IOP Conf. Series: Materials Science and Engineering **807** (2020) 012005 doi:10.1088/1757-899X/807/1/012005

Factors Influencing The Greenhouse Gas Emission Disclosure on Manufacturing Firms in Indonesia

Erna Listyaningsih[1], Natalina[2]

[1] Economics Faculty of Universitas Malahayati
[2] Engineering Faculty of Universitas Malahayati

Corresponding e-mail: ernatya04@yahoo.com

Abstract. Greenhouse gas (GHG) emission disclosure study is interesting to be investigated in recent years. Nevertheless, the results are still varying. This research investigated the influence of firm size, Return on Asset (ROA), leverage and environmental performance on GHG emission disclosures of listed manufacturing firms of Indonesia Stocks Exchange (IDX). Multiple regression methodology employed in this study. Sample used was 36 firms that consisted of manufacturing companies in the ranking of PROPER and IDX during 2015-2017. It was found that firm size and environmental performance had an effect on the GHG emission disclosure while ROA and leverage did not have effect. Furthermore, large companies tend to carry out information on GHG emissions disclosures voluntarily than the small one. It indicates that the ranking of PROPER motivated large firms to give information of GHG emission. This finding supported the previous studies in which firm size influenced the GHG emission disclosure.

1. Introduction

The issue of climate change and its effects has caused emerging the new environment rule namely the alleviation of the GHG around the world such as carbon pricing [1]. Previously, it was made the convention in Kyoto, Japan in 1997 which is known as The Kyoto Protocol which is an international community to alleviation the GHG emission [2]. Additionally, through the Kyoto Protocol, the international community has recognize the possible high cost associated with reducing GHG emission and as a result, allowed ratifying countries to use flexible mechanisms including emission trading, joint implementation, clean development mechanism, and joint fulfillment [3]. The other research found that the companies which in countries under the GHG law have higher emission disclosure levels [4].

Indonesia is one of the countries that has ratified the Kyoto Protocol certainly has consequences for implementing the contents contained in the protocol. However, Indonesia is including in developing countries therefore they are not required to reduce emissions but can do it voluntarily and are asked to implement sustainable development that is cleaner and more climate friendly. The Protocol Kyoto addressed on obligation of firm to admit, quantify, note, provide and expose carbon emission [5].

Figure 1 presents that electricity and heat production is 25% of 2010 global GHG emission. Electricity and heat production have the biggest contribution on GHG emission, the second and third is agriculture, forestry & other land use and industry respectively. It indicates that sector such as electricity, agriculture and industry support the bigger GHG emission than the other sector. Additionally, size of manufacturing firms are also influence to disclose the GHG emission [6].

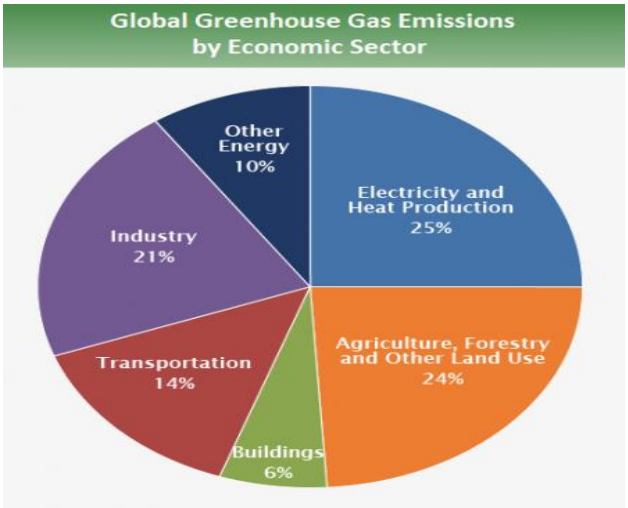

Figure 1. Global GHG Emission by Economis Sector

Previous studies have investigated the factors which influenced on GHG gas emission [1,5–13]. However, the findings are still varying. Those factors which influenced the GHG emission disclosure was such as business performance (profitability, leverage), size of firm, industry sector, media exposure, corporate governance and environmental performance. While other study investigated the effect of foreign direct investment inflows, economic development, and energy consumption on GHG emissions [14]. Therefore, this study attempts to investigate the factors which influencing the GHG emission disclosure by using manufacturing firms which is listed in Indonesia Stock Exchange (IDX). Furthermore, The firm that is not good in performance will take less emission alleviation, however to quantify the performance itself is not easy due to no single measurement clearly [10]. The GHG emission disclosure is one of the actions to gain the legitimacy from stakeholder[6,11,15]. In the context of Indonesia, a firm with a high ranking companies based on PROPER classification which is compiled by the Ministry of Environmental of Republic Indonesia have a good environmental performance. With this assessment, the company tries to inform its environmental performance in this term is GHG emission disclosure to gain stakeholder support and legitimacy of the community.

The objectives of this study is to investigate whether size of firm, business performance namely return on assets (ROA) and leverage as performance measurement, and environmental performance which is measured from the ranking list of PROPER influence GHG emission disclosure. In addition, to measure the extent of GHG emission disclosure, this study employed the Disclosure Index adopted from Choi et al. (2013). This study conducted multiple regressions for analysis data. To the authors' best knowledge, previous studies on this issue in Indonesia only focused on the effect of environmental performance and GHG emission disclosure on firm value, while the other just measured the extend of GHG emission disclosure without including environmental performance. Therefore, this study conducted by adding environmental performance which is employing PROPER proxy toward GHG emission disclosure. The results of this study could provide the latest empirical insight regarding factors which influence GHG emission disclosure on manufacturing firms which is listed in IDX which would be useful for organization and investors.

2. Methodology

This study used purposive sampling method to collect the data. The data year used was 2015-2017. All data retrieved from IDX and sustainability report. To measure GHG emission disclosure, this study employed the Choi index on Carbon Disclosure [5,12].

This study used multiple regression to investigate the influence of factors to GHG emission disclosure. To measure the GHG disclosure, the index methodology is conducted by using some GHG reporting frameworks [9].

3. Literature Review

3.1 Legitimacy Theory

According to legitimacy theory, firm makes sure that stakeholders look what they have done was legitimate [15]. The GHG emission disclosure is one of the actions to gain the legitimacy [6,11,15]. However, the other study found that environmental legitimacy significantly negatively influences the likelihood of corporate carbon disclosure [16].

3.2 GHG emission disclosure

In the context of Indonesia, the disclosure of GHG is non-mandatory. However, firm which conducting the GHG emission disclosure will obtain usefulness such as legitimacy from investors, reducing operating cost, fines and penalty [15].

Furthermore, larger firms tend to conduct voluntary GHG emission disclosure to decrease the potential risks [13]. In addition, they tend to present more credible the GHG emission disclosure [6]. Furthermore, profitability and leverage influenced the GHG emission disclosure, in where unprofitable firms using the GHG emission disclosure for legitimacy goal, and the more leverage used from creditor the bigger possibility voluntary disclosure [6,13].

The PROPER rating also becomes signal that even though they play a role for changes in extreme weather, however they have made various efforts which is in accordance with the norm and tested by the independent party or government through the program PROPER to restore the environment so as to provide support for company in gaining legitimacy from the surrounding community until finally the business they are not hindered by environmental issues [17].

If the ownership of firm is hold broadly, then managers tend to disclose information regarding GHG emission voluntarily [11,15]. Therefore, this study posits the hypothesis. The hypothesis is , there are influence of firm size, ROA, leverage, and ranking of PROPER on GHG emission disclosure

4. Results

4.1. The influences of size, ROA, Leverage and environmental performance on GHG disclosure

Table 1 shows that the biggest mean is firm size, while the lowest mean is dummy gold. Additionally, the biggest standard deviation is ROA and the lowest one is dummy gold.

Table 1. The Descriptive Statistics

Variables	Mean	Deviation Standard
GHGDisc	4.565	3.703
Firm Size	15.316	1.509
ROA	7.321	10.251
Leverage	0.460	0.192
DummyGold	0.02	0.141
DummyGreen	0.10	0.303
DummyBlue	0.78	0.418

Table 2 shows that the firm size, dummy gold and dummy green have effect on the GHG emission disclosure while others do not have effect on the GHG emission disclosure, in where firm size has significance at 1% level, dummy gold and dummy green have significance at 5% levels respectively. In addition, the value of adjusted R square is 28.6%. It means that the contribution of firm size, ROA, leverage and environmental performance on GHG emission disclosure is 28.6 % and the remaining explained by other variables beyond those variables. This result support the previous study in which firm size influenced the GHG emission disclosure [6,13]. Additionally, regarding dummy gold and dummy green are significant at 5% level on GHG emission disclosure, this findings support the previous study about legitimate theory [6,11,15].

Table 2. Multiple Linear Regression Test

Variables	β Coefficient	T	p-value	Adjusted-R square
Firm Size	0.981	4.356	***0.000	0.286
ROA	0.037	1.135	0.259	
Leverage	2.660	1.612	0.110	
Dummy Gold	5.127	2.083	**0.040	
Dummy Green	3.104	2.076	**0.041	
Dummy Blue	1.180	1.098	0.275	

5. Discussion

This research found that firm size and environmental performance influence the GHG emission disclosures. The company can provide guarantees with the existence of environmental information for the public that even though they contribute in climate change, but they have also minimized it. Big firms tend to do so due to they have been able to. However, there were a number of companies that have good PROPER ratings, apparently not publishing GHG disclosure information. It can be explained that it is possible due to the company has limitation resources to participate in PROPER because there are various requirements from two categories the main thing that must be owned by the company, namely the criteria for obedience and aspect assessment environmental management [17]. Nevertheless, this study supported the previous study in which there were influence firm size and environmental performance on the GHG emission disclosure [6,13].

6. Conclusion

This study found that firm size and environmental performance influenced on the GHG disclosure, while other independent variables did not influence on the GHG disclosure. These findings indicate that the firm that has big size and has a good ranking as well tends to conduct disclosure information due to they are able to do so. These findings supported the previous studies that firm size affected the GFG emission disclosure. Additionally, environmental performance which is measured from the ranking list of PROPER affected the GHG emission disclosure as well in which this study employed dummy variables for environmental performance.

References

[1] Borghei-Ghomi Z and Leung P 2013 An Empirical Analysis of the Determinants of Greenhouse Gas Voluntary Disclosure in Australia *Account. Financ. Res.* **2** 110–27
[2] Setyaningsrum W 2015 Analisis Yuridis Implementasi Protokol Kyoto Di Indonesia Sebagai Negara Berkembang *J. Komun. Huk.* **1** 185–98
[3] Donehower J 2008 Analyzing carbon emissions trading: a potential cost efficient mechanism to reduce carbon emissions *Environ. Law.* **38** 177–208
[4] Reid E M and Toffel M W 2009 Responding To Public And Private Politics : Corporate Disclosure Of Climate Change Strategies *Strateg. Manag. J.* **1178** 1157–78
[5] Irwhantoko I and Basuki B 2016 Carbon Emission Disclosure: Studi pada Perusahaan Manufaktur Indonesia *J. Akunt. dan Keuang.* **18** 92–104
[6] Rankin M, Windsor C and Wahyuni D 2010 An investigation of voluntary corporate greenhouse gas emissions reporting in a market governance system *Accounting, Audit. Account. J.* **24** 1–36

[7] Hermawan A, Aisyah I S, Gunardi A and Putri W Y 2018 Going Green : Determinants of Carbon Emission Disclosure in Manufacturing Companies in Indonesia **8** 55–61
[8] Jannah R and Muid D 2014 Analisis Faktor-Faktor Yang Mempengaruhi Carbon Emision Disclosure Pada Perusahaan Di Indonesia (Studi Empiris pada Perusahaan yang Terdaftar di Bursa Efek Indonesia Periode 2010-2012) *Diponegoro J. Account.* **3** 2337–3806
[9] Tauringana V and Chithambo L 2015 The effect of DEFRA guidance on greenhouse gas disclosure *Br. Account. Rev.* **47** 425–44
[10] Broadstock D C, Collins A, Hunt L C and Vergos K 2018 Voluntary disclosure, greenhouse gas emissions and business performance: Assessing the first decade of reporting *Br. Account. Rev.* **50** 48–59
[11] Kılıç M and Kuzey C 2018 The effect of corporate governance on carbon emission disclosures: Evidence from Turkey *Int. J. Clim. Chang. Strateg. Manag.*
[12] Bahari N A S, Alrazi B and Husin N M 2016 A Comparative Analysis of Carbon Reporting by Electricity Generating Companies in China, India, and Japan *Procedia Econ. Financ.* **35** 74–81
[13] Halimah N P and Yanto H 2018 Determinant of Carbon Emission Disclosure at Mining Companies Listed in Indonesia Stock Exchange *ICE-BEES 2018* vol 2018 pp 127–41
[14] Sarkodie S A and Strezov V 2019 Science of the Total Environment Effect of foreign direct investments , economic development and energy consumption on greenhouse gas emissions in developing countries *Sci. Total Environ.* **646** 862–71
[15] Berthelot S and Robert A-M 2011 Climate Change Disclosures: An Examination of Canadian Oil and Gas Firms *Issues Soc. Environ. Account.* **5** 106
[16] Li D, Huang M, Ren S, Chen X and Ning L 2018 Environmental Legitimacy, Green Innovation, and Corporate Carbon Disclosure: Evidence from CDP China 100 *J. Bus. Ethics* **150** 1089–104
[17] Anggraeni D Y 2015 Pengungkapan Emisi Gas Rumah Kaca, Kinerja Lingkungan, Dan Nilai Perusahaan *J. Akunt. dan Keuang. Indones.* **12** 188–209