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The Effect of Greenhouse Gas Emissions Disclosure and Environmental Performance on Firm Value: Indonesia Evidence Gabrielle, Agus Arianto Toly Dept. of Accounting, Petra Christian University T Building 3rd floor, Siwalankerto St. 121-131 Surabaya, 60236, Indonesia E-mail: angelagabrielle(@gmail.com ABSTRACT

This study aimed **to** investigates **the** effect **of greenhouse gas emissions disclosure and environmental performance on firm value.**   **1**

This study also investigates

the role of environmental performance in moderating the relationship between them. The samples **of this study**   **1**

were companies participating in the Performance Rating Assessment Programme on Environment Management (PROPER/Program Penilaian Peringkat Kinerja Perusahaan) of the Ministry of Environment Republic of Indonesia that are listed in the Indonesia Stock Exchange (BEI) 2014- 2017. The data used were secondary data from annual reports and/or sustainability reports. The results of this research found that greenhouse gas emissions disclosure and environmental performance have

a positive effect **on firm value. Environmental performance does not** moderate **the**   **1**

relationship between

greenhouse gas emissions disclosure and firm value. Total assets and 1

net operating income as control variables have a positive effect on

firm value. Keywords: Carbon Disclosure, Greenhouse Gas Emissions, Environmental Performance, Firm Value 1

1. INTRODUCTION The phenomenon of global warming caused by uncontrolled accumulation of greenhouse gas (GHG) emissions into the atmosphere has a potentially damaging and irreversible impact. An international body for climate change assessment, Intergovernmental Panel on Climate Change (2014), concluded that human activity is a major cause of increasing global average temperatures and immediate action to reduce global warming into tolerable limit is needed, but this goal will only be achieved by significantly reducing GHG emissions. It also cannot be denied that the increase in global average temperature has been started since the industrial revolution in 1750. This industrial growth is positively related to the amount of GHG emissions produced by companies. Dunlaap & Saarce (1991) states that the public views business activities and firms as the biggest contributors to the current environmental problems, and thus public demands these firms to disclose information about the impact of their activities to the environment. Abdel-Rahim (2010) claimed that disclosures through annual reports are the most preferred media because they are considered the most effective and credible, and these disclosures are expected to lead firms to more environmentally responsible decision making (Choi, Lee, & Psaros, 2013). The importance of the issue of reducing GHG emissions also causes high demands from investors so that firms provide information on the GHG emissions it produces because this information is valuable for evaluating firms risks (Jaggi, Allini, Macchioni, & Zampella, 2018). Although in Indonesia the disclosure of GHG emissions is still voluntary, Healy & Palepu (2001) claim that voluntary disclosure can improve the quality of the firms' financial statements, which makes potential investors interested in investing in these firms. The firms' increasing attention to environmental issues is also because natural resources are limited and therefore, it is important for firms to manage its resources effectively and efficiently for the survival of their business. Thus, presenting these efforts in the firms' annual report will make stakeholders able to assess the survival of these firms (Anggraeni, 2015). Previous research shows

that GHG emissions disclosure has a positive effect on firm value 1

(Matsumura, Prakash, & Vera-Munoz, 2014; Saka & Oshika, 2014; Anggraeni, 2015) and return on assets (ROA) (Ganda, 2017). However, there are other contradictory research findings where the disclosure of GHG emissions has a negative effect on return on investment (ROI) (Stanny & Ely, 2008) (Prado- Lorenzo, Rodríguez-Domínguez, Gallego-Álvarez, & García-Sánchez, 2009) and market value added (MVA) (Ganda, 2017). In the past, the firms viewed environmental issues and activities to reduce pollution as an expense because of the large number of costs incurred for activities such as waste disposal activities, maintenance of water treatment plants and smoke disposal, reclamation, site recovery and so on. But on the contrary, many recent studies show that firms have greater consideration on the impact of their activities on the

environment, because they find that good environmental management activities (waste management, water consumption, GHG emissions control, waste purification and so on) can lead to saving resources and increasing productivity (Cucchiella, Gastaldi, & Miliacca, 2017). The firms' environmental performance assessment requires indicators that are measurable, objective and accountable. Therefore, the Ministry of Environment of the Republic of Indonesia made PROPER (Program Penilaian Peringkat Kinerja Perusahaan) rating as an effort to enhance the role of firms in environmental preservation and encourage companies that have a good environmental performance to implement cleaner production. The previous research by Al-Tuwaijri, Christensen, & Hughes II (2004), Titisari & Alviana (2012), Tjahjono (2013), Anggraeni (2015), and Suratno, Bondan, Darsono, & Mutmainah (2006) found that environmental performance is positively related to firm performance. Firm's main purpose in disclosing information is to provide added value, but disclosing information about GHG emissions indicates that the firm is involved in the process of climate change. Therefore, the presence of environmental performance can provide assurance to the public that even though firm contributes to climate change, they have also tried to minimize these impacts (Anggraeni, 2015). Saka & Oshika (2014) is the first study to examine the interaction between GHG emission disclosure and environmental performance on firm value. They found that the greater the volume of GHG emissions (environmental performance), the stronger the positive effect of GHG emissions disclosure on firm value. In Indonesia, Anggraeni (2015) found that environmental performance does not affect the

> **relationship between GHG emissions disclosure and firm value.** 1

Firms that disclose their environmental information demonstrate transparency, reduce the risk of uncertainty, and provide a competitive advantage. Conversely, firms that disclose little or no disclosure show many risks, such as the risk of litigation, penalties for pollution, future environmental costs, and low future cash flows (Iatidris, 2013). Therefore, the main motivation for firms to disclose information is to improve the image and reputation of the company in the public eye (Hooghiemstra, 2000). Arimura, Hibiki, & Katayama (2008) stated that now customers need "green" products and processes to avoid the risks coming from suppliers (firms) who are less environmentally conscious. Therefore it is important to know that the public will choose firms that care about the environment. As a consequence, it is important for firms to disclose environmental information in annual reports and/or sustainability reports so that the public will know that the firm cares about the environment, obtains legitimacy to continue its business, and ultimately increases firm value. Based on the explanation, this study aims to examine: (1) the effect of GHG emissions disclosure on firm value, (2) the effect of environmental performance on firm value, and (3) environmental performance as a moderating variable on the relationship between GHG emission disclosures and firm value. 2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT 2.1. Legitimacy Theory Lindblom (1994) defines

> **legitimacy as a condition or status** that **exists when** the **value system** of an entity **is** equal to **the value system of** a large **social system** in **which the entity is a part** of it. **Legitimacy theory** states **that** 3

companies disclose information as a reaction to environmental (economic, social and political) pressures, and to legitimize the existence and behavior of firms (Guthrie & Parker, 1989). Firms can disclose corporate social responsibility report to gain legitimacy from the society. The corporate social responsibility report

(which contains GHG emissions disclosure), is one of the firm's efforts to report its business operations in exploring, controling, and safeguarding natural resources. When legitimacy is obtained, the firm may continue to use these resources for its business because the firm has fulfill the value system and considers the condition of society and the environment. 2.2. Signaling Theory Signal theory suggests how firms should provide signals to users of financial statements. Voluntary disclosure is a way to get signals from investors, where firms will disclose more information than is required (Campbell, Shrives, & Saager, 2001) because firms hope that information can be interpreted as a positive signal about firm performance and reduce information asymmetry (Oliveira & Ferreira, 2011). Signals must not be copied easily by other firms and must be in accordance with the

> **actual quality of the firm** to be effective **(Morris,** 1978). **This can be** achieved **by**"hard"**disclosures (Clarkson,** Li, Richardson, & Vasvari, **2008),** where firms with **superior**   3

> **environmental performance signal their performance quality using objective measures.**   3

Objective measurement of environmental performance in Indonesia can be done through PROPER rating, where Ministry of Environment as an independent party will assess the firm's performance into five color ratings, namely gold (best), green (very good), blue (good), red (bad), and black (very bad). 2.3. Stakeholder Theory According to Gozali & Chariri (2007), stakeholders are individuals, groups of people, communities, or society both as a whole or some who have interests and relationships with the firm. Stakeholder theory states that firms must pay attention to the interests of all stakeholders in order to succeed in the long term (Jones, 1995). The rise of the issue of environmental pollution and global warming has caused environmentally conscious stakeholders to become more aware of firms activities related to environmental pollution, and these stakeholders require firms to disclose GHG emissions information in annual reports and/or sustainability reports (Rokhmawati, Sathye, & Sathye, 2015). This disclosure can provide information about company performance (Jose & Lee, 2006) so that stakeholders can evaluate the company and become a communication tool between the company and its stakeholders (Wibisono, 2007). 2.4. Greenhouse Gas Emission Disclosure GHG emission disclosure is a collection of past quantitative and qualitative information and firm's predictions regarding the level of company GHG emissions, as well as disclosure of the explanations and implications of corporate finance in dealing with climate change (Najah, 2012). Voluntary disclosure of GHG emissions can be done through CDP. The Carbon Disclosure Project (CDP) is an independent non-profit organization in the UK that focuses on disclosing firm's emissions that cause global warming. CDP facilitates active communication between firms and investors through publishing reports on questionnaire results. CDP also sent questionnaires to several firms in Indonesia, but the number of participating companies was still limited. Therefore, to measure the extent of GHG emissions disclosure, this study uses carbon emission disclosure index (which is made based on CDP reports) by Choi, Lee, & Psaros (2013) with content analysis methods. Data sources are obtained from annual reports and/or company sustainability reports. 2.5. Environmental Performance ISO 14001 defines environmental performance as how well the organization manages the environmental aspects of its activities, products, services, and consequences for the environment. Measuring environmental performance in Indonesia can be done through the Performance Rating Assessment Programme on Environment Management

(PROPER/Program Penilaian Peringkat Kinerja Perusahaan) of the Ministry of Environment Republic of Indonesia. This program aims to encourage firms to comply with environmental regulations and achieve environmental excellence through the integration of sustainable development principles in the production and service processes, by implementing an environmental management system, 3R (Reduce, Reuse and Recycle), energy efficiency, conservation of resources, ethical business conduct, and community responsibility through community development programs (Ministry of Environment, 2013). 2.6. Firm Value Husnan (2008) defines firm value as the price that prospective buyers are willing to pay if the firm is sold. The market price of a firm's shares can reflect the firm value (Fama, 1978). The higher the stock price, the higher the firm value which provides shareholders with prosperity (Husnan & Pudjiastuti, 2002). According to Keown (2001), a firm's share price reflects the firm value and the entire complexity of the firm's real-world risk, which reflects investment, funding, and dividends decisions from the point of view of investors. 2.7. Relation between Greenhouse Gas Emission Disclosure and Firm Value In general, disclosures are useful for reducing information asymmetry between firms and outsiders, including investors, thereby facilitating the efficient allocation of scarce resources (Healy & Palepu, 2001). Firms that voluntarily and transparently disclose their GHG emissions can reduce the rate of return requested by investors because

> **investors can estimate firm-specific information (Diamond, 1985)**   3

and process their investment decisions adequately (Aerts & Cormier, 2009). However, if the firm does not disclose GHG emissions, it is possible that investors will treat these non-disclosure firm as a bad signal and punish them (Milgrom, 1981). In addition, investors tend to seek information on GHG emissions themselves for firms that do not disclose. This information seeking process is costly for investors and thus this also ultimately increases firms costs (Johnston, 2005). Some studies

> **show that GHG emissions disclosure has a positive** effect **on firm'** s   1
> performance or **value**

(Matsumura, Prakash, & Vera-Munoz, 2014; Saka & Oshika, 2014; Anggraeni, 2015; Ganda, 2017). Dhaliwal, Li, Tsang, & Yang (2011) confirm that environmental disclosures are identical to lower costs of equity capital, while Guidry & Patten (2010) observe positive reactions by the stock market when high-quality sustainability reports are issued. Thus, high disclosure will increase the firm value. In addition, now consumers make decisions based on how well firms manage their environmental problem. Thus, choosing brands not only by its products quality but also those who are environmentally responsible. Therefore, the disclosure of GHG emissions information is expected to provide a positive signal to the market that companies care about their environmental responsibilities (Barnett & Salomon, 2012). Voluntary disclosure of information on GHG emissions also creates added value for firms in the eyes of stakeholders, because stakeholders can understand how firms' policies, values, and motives are in overcoming GHG emissions and paying attention to their environment (Ahmad & Hossain, 2015). However, there are other contradictory research findings in which the disclosure of GHG emissions actually has a negative effect on the firm's performance or value (Prado-Lorenzo, Rodríguez-Domínguez, Gallego-Álvarez, & García-Sánchez, 2009; Hsu & Wang, 2013; Ganda, 2017). Hsu & Wang (2013) found that when firms disclose information that their business raises GHG emissions that contribute to global warming, the public will respond this information negatively because investors concerned that the costs incurred by the firm to reduce global warming can

outweigh the benefits it received. Because previous research on the effect of disclosure of GHG emissions information on firm value is still inconclusive, the hypothesis of this study has not been able to conclude the direction of the relationship between the two variables. The first hypothesis in this study is: HA1 GHG emission disclosure affects the firms' market value. 2.8. Relation between Environmental Performance and Firm Value The impact of environmental performance on firms can be seen from two perspectives (Hassel, Nyquist, & Nilsson, 2005). First, environment-related

> **costs can be** considered **investment expenditures** which increase **competitiveness and profitability (Porter & Linde, 1995a).** ⬜ 3

Public views good environmental performance as a good news so firms are competing with each other to show superior environmental performance. This competition ultimately produces more innovation, productivity, and profitability. Cucchiella, Gastaldi, & Miliacca (2017) argue that good environmental management activities (waste management, water consumption, controlling GHG emissions, refining waste and so on) can lead to saving firms' resources, increasing productivity and income, and ultimately the value of the firm. In other words,

> **a firm can** obtain **economic and social benefits while protecting the environment** ⬜ 3

by adopting a good environmental strategy (Hart & Ahuja, 1996). However, opponents of this first view argue that the costs incurred for firms to be environmentally friendly

> **usually exceed the** benefits, **which results in a waste firms resources and** reduce **profitability (Jaggi & Freedman, 1992).** ⬜ 3

As a result, some investors consider environmental expenditure as an additional cost which reduces income and decreases firm value (Hassel, Nyquist, & Nilsson, 2005). This is also supported by Lewandowski's (2017) research, who found that firms with superior environmental performance must pay an expensive fee for such performance. Previous research by Al-Tuwaijri, Christensen, & Hughes II (2004), Titisari & Alviana (2012), Tjahjono (2013), Anggraeni (2015), and Suratno, Bondan, Darsono, & Mutmainah (2006) stated that environmental performance has a positive effect on firm performance. Good environmental performance shows that the firm cares about environmental issues and thus the firm will receive a positive response from investors and increase public trust, which is expected to improve the firm's economic performance (Titisari & Alviana, 2012). However, there are also firms that get disincentives for their environmental management, so Luo & Tang (2014) stated that this could indicate the presence of bad news for the market. Because the results of previous studies regarding the effect of environmental performance on firm value found more positive than negative effects, the second hypothesis in this study is: HA2 Environmental performance has a positive effect on firm value. 2.9. The Moderating Role of Environmental Performance on The Relationship between GHG Emission Disclosures and Firm Value The conclusion is still cannot be found whether the disclosure of

GHG emissions has a positive/ negative effect **on firm value.** Therefore, including the **environmental performance** | 1 |

as a moderating variable will better help to understand the relationship between disclosure of GHG emissions and firm value when firms efforts to maintain the environment are rewarded through PROPER rating (Anggraeni, 2015). Firms' main motivation in disclosing information is to enhance the image and reputation in the public eye (Hooghiemstra, 2000), but the decision to disclose GHG emissions information indicates that the firm is actually involved in the process of climate change. Therefore, the presence of environmental performance can provide assurance to the public that even though firms contribute to climate change, they have also tried to minimize these impacts (Anggraeni, 2015). Saka & Oshika (2014) is the first research to examine the interaction between GHG emission disclosure and environmental performance on firm value. They found that the greater the volume of GHG emissions (environmental performance), the stronger the positive effect of GHG emissions disclosure on firm value. Nevertheless, research conducted by Anggraeni (2015) shows that environmental performance does not affect the

relationship between GHG emissions disclosure and firm value. | 1 |

Based on the explanation, this study assumes that the PROPER rating can moderate the effect between GHG information disclosure and firm value. The third hypothesis in this study is: HA3 Environmental performance will strengthen/weaken the effect of GHG emissions disclosure on firm value. 3. RESEARCH MODEL 3.1. Models This study uses moderated regression analysis. Model 1 is used to test hypotheses 1 and 2, with the following equation: $FV_{t+1} = \beta_0 + \beta_1 GHG_{it} + \beta_2 PROPER_{it} + \beta_3 TASSET_{it} + \beta_4 OPINC_{it} + \varepsilon_{it}$ Model 2 is used to test hypothesis 3, with the following equation: $FV_{t+1} = \beta_0 + \beta_1 GHG_{it} + \beta_2 PROPER_{it} + \beta_3 GRKxPROPER + \beta_4 TASSET_{it} + \beta_5 OPINC_{it} + \varepsilon_{it}$ Where: FV_{t+1} GHG_{it} $PROPER_{it}$ $TASSET_{it}$ $OPINC_{it}$ ε_{it} = Firm value on March 31st t+1 = GHG emissions dislosure = Environmental performance = Firms' total assets = Firms' net operating income = error 3.2. Sample selection and data collection The final sample consisted of 42 companies out of 1,908 companies listed in the PROPER rating during the 2014-2017 period. The total sample of this research was 168 samples with 42 samples for each year. The final sample was selected using following criteria: (1) Firms listed on the PROPER rating for the 2014-2017 period, (2) Firms listed on the Indonesia Stock Exchange (IDX) for the 2014-2017 period, and (3) Firms that publishes annual reports and/or sustainability reports that can be downloaded through the IDX website or the website of each company. This study uses quantitative data with secondary data sources. Data is obtained from annual reports and/or sustainability reports which can be found on the IDX's official website, namely www.idx.co.id or each firm's website. The list of firms evaluated by the Ministry of Environment was obtained from the official website of the Ministry of Environment for the PROPER program, namely www. proper.menlh.go.id. 3.3. Dependent Variable Firm value as the dependent variable in this study is measured using the market value of equity in period t+1, to see when firms disclose GHG emissions and environmental performance in period t will have an impact on the firms' future (t+1) value. March 31st was chosen because companies in Indonesia mostly published annual reports around that time. Data on stock prices and the number of outstanding shares on March 31st can be downloaded through the IDX official website, namely www.idx.co.id in the summary section. FV_{t+1} = Stock Price on March 31st x Number of Outstanding shares 3.4. Independent Variables The measurement of GHG emissions disclosure as the first independent variable uses the carbon emission disclosure index by Choi, Lee, & Psaros (2013) with content analysis method. The

index adopted from the research of Choi, Lee, & Psaros (2013) consists of five broad categories relating to climate change and carbon emissions as follows: 1. GHG emissions accounting 2. Climate change: risks and opportunities 3. Energy consumption accounting 4. GHG reduction and cost 5. Carbon emission accountability To measure the extent of GHG emissions disclosure, a checklist consisting of 18 disclosure items was used. Each disclosure item is worth 1 so that if the firm discloses all items (in the annual report and/or sustainability report) then the firm's score is 18. Weighting formula of this index is as follows: GHG = 100% The second independent variable that also acts as a moderating variable is environmental performance. The company's environmental performance is proxied by the Performance Rating Assessment Programme on Environment Management (PROPER) rating obtained by each firm which can be obtained from annual reports and/or sustainability reports. The rating consists of five colors, ranging from gold (best), green (very good), blue (good), red (bad), and black (very bad). Environmental Performance is measured based on a ranking system, ranging from 1 to 5: ? A score of 5 is given to firms which receive gold colour in PROPER; ? A score of 4 for green in PROPER ? A score of 3 for blue in PROPER; ? A score of 2 for red in PROPER; and ? A score of 1 for black in PROPER 3.5. Control Variables In this study, the control variable used is total assets and net operating income of each firms. Book value of total assets (total assets) is obtained from statement of financial position, while net operating income is obtained from income statement of each firms. 4. DATA ANALYSIS 4.1. Descriptive statistics Descriptive statistics of each variable are reported in Table 1. The dependent variable in this study, which is firm value (FV), has a minimum value of 54.635.836.500 and a maximum value of 462.945.946.062.000. The average value of the firms in this study is 39.098.655.938.404, this indicates that the majority of samples in this study are firms with high value. The standard deviation of 83.194.776.926.655 shows that the firms in this study are very diverse so they can represent all firms in Indonesia. The first independent variable in this study, namely the disclosure of GHG emissions (GHG) has a minimum value of 0 and a maximum value of 100. The average GHG emission disclosure in 168 samples is 34,36. This shows that the level of GHG emission disclosure in study sample is still quite low. The standard deviation of 31,74 indicates that the firms in this study sample is very varied and the distance between firms is very large. Environmental performance (PROPER) as an independent variable as well as a moderating variable between GHG emission (GHG) disclosure and firm value (FV) has a minimum value of 2 (red rating) and a maximum value of 5 (gold rating). The firms that became the sample of the study was dominated by the value of 3, namely the blue rating. This indicates that the average environmental performance in sample firms in Indonesia is already quite good. The first control variable in this study is total assets (TASSET). The minimum value of the total assets of the firms which is the study sample is 502.990.012.416 and the maximum value of total assets is 92.534.431.078.400. The average total assets of the firms in the study sample are 2.139.192.162.482 and the standard deviation is 3.313.011.141.612. The second control variable in this study is net operating income (OPINC). The minimum value of firms' net operating income is -701.438.492.672 and the maximum value of net operating income is 16.179.317.964.800. The average net operating income is 2.139.192.162.355 and the standard deviation is 3.313.011.141.471. Before conducting regression analysis, a series of tests for normality of residuals, multicollinearity, heteroscedasticity and autocorrelation is conducted to fulfil the classical assumptions. The regression model that meets the classical assumption will be assigned for the purpose of analysis in this study. Table 1. Descriptive Statistics N Minimum Maximum Mean Std. Deviation FV GHG PROPER TASSET OPINC 168 54.635.836.500 462.945.946.062.000 39.098.655.938.404 168 - 1 - 168 2 5 3 168 502.990.012.416 92.534.431.078.400 17.012.668.502.482 168 -701.438.492.672 16.179.317.964.800 2.139.192.162.355 83.194.776.926.665 - 1 20.855.853.135.612 3.313.011.141.471 4.2. Regression Results 4.3. Regression Results on 1st Model Table 2, 3, and 4 are the regression results of model 1. Based on Table 2, to determine the magnitude of the effect of the independent variables GHG (X1), PROPER (X2), TASSET (X3), and OPINC (X4) on the dependent variable FV (Y) can be seen from the value of R^2 which is

equal to 78,5%, which means the independent variable GHG (X1), PROPER (X2), TASSET (X3) and OPINC (X4) are able to explain the FV (Y) of 78,5% and the remaining 21,5% is explained by other variables not discussed in this research. Based on Table 3, Fvalue 140,544 greater than Ftable 2,27 with a significance level less than 0,05 which is equal to 0,000. This means that the resulting regression model is suitable to determine the effect of the independent variables GHG (X1), PROPER (X2), TASSET (X3), and OPINC (X4) on the dependent variable FV (Y). Based on Table 4, GHG (X1) has Tvalue 6,176 greater than Ttable 1,975 with a significance level less than 0,05, which

is equal to 0, 000. Therefore **it can be concluded that the** independent **variable** GHG (X1) partially **has** a **significant effect on the**

2

FV dependent variable (Y). PROPER (X2) has Tvalue 2,076 greater than Ttable 1,975 with a significance level less than 0,05, which

is equal to 0, 040. Therefore **it can be concluded that the** independent **variable** PROPER (X2) partially **has** a **significant effect on the**

2

FV dependent variable (Y). TASSET (X3) has Tvalue 8,959 greater than Ttable 1,975 with a significance level less than 0,05 which

is equal to 0, 000. Therefore, **it can be concluded that the** independent **variable** TASSET (X3) partially **has** a **significant effect on the**

2

FV dependent variable (Y). OPINC (X4) has Tvalue 2,789 greater than Ttable 1,975 with a significance level less than 0,05 which

is equal to 0, 006. Therefore, **it can be concluded that the** independent **variable** OPINC (X4) partially **has** a **significant effect on the**

2

FV dependent variable (Y). Equations formed based on the regression results for the first regression model are as follows: Y = 1,317 + 2,275 X1 + 0,628 X2 + 0,772 X3 + 0,012 X4 + e Table 2. Model Summary Model R R Square Adjusted R Square Std. Error of the Estimate Durbin-Watson 1 ,886a ,785 ,779 ,71236 1,907 a. Predictors: (Constant), OPINC, GHG, PROPER, TASSET b. Dependent Variable: FV Table 3. ANOVA Model Sum of Squares df Mean Square 1 Regression 285,277 Residual 78,147 Total 363,424 4 71,319 154 ,507 158 F Sig. 140,544 ,000b a. Dependent Variable: FV b. Predictors: (Constant), OPINC, GHG, PROPER, TASSET Table 4. Coefficients Unstandardized Coefficients Model B Std. Error Standardized Coefficients Beta t Sig. Tolerance Collinearity Statistics VIF 1 (Constant) 1,317 ,726 1,814 ,072 GHG 2,275 ,368 ,355 6,176 ,000 ,422 2,370 PROPER ,628 ,303 ,084 2,076 ,040 ,849 1,178 TASSET ,772 ,086 ,521 8,959 ,000 ,412 2,427 OPINC ,012 ,004 ,110 2,789 ,006 ,901 1,110 a. Dependent Variable: FV 4.4. Regression Results on 2nd Model (Environmental Performance as Moderating Variable) Table 5, 6, and 7

are the regression results of model 2. Based on Table 5, to determine the magnitude of the effect of the independent variables GHG (X1), PROPER (X2), GHGxPROPER (X3), TASSET (X4), and OPINC (X5) on the dependent variable FV (Y) can be seen from the value of R2 which is equal to 78,5%, which means the independent variable GHG (X1), PROPER (X2), GHGxPROPER (X3), TASSET (X4), and OPINC (X5) are able to explain the FV (Y) of 78,5% and the remaining 21,5% is explained by other variables not discussed in this research. Based on Table 5, Fvalue 140,544 greater than Ftable 2,16 with a significance level less than 0,05 which is equal to 0,000. This means that the resulting regression model is suitable to determine the effect of the independent variables GHG (X1), PROPER (X2), GHGxPROPER (X3), TASSET (X4), and OPINC (X5) on the dependent variable FV (Y). Based on Table 6, GHG (X1) has Tvalue 3,305 greater than Ttable 1,976 with a significance level less than 0,05, which

is equal to 0, 001. Therefore **it can be concluded that the** independent GHG **variable** (X1) partially **has** a **significant effect on the**

| 2 |

FV dependent variable (Y). PROPER (X2) has Tvalue 2,058 greater than Ttable 1,976 with a significance level less than 0,05, which

is equal to 0, 041. Therefore **it can be concluded that the** independent **variable** PROPER (X2) partially **has** a **significant effect on the**

| 2 |

FV dependent variable (Y). GHGxPROPER (X3) has Tvalue -,0,093 less than Ttable 1,976 with a significance level greater than 0,05, which

is equal to 0, 926. Therefore **it can be concluded that the** independent **variable**

| 2 |

GHGxPROPER (X3) do not has significant effect on the FV dependent variable (Y). TASSET (X4) has Tvalue 8,758 greater than Ttable 1,976 with a significance level less than 0,05 which

is equal to 0, 000. Therefore, **it can be concluded that the** independent **variable** TASSET (X4) partially **has** a **significant effect on the**

| 2 |

FV dependent variable (Y). OPINC (X5) has Tvalue 2,775 greater than Ttable 1,976 with a significance level less than 0,05 which

is equal to 0, 006. Therefore, **it can be concluded that the** independent **variable** OPINC (X5) partially **has** a **significant effect on the**

| 2 |

FV dependent variable (Y). Equations formed based on the regression results for the second regression

model are as follows: Y = 1,329 + 2,331 X1 + 0,633 X2 - 0,084 X3 + 0,770 X4 + 0,012 X5 + e Table 5. Model Summary Model R R Square Adjusted R Square Std. Error of the Estimate Durbin-Watson 2 ,886a ,785 ,778 ,71466 1,910 a. Predictors: (Constant), OPINC, GRKxPROPER, PROPER, TASSET, GRK b. Dependent Variable: FV Table 6. ANOVA Model Sum of Squares df Mean Square F Sig. 2 Regression 285,281 Residual 78,143 Total 363,424 5 153 158 57,056 ,511 111,713 ,000b a. Dependent Variable: FV b. Predictors: (Constant), OPINC, GRKxPROPER, PROPER, TASSET, GRK Table 7. Coefficients Model Unstandardized Coefficients B Std. Error Standardized Coefficients Beta t Sig. Tolerance Collinearity Statistics VIF 2 (Constant) 1,329 ,739 1,799 ,074 GRK 2,331 ,705 ,364 3,305 ,001 ,116 8,631 PROPER ,633 ,307 ,085 2,058 ,041 ,827 1,209 GRKxPROPER -,084 ,903 -,009 -,093 ,926 ,153 6,553 TASSET ,770 ,088 ,520 8,758 ,000 ,398 2,513 OPINC ,012 ,004 ,110 2,775 ,006 ,900 1,111 a. Dependent Variable: FV 5. DISCUSSION 5.1. The Effect of GHG Emissions Disclosure on Firm Value Examining the effect of GHG emissions disclosure on firm value shows significance value level lower than 0,05, which is 0,000. This result indicates that partially,

> **GHG emissions disclosure has a positive** effect **on firm value.**   1

A positive regression coefficient indicates that the higher GHG emissions disclosure made by the firm, the higher firm value is. Based on this finding, it can be concluded that the HA1 is accepted. The results showed that the public responded positively to firm's effort to disclose their carbon emissions. In line with the theoretical framework by Lambert, Leuz & Verrecchia (2007), which states that investors need information to identify risks related to firm performance, so the higher voluntary disclosure made by the firm, the lower firm's capital costs are. Reduced costs of capital will be followed by an increase in the value of the firm. When associated with GHG emissions disclosure, it can be concluded that firms which voluntarily and honestly disclose their GHG emissions provide transparent non-financial information to investors about GHG emissions produced by the firm and how well they manage GHG emissions (Najah, 2012).

> **This information** further **reduces the risk** of estimation **and helps investors to be more confident** deciding **in**   3

which firm they should invest. The results of this research that prove

> **GHG emissions disclosure has a positive** effect **on firm value**   1

are also in line with research findings by Saka & Oshika (2014), Matsumura, Prakash, & Vera-Munoz (2014) and Anggraeni (2015). Disclosing information about GHG emissions provided an added value to stakeholders because stakeholders can understand how firm's policies, value, and motives to cope with GHG emissions and their environment (Ahmad & Hossain, 2015). GHG emissions disclosure also shows that the firm has the capability to manage the environmental impact of their business (Griffin & Sun, 2013). This shows that in Indonesia consumers make decisions based on how well firms manage their environmental problem and thus, choosing brands not only by its products quality but also those who are environmentally responsible. 5.2. The Effect of Environmental Performance on Firm Value Examining the effect of environmental performance on firm value shows significance value level lower than 0,05, which is

0,04. These results indicate that partially, environmental performance has a positive effect on firm value. Based on these findings, it can be concluded that HA2 is accepted. The results of this study indicate that the public considers the management of the environment as one indicator in assessing firm performance. Good environmental performance is responded positively by the public so firms compete with each other to show good environmental performance and this competition will result in more innovation, productivity, and profitability

> **(Porter & Linde, 1995a). In a sense, by adopting** a **good environmental** strategy, firms **can** obtain **economic and social benefits while protecting the environment**
>
> `3`

(Hart & Ahuja, 1996). Cucchiella, Gastaldi, & Miliacca (2017) argue that good environmental management activities (waste management, water consumption, controlling GHG emissions, refining waste and so on) can lead to saving firms' resources, increasing productivity and income, and ultimately the value of the firm. The finding of positive effect of environmental performance on firm value is also in line with previous researches by Al-Tuwaijri, Christensen, & Hughes II (2004), Titisari & Alviana (2012), Tjahjono (2013), Anggraeni (2015), and Suratno, Bondan, Darsono, & Mutmainah (2006). Environmental performance measured using PROPER ratings has been responded positively by the majority of people in Indonesia. The increase of public attention to environmental issues and increasingly stringent regulations related to the environment make sustainable environmental management an important aspect of assessment for a firm (Yadav, Han, & Rho, 2015). 5.3. The Effect of Environmental Performance on the Relationship between GHG Emissions Disclosure and Firm Value Examining the effect of GHG emissions disclosure on firm value which moderated by environmental performance shows significance values higher than 0,05, which is 0,926. These results indicate that environmental performance does not moderate the relationship between GHG emissions disclosure and firm value, so it can be concluded that HA3 is rejected. In line with previous research conducted by Anggareni (2015), the presence of environmental performance as a guarantee that the firm has tried to preserve the environment does not affect the public's assessment of the information regarding GHG emissions disclosed by the firm. This is likely to occur because public views environmental preservation activities carried out by the firm through PROPER rating does not specifically show how firm can cope with the climate change process due to the GHG emissions it produces. As a result, environmental performance does not moderate the

> **relationship between GHG emissions disclosure and firm value.**
>
> `1`

6. CONCLUSION

> **This study** aimed **to investigate the** effect **of greenhouse gas emissions disclosure and environmental performance on firm value.**
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This study also investigates the

tests conducted in the previous chapter, the conclusions that can be drawn are as follows: GHG emissions disclosures has a significant positive effect on firm value. Thus, the higher the level of GHG emission disclosure carried out by the firm, the higher the value of the firm. Second, the results also showed that environmental performance has a significant positive effect on firm value. Thus, the better the firm's environmental performance, the higher the value of the firm. Lastly, the results of the study indicate that environmental performance cannot moderate the relationship between GHG emissions disclosure and firm value. Thus, the value of the firm does not provide a response to the disclosure of GHG emissions in the presence of environmental performance.

REFERENCES Abdel-Rahim, H. Y., & Abdel-Rahim, Y. (2010). Green accounting – a proposition for EA/ER conceptual implementation methodology. Journal of Sustainability and Green Business, 1. Retrieved from http://www.aabri.com/manuscripts/10449.pdf Aerts, W., & Cormier, D. (2009). Media legitimacy and corporate environmental communication. Accounting, Organizations and Society, 34(1), 1-27. Ahmad, N. N., & Hossain, D. M. (2015). Climate change and global warming discourses and disclosures in the corporate annual reports: A study on the Malaysian companies. Procedia - Social and Behavioral Sciences, 172, 246-253. Al-Tuwaijri, S., Christensen, T., & Hughes II, K. E. (2004). The relations among environmental disclosure, environmental performance, and economic performance: A simultaneous equations approach. Accounting, Organizations, and Society, 29, 447-471. Anggraeni, D. Y. (2015). Pengungkapan emisi gas rumah kaca, kinerja lingkungan, dan nilai perusahaan. Jurnal Akuntansi dan Keuangan Indonesia, 12(2), 188-209. Arimura, T. H., Hibiki, A., & Katayama, H. (2008). Is a voluntary approach an effective environmental policy instrument? Journal of Environmental Economics and Management, 55(3), 281-295. Barnett, M. L., & Salomon, R. M. (2012). Does it pay to be really good? Addressing the shape of the relationship between social and financial performance. Strategic Management Journal, 33(11), 1304–1320. Campbell, D., Shrives, P., & Saager, H. (2001). Voluntary disclosure of mission statements in corporate annual reports: signaling what and to whom? Business and Society Review, 106(1), 65–87. Choi, B. B., Lee, D., & Psaros, J. (2013). An analysis of Australian company carbon emission disclosures. Pacific Accounting Review, 25(1), 58-79. Clarkson, P., Li, Y., Richardson, G., & Vasvari, F. (2008). Revisiting the relation between environmental performance and environmental disclosure: an empirical analysis. Accounting, Organization and Society, 33(4-5), 303-327. Cucchiella, F., Gastaldi, M., & Miliacca, M. (2017). The management of greenhouse gas emissions and its effects on firm performance. Journal of Cleaner Production, 167, 1387-1400. Dhaliwal, D., Li, O., Tsang, A., & Yang, Y. (2011). Voluntary nonfinancial disclosure and the cost of equity capital: the initiation of corporate social responsibility reporting. The Accounting Review, 86(1), 59-100. Diamond, D. W. (1985). Optimal release of information by firms. The Journal of Finance, 40(4), 1071-1094. Dunlap, & Saarce. (1991). Enviromental problems and protection. Public Opinion Quarterly, 55(4), 651-672. Fama, E. (1978). The effects of a firm's investment and financing decisions on the welfare of its security holders. American Economic Review, 68(3), 272-284. Ganda, F. (2017). The influence of carbon emissions disclosure on company financial value in an emerging economy. Environment, Development and Sustainability, 20, 1-10. Ghozali, I., & Chariri, A. (2007). Teori Akuntansi. Semarang: Badan Penerbit Universitas Diponegoro. Griffin, P., & Sun, Y. (2013). Going green: Market Reactions to CSR newswire releases. Journal of Accounting and Public Policy, 32(2). Guidry, R., & Patten, D. (2010). Market reactions to the first-time issuance of corporate sustainability reports: evidence that quality matters. Sustainability Accounting, Management and Policy Journal, 1(1), 33-50. Guthrie, J., & Parker, L. D. (1989). Corporate social reporting: a rebuttal of legitimacy theory. Accounting & Business Research, 9(76), 343-352. Hart, S. L., & Ahuja, G. (1996). Does it pay to be green? An empirical

examination of the relationship between emission reduction and firm performance. Business Strategy and the Environment, 5(1), 30-47. Hassel, L., Nyquist, S., & Nilsson, H. (2005). The value relevance of environmental performance. European Accounting Review, 14(1), 41-61. Healy, P. M., & Palepu, K. G. (2001). Information asymmetry, corporate disclosure, and the capital markets: A review of the empirical disclosure literature. Journal of Accounting and Economics, 31(1-3), 405-440. Hooghiemstra, R. (2000). Corporate communication and impression management–new perspectives why companies engage in corporate social reporting. Journal of business ethics, 27(1), 55-68. Hsu, A. W., & Wang, T. (2013). Does the market value corporate response to climate change? Omega, 41(2), 195-206. Husnan, S. (2008). Manajemen keuangan teori dan penerapan (Keputusan jangka panjang). Yokyakarta: BPFE UGM. Husnan, S., & Pudjiastuti, E. (2002). Dasar-dasar manajemen keuangan. Yogyakarta: UPP AMP YKPN. Iatidris, G. E. (2013). Environmental disclosure quality: Evidence on environmental performance, corporate governance and value relevance. Emerging Market Review, 14, 55-75. Intergovernmental Panel on Climate Change. (2014). Climate change 2014: synthesis report. Contribution of working Groups I, II and III to the fifth assessment report of the Intergovernmental Panel on Climate Change. Geneva, Switzerland: IPCC. Jaggi, B., & Freedman, M. (1992). An examination of the impact of pollution performance on economic and market performance: pulp and paper firms. Journal of Business Finance & Accounting, 19(5), 697-713. Jaggi, B., Allini, A., Macchioni, R., & Zampella, A. (2018). Do investors find carbon information useful? Evidence from Italian firms. Review of Quantitative Finance and Accounting, 50(4), 1031-1056. Johnston, J. S. (2005). Signaling Social Responsibility: on the Law and Economics of Market Incentives for Corporate Environmental Performance. Working paper 66. University of Pennsylvania Law School. Jones, T. M. (1995). Instrumental stakeholder theory - A synthesis of ethics and economics. Academy of Management Reviews, 20, 404-437. Jose, A., & Lee, S. M. (2006). Environmental reporting of global corporations: A content analysis based on website disclosures. Journal of Business Ethics, 72(4), 307-201. Keown, A. J. (2001). Dasar-dasar manajemen keuangan. Jakarta: Salemba Empat. Lambert, R., Leuz, C., & Verrecchia, R. (2007). Accounting information, disclosure, and the cost of capital. Journal of Accounting Research, 45(2), 385-420. Lewandowski, S. (2017). Corporate carbon and financial performance: The role of emission reductions. Business Strategy and the Environment, 26(8), 1196-1211. Lindblom, C. K. (1994). The implications of organizational legitimacy for corporate social performance and disclosure. Paper presented at the Critical Perspectives on Accounting Conference. New York. Luo, L., & Tang, Q. (2014). Does voluntary carbon disclosure reflect underlying carbon performance? Journal of Contemporary Accounting & Economics, 10(3), 191-205. Matsumura, E. M., Prakash, R., & Vera-Munoz, S. C. (2014). Firm-value effects of carbon Emissions and carbon disclosures. The Accounting Review, 89(2), 695-724. Milgrom, P. R. (1981). Good news and bad news: Representation theorems and applications. Bell Journal of Economics (Autumn), 380–391. Ministry of Environment. (2013). Performance Rating Assessment Programme on Environment Management. Retrieved from http://proper.menlhk.go.id Morris, R. (1978). Signalling, agency theory and accounting policy choice. Accounting and Business Research, 18(69), 47-56. Najah, M. S. (2012). Carbon risk management, carbon disclosure and stock market effects: An international perspective. University of Southern Queensland. Oliveira, M. A.-Y., & Ferreira, J. J. (2011). Facilitating qualitative research in business studies: Using the business narrative to model value creation. African Journal of Business Management, 5(1), 68-75. Porter, M. E., & Linde, C. (1995a). Toward a new conception of the environment- competitiveness relationship. The Journal of Economic Perspectives, 9(4), 97-118. Prado-Lorenzo, J., Rodríguez-Domínguez, L., Gallego-Álvarez, I., & García-Sánchez, I. (2009). Factors influencing the disclosure of greenhouse gas emissions in companies world-wide. Management Decision, 47(7), 1133-1157. Rokhmawati, A., Sathye, M., & Sathye, S. (2015). Effect of GHG emission, environmental performance, and social performance on financial performance of listed manufacturing firms in Indonesia. Procedia - Social and Behavioral Sciences, 211, 461-470. Saka, C., & Oshika, T. (2014). Disclosure effects,

carbon emissions and corporate value. Sustainability Accounting, Management and Policy Journal, 5(1), 22-45. Stanny, E., & Ely, K. (2008). Corporate environmental disclosures about the effects of climate change. Corporate Social Responsibility and Environmental Management, 15(6), 338-348. Suratno, Bondan, I., Darsono, & Mutmainah, S. (2006). Pengaruh Environmental Performance terhadap Environmental Disclosure dan Economic Performance. Paper presented at Simposium Nasional Akuntansi 9. Padang. Titisari, K. H., & Alviana, K. (2012). Pengaruh environmental performance terhadap economic performance. Jurnal Akuntansi dan Keuangan Indonesia, 9, 56-67. Tjahjono, M. E. (2013). Pengaruh kinerja lingkungan terhadap nilai perusahaan dan kinerja keuangan. Jurnal Ekonomi, 4(1), 38-46. Wibisono, Y. (2007). Membedah konsep dan aplikasi corporate social responsibility (CSR). Gresik: Fascho Publishing. Yadav, P. L., Han, S. H., & Rho, J. J. (2015). Impact of environmental performance on firm value for sustainable investment: Evidence from large US firms. Business Strategy and the Environment, 25(6), 402-420.