Nevertheless, it is shown in Figure 1 that the rate is consistently increasing from 2012 to 2014 from all primary and secondary industries. It signals that awareness and concerns of public companies in Indonesia related to environmental issues and carbon emission are consistently increasing each year. Based on that finding, it is

expected that the awareness and concerns will keep increasing in the future.

The primary industry has a higher rate of disclosure because it has a direct impact on nature and the environment from its operational activities, both extractive and exploitative. Therefore, the

impact of environmental damage is higher than that of the secondary industry. This impact pushes the companies of this industry to conserve and maintain the environment's sustainability as one of the CSR activities.

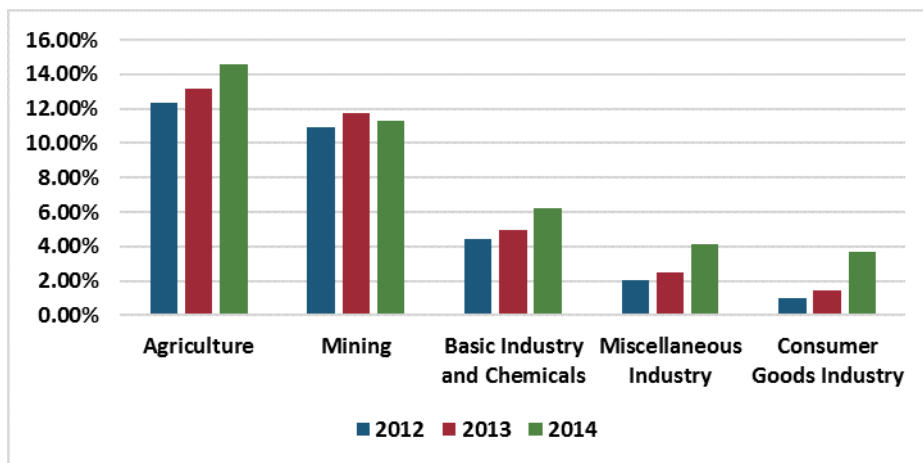


Figure 1. Average Level of Carbon Emission Disclosure in Indonesia

Article 47 Law No. 40/2007 specifically requires companies that have business activities related to the environment to conduct CSR activities intensively by such as planting trees, forest conservation, greenhouse gas emission reduction, and disclose information of environmental activities entirely and in more detail.

### Regression Results

This research intends to understand the factors that significantly affect the disclosure rate of carbon emission with family ownership, financial slack, social reputation, and industry regulation as independent variables. The results of hypothesis testing can be seen in Table 5.

Table 5  
Regression Test Results

Variables	Coefficient	Sig.	Description
FAM	-0,0058	0,325	Not Significant
FSLACK	0,0034	0,010***	Significant
REP	0,2512	0,000***	Significant
IND	0,0299	0,000***	Significant
SIZE	0,0296	0,000***	Significant
ROA	0,0203	0,136	Not Significant
LEV	-0,0350	0,004***	Significant
<b>Total Observations</b>	<b>537</b>		
<b>R<sup>2</sup></b>	<b>0,4396</b>		
<b>Prob &gt; F</b>	<b>0,0000</b>		

CDISC = Level of carbon emission disclosure; FSLACK = Financial slack level (measured by cash and cash equivalent compared to current liabilities); SIZE = Total assets in million rupiah; ROA = Profitability level (Net Income compared to Average Total Assetst); LEV = Leverage level (measured by total debt compared to total assets); FAM = Dummy variable for family companies, 1 for family-owned company, 0 otherwise; REP = Dummy variable for social reputation, 1 for companies which are in SRI-KEHATI index, 0 otherwise; IND = Dummy variable for industry regulation, 1 for mining companies, 0 otherwise.

NOTE : \* significant at  $\alpha = 10\%$  ; \*\* significant at  $\alpha = 5\%$  ; \*\*\* significant at  $\alpha = 1\%$

The result of the regression test shows that family ownership (FAM) does not have a significant effect on carbon emission disclosure. It can be explained from the average rate of disclosure that it is only slightly different between family-owned companies and non-family-owned companies. The average rate of disclosure in family-owned companies is 6.24%, while for non-family-owned companies is 0.04%. Statistically, the effect of family ownership on the rate of disclosure is clearly represented.

Another reason that might support why family ownership does not have a significant effect is that it is due to the proxy used as the measurement that is too weak since it only sees the first layer of ownership and not the ultimate owner.

The financial slack rate is proven to have a positive effect on the disclosure rate. Therefore, hypothesis 2 is accepted. The financial resource is an internal factor which becomes one of management's consideration to apply sustainable practices and disclosures. Companies with high financial slack indicate that companies can utilize the excess resource to do activities that would not be done if companies have low financial slack (Chithambo & Tauringana, 2014). This finding corresponds with the resource-based view of the firm theory, which stated that a company would manage its resources to reach a competitive advantage. It also corresponds with Chithambo and Tauringana (2014), who found that financial slack rate positively affects on emission disclosure rate. With the increase of sustainability issues, companies will utilize the excess of resources to increase companies' value by doing sustainable activities and disclosing voluntarily.

Social reputation is also proven to have a positive effect on the disclosure rate. This result is in accordance with Choi et al. (2013), who found that companies with high reputation and visibilities tend to maintain their reputation and legitimacies by increasing their disclosure related to sustainability issues and carbon emission to stakeholders. The legitimacy theory explained that there is a social contract concept between companies and surrounding communities in which the communities give their rights and authorities to companies to manage resources properly (Mathews, 1993). It demands companies to conduct business as what is expected from the communities, thus making companies attempt to gain legitimacy and recognition that they have done their business as expected (Tilling, 2004). Kansal et al. (2014) stated that companies that have a good reputation would tend to increase their sustainability disclosure to keep their

good reputation.

Industry regulation is proven to affect significantly on disclosure rate. The mining industry has a direct impact on the environment because the industry operates to manage natural resources yet also generates a high rate of emission. This signifies that this industry is sensitive to environmental issues; hence strict regulations are enforced by the government. Companies within this industry are required to have a sustainable business practice as well as disclosing information related to the company's environmental data, especially those related to greenhouse gas emission. Legitimacy theory stated that companies would attempt to gain legitimacy from the external party, which explains that the companies will disclose all required information regarding carbon emission in response to the pressures given by the regulators.

Company size affects positively and significantly in accordance with Choi et al. (2013) and Chithambo and Tauringana (2014). Companies with big sizes will get more requisitions and attention from communities, which will lead to more proper business conduct following the norms and values that are strongly held by the communities. It will force the big companies to be more aware of environmental and social issues by conducting sustainable business practice and disclosure.

The profitability rate, which is measured using ROA, does not prove to have any effect on emission disclosure rate. It can happen because the awareness and concerns of carbon emission issues are still low shown by the average disclosure rate. This finding is in accordance with Choi et al. (2013), who found that the profitability rate measured by ROA does not have any significant effect on disclosure rate. Yet, the leverage rate is proven to have a negative and significant effect on the disclosure rate. Companies with a bad financial condition tend to focus on improving their financial condition by reducing their financial distress risk. On the contrary, companies with excellent financial conditions tend to increase their values by conducting sustainable business practices. It corresponds with Cormier and Magnan (2003), who found that the leverage rate has a negative effect on companies' environmental information disclosure.

## 5. CONCLUSION, IMPLICATION, SUGGESTION, AND LIMITATIONS

First of all, it can be concluded that the awareness of the business to measure and disclose their carbon emission is still low due to the companies' voluntary intention for most of the industries. However, it is

essential that the government create a specific regulation addressing the business players to reduce their carbon emission in order to achieve the national emission target. Companies should also make such policies and strategies to promote emission for their stakeholders and investors.

Out of four independent variables as the determinants, three have an impact on the carbon emission disclosure rate. Family ownership is not proven to have a significant effect on carbon emission disclosure. Yet, the financial slack rate, social reputation, and industry regulation are shown to have a positive effect on the carbon emission disclosure rate. The financial slack rate proves to have a positive impact in accordance with the resource-based view of the firm theory. The social reputation factor is aligned with the legitimacy theory and stakeholder theory, which state that companies with a good reputation tend to maintain their reputation and keep their legitimacy that has been obtained from companies' stakeholders. Companies with business activities directly exposed to the environment and natural resources management, such as mining companies, will have higher pressures from their stakeholders, such as the government and certain interest groups. The findings can help the government as a policymaker to create an appropriate regulation that targets businesses to reduce and disclose their carbon emission level. In addition, understanding the determinants of carbon emission disclosure will enable the stakeholders or any other interest groups to have an appropriate level of consideration about why and what is the motivation for such disclosure.

The analysis and results reported in this research are based on the samples of natural resources and the manufacturing industry. Therefore, it does not represent all companies. In addition, the level of disclosure measurement is based on a checklist adapted from CDP in which companies in Indonesia have not participated yet. This checklist is used because CDP has invited companies in Indonesia to participate in the project, but the participation rate is still low. It is suggested that future research should use a carbon emission disclosure scoring index, which is more relevant to companies' conditions in Indonesia. Moreover, the proxy used for family ownership should show the ultimate owners and family relationships to represent family ownership more appropriately.

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