



The Impact of Carbon Disclosure on Firm Value with Foreign Ownership as A Moderating Variable

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ABSTRACT

The purpose of the study is to analyze the effect of carbon disclosure on firm value and examine the moderation effect of foreign ownership. This study used all of the companies listed on the Indonesia Stock Exchange (BEI) between 2016 and 2018 as the population and employed a purposive sampling method to determine 194 companies as the final data observation. The data were collected from annual report and sustainability report released by the sample companies and analyzed using Moderated Regression Analysis (MRA). The result shows that carbon disclosure negatively affects firm value, while, foreign ownership significantly moderates the relationship between both variables.

Keywords:

Firm value, carbon disclosure, climate change, foreign ownership

Dampak Pengungkapan Karbon terhadap Nilai Perusahaan dengan Kepemilikan Pihak Asing sebagai Variabel Moderasi

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ABSTRAK

Penelitian ini bertujuan untuk mengetahui pengaruh pengungkapan karbon terhadap nilai perusahaan dan untuk mengetahui apakah kepemilikan pihak asing dapat memoderasi hubungan tersebut. Populasi yang digunakan adalah seluruh perusahaan yang terdaftar di Bursa Efek Indonesia (BEI) selama tahun 2016 hingga 2018. Pemilihan sampel menggunakan metode purposive sampling dan didapatkan data observasi sebanyak 194 perusahaan. Data dikumpulkan dari laporan tahunan dan laporan keberlanjutan perusahaan yang menjadi sampel penelitian. Moderated Regression Analysis (MRA) digunakan untuk menganalisis data penelitian. Hasil analisis menunjukkan bahwa pengungkapan karbon berpengaruh secara negatif terhadap nilai perusahaan, namun keberadaan kepemilikan asing mampu memoderasi hubungan tersebut.

Kata Kunci:

Nilai perusahaan, pengungkapan karbon, perubahan iklim, kepemilikan asing

1. Introduction

It is undeniable that environmental change is taken place right now. Based on research by Kahn et al. (2019), environmental changes affect the economy in the long run and are predicted to reduce world GDP per capita by seven percent lower than it is supposed to be by the next century if no preventive action is taken. Rezai et al. (2018) also found that the environmental changes, in the long run, will reduce the profitability, investment,

and productivity of companies. This forecast raises the attention of various parties regarding the environmental changes, especially the government of countries globally.

The increasing attention from governments around the world leads 196 countries to sign the Paris Agreement, which states every participating country promises they will contribute to reduce the rate of climate change by reducing their gas emission and even try to restore the damage

starting by 2020 (United Nations, 2015). In this agreement, the most emphasized point is carbon gas emissions, where carbon gas is believed to be the main factor contributes to global warming and environmental change.

Indonesia is one of the countries signed the agreement. Through Presidential Decree No. 61 (2011) concerning the National Action Plan Decrease Greenhouse Gases (*Rencana Aksi Nasional Penurunan Gas Rumah Kaca/ RAN-GRK*), signed by Susilo Bambang Yudhoyono, the former President of Indonesia, the Indonesian government encourages the entire communities, especially industries to reduce their gas emissions. It is expected that by 2020 Indonesia's carbon gas emission can be reduced by at least 26% (Presidential Decree No. 61, 2011).

Not only the government, but the businessman also starts to include environmental aspects into their business decision. Lash & Wellington (2007) and Kolk & Pinkse (2005) state that the climate change issue is one of the most important agendas to be solved in the last decades. The increase of stakeholder awareness and concern for the environment made new pressure on the companies to change their operation to reduce the amount of their carbon emission and disclose it as valuable information (Kolk, Levy, & Pinkse, 2008). The information will be used by stakeholders in assessing the company's emission performance (Freedman & Jaggi, 2004).

Equity markets have realized that the economic transition to a low carbon economy will have an impact on the competitiveness of the company and the company's value in the long term (Goldman Sachs Sustain, 2009). However, even though the information about the company's policies and emission performance is essential, only a few companies in Indonesia provide carbon disclosure (Faisal et al., 2018; Hermawan, Aisyah, Gunardi, & Putri, 2018). The reasons why many Indonesian companies do not publish carbon disclosure are that the information is still a part of voluntary reporting and the management unable to

determine precisely whether the benefit more significant than the cost incurred for conducting such disclosure (Anggraeni, 2015).

Several previous studies that examined the impact of carbon disclosure on firm value found inconsistent results. Some studies found positive impact of carbon disclosure on firm value (Putri & Aryani, 2016; Saka & Oshika, 2014), while the other studies for instance, Lee, Park, & Klassen, 2015), Matsumura, Prakash, & Vera-Muñoz (2014) and Sudibyo (2018) unveiled negative impact or no impact. This result inconsistency possible due to the missing moderating effect of other variables.

According to Namazi & Namazi (2016), a moderation relationship is important in examining the relationship between two variables to explain the complex business better than the direct relationship. Thus, we include foreign ownership as the moderating variable. Several reasons why foreign ownership is chosen: (1) foreign investors are still dominating the Indonesia equity market by 51% market share in 2018 (Ayuningtyas, 2019; CNN Indonesia, 2019); (2) foreign investors are more concerned with the environment since they are more knowledgeable and obedient to ecological laws (Rustam, Wang, & Zameer, 2019); (3) foreign investors are more influential in determining the stock prices in the market (Richards, 2002; Wang, 2007).

Similar to other investors, foreign investors will focus on value maximization and legitimacy, however, they perhaps faced more risk as they invest in foreign countries especially emerging countries with different laws and regulations (Kabir & Thai, 2017). The risk of information asymmetry increase for foreign investors (Kabir & Thai, 2017). To reduce the risk, foreign investors actively participate in decision-making. The active participation of foreign investors potentially creates pressures the firms to engage in a responsible decision for legitimacy purposes (Oh, Chang, & Martynov, 2011). In this context, Kabir & Thai, (2017) found that foreign ownership has a

moderating effect on the relationship between CSR and firm performance.

This study has two purposes: to examine the impact of carbon disclosure on firm value and to examine the moderating effect of foreign ownership on the relationship between carbon disclosure on firm value. Therefore, this study contributes by giving empirical evidence and explanation the moderating effect of foreign ownership on the relation between carbon disclosure and firm performance.

This paper is organized as follows, a brief discussion on literature review, followed by hypothesis development. The next section will discuss the research methodology including analysis results and finally, this paper will be concluded by the conclusion, limitations, and suggestions for future research.

2. Literature review and hypothesis development

Firm value is a proxy to measure shareholder's prosperity. Therefore, the final objective of each company is to increase firm value to increase shareholder prosperity (Ikhwandarti, Pratolo, & Suryanto, 2010; Iswajuni, Manasikana, & Soetedjo, 2018). Iswajuni et al. (2018) state that firm value reflects value given by financial markets and reflects the amount invested by the investor to the company. Firm value can be influenced by several factors, usually categorized into financial factors (e.g., profitability, size, leverage) and non-financial factors (e.g., ownership structure, type of principal/shareholder, ESG disclosure, and carbon disclosure) (Abdullah et al., 2015; Cooper, Gulen, & Ovtchinnikov, 2010; Freedman & Jaggi, 2009; Kumar, 2003; Li Ju & Shun Yu, 2011; Li, Gong, Zhang, & Koh, 2018; McWilliams & Siegel, 2000; Oh et al., 2011; Amelinda et al., 2019; Randøy & Goel, 2003; Wang et al., 2008; Yu, Guo, & Luu, 2018).

Even though carbon disclosure is still voluntary in Indonesia, investors still use this information as a complement for financial

information in assessing the company (Abdullah et al., 2015; Uyar & Kılıç, 2012).

Two theories that can be applied to explain the voluntary nature of carbon disclosure are signaling theory and legitimacy theory (Datt, Luo, & Tang, 2019). Both theories state that carbon disclosure likely influence firm value although with different explanation (Datt, Luo, & Tang, 2019). Signaling theory suggests that companies do carbon disclosure because they have "good news" regarding their carbon performance, so they gain an incentive to share the information. On the other hand, legitimacy theory suggests that companies do carbon disclosure due to investor pressure (Datt, Luo, & Tang, 2019; Blanco et al., 2017). The increasing risk faced by foreign investors raises the pressure on the company to do carbon disclosure. Therefore, in this study, we argue that legitimacy theory is more appropriate in explaining the effect of carbon disclosure on firm value with the foreign investor as the moderating variable.

Legitimacy theory explains that a company, when doing their operations must continuously meet the public expectations to keep receiving legitimacy from them. The company needs to do it because of the "social contract" that occurs between the company and the surrounding community (Choi, Lee, & Psaros, 2013). Legitimacy is a dynamic concept that can change anytime depends on the place and time (Lindblom, 1994). Therefore the company must also pay attention to the changes that happen in society to maintain their legitimacy and did not threaten the company's going concerned/survival (Islam, 2017; Suaryana, 2011).

Nowadays, stakeholders begin to pay attention to the environment and putting pressure on the company to do mitigation activity, and require the company to disclose the information (Islam, 2017; Berthelot & Robert, 2011; Suaryana, 2011). Firms respond to the pressure by changing their operation activities and disclose them in the annual report. Such response will be expected to

have a positive impact as the firm can increase legitimacy from stakeholder (Islam, 2017; Berthelot & Robert, 2011; Suaryana, 2011) and get several other benefits such as increasing firm value (Hermawan et al., 2018; Loh, Thomas, & Wang, 2017), sustain its operation (Anggraeni, 2015), and remain company going concerned (Suaryana, 2011).

Carbon disclosure and firm value

The increasing public concern about climate change issues resulted in a new pressure for the company to disclose information about their operational activities that can affect the environment. Legitimacy theory explains that the increase in public concern will make a new expectation to the company, which leads to the new disparity. To reduce the disparity and receive legitimacy from the community, the company must include global warming issue into company's strategic management (Kolk & Pinkse, 2005; Lash & Wellington, 2007) and disclose the information concerning company social and environmental activity with carbon disclosure (Anggraeni, 2015; Berthelot & Robert, 2011). The disclosure can be done in the annual reports to communicate a company's social and environmental activity (Suaryana, 2011).

The disclosure of information regarding a company's environmental activities increasing the legitimacy of the community that leads to a positive impact on firm value (Hermawan et al., 2018; Loh et al., 2017). This argument is in line with Clarkson et al. (2013), who stated transparency in voluntary environmental disclosure could lead to an increase in firm value through the increase of the share price. Specifically, Saka & Oshika (2014) says carbon disclosure can reduce the uncertainty of investors on the consequence of gas emission on the company's financial performance in the future and helps the investors in evaluating the effects. Hooghiemstra (2000) also states that social and environmental disclosure will impact company

reputation. A good reputation leads to easier access into the capital market and more easily attract investor. From the discussion, the hypothesis for the impact of carbon disclosure on firm value in this study formulated as follows.

H₁: Carbon disclosure has a positive impact on firm value.

Moderating effect of foreign ownership

Previous studies found the inconsistent result of the direct effect of carbon disclosure on firm value (Putri & Aryani, 2016; Saka & Oshika, 2014); Lee et al., 2015; Matsumura et al., 2014), and (Sudibyo, 2018). These results can be solved with the existence of moderating variables. As Namazi & Namazi (2016) argue that moderation relationship is critical in examining the relationship between two variables. We argue that foreign investment is an important variable in the relation between carbon disclosure and firm value. Legitimacy theory explains when the company can fulfill stakeholder's expectations, then the company will get legitimacy from stakeholders and society in general, which can ensure the company's survival and also increasing the company's firm value. Foreign investors who care about the environment and more obedient to ecological laws than local investors (Rustam et al., 2019) will give more pressure on the company. As a result, the company should fulfill that expectation. The disclosure of activities regarding the reduction of carbon emissions will lead to more legitimacy gained from foreign investors. Richards (2002), argues that foreign investors are more influential in determining share price. Therefore, the legitimacy of foreign ownership can influence the relationship between carbon disclosure and firm value. The hypothesis for the moderating effect of foreign ownership formulated as follows.

H₂: Foreign ownership moderates the relationship between carbon disclosure and firm value.

3. Research method

Population and sample selection

The population of this study is the companies listed on Indonesia Stock Exchange (BEI) from 2016 until 2018 after the Paris Agreement was signed in 2015. The sample selection was carried out using purposive sampling with criteria: (1) the company is listed on Indonesia Stock Exchange; (2) the annual report and/or sustainability report can be accessed on the official website of the Indonesia Stock Exchange and/or the company website, and (3) the company do carbon disclosure. We employ secondary data in this study, where they are retrieved from the annual report and sustainability report (if available) released by the company each year. We retrieve the reports from the Indonesia Stock Exchange website and company websites.

Variable measurement

Firm value measure using market capitalization (MCAP), based on Abdullah et al., (2015). MCAP is the most suitable/appropriate proxy to measure firm value. MCAP can capture the overall market value of the company rather than the price per share that only evaluates the company from the price per share (Anam et al., 2011; Uyar & Kılıç, 2012). MCAP is calculated by multiplying the price per share with the share

outstanding at the end of the year. Furthermore, MCAP transformed into natural logarithmic form (LN) to reduce the skewness and kurtosis level of the data (Abdullah et al., 2015; Uyar & Kılıç, 2012)

Similar to previous research, we measure carbon disclosure using content analysis (Mi Choi, Sul, & Kee Min, 2012; Putri & Aryani, 2016; Sudibyo, 2018). In contrast to previous studies that used the CDP questionnaire in compiling an assessment/scoring index, we use the Global Reporting Initiative (GRI) Standards 305: Emission. The GRI Standards 305 is used in this study because most companies in Indonesia employ this index when discloses their environmental activities. Therefore, we conclude that GRI Standards are more appropriate to assess the environmental disclosure in Indonesia compared to CDP Questionnaire. Even though we choose the GRI index, CDP has been aligning its questionnaire with the GRI standard (Global Reporting Initiative, 2017). Thus, problem in difference in the scoring index basis can be avoided. Every scoring item based on reporting requirements stated in GRI 305: Emission can be applied in all industries; therefore, it can be ensured that the valuation is fair and unbiased. The scoring index/item is listed as follows.

Table 1. Carbon disclosure scoring index

Category	Code	Item
Management Approach (GRI 103)	PM1	Explanation about why emission gas material is a topic for the company
	PM2	Explanation of how the company manage its gas emission
	PM3	Statement of emission management objectives
	PM4	Company's policy or commitment description related to gas emission
	PM5	Management approach evaluation related to gas emission
Emission (GRI 305)	CD1	Gas emission total presented in a metric ton
	CD2	Disclose the source of emission factors
	CD3	Disclose base year of calculation
	CD4	Disclose standard, methodology, assumption, and, or calculation tool used
	CD5	Emission gas intensity ratio
	CD6	Reduction of gas emission

Source: Global Reporting Initiative (2016)

If the company discloses the item listed in Table 1, then each item disclosed is being scored

one and otherwise scored zero. Due to that scoring method, the maximum score a company can get is

11, with the minimum score is 1. Then, the score is transformed into decimal form by dividing it by 11.

In this study, foreign ownership is measured with the percentage of ownership (Oh et al., 2011). The percentage calculated by dividing the total share owned by the foreign investor by the total outstanding share in the period.

This study used three control variables that are profit, size, and leverage. A company that has a high profit tends to have a good performance, good prospect, and lower risk (Abdullah et al., 2015). Profit measure with net income divided by total equity (Abdullah et al., 2015). Large companies generally disclose more information to

investors, which facilitates large companies to get investment, so usually, large companies have greater firm value than small companies (Abdullah et al., 2015). The size will be measured using the logarithmic form of the company's total asset. Leverage is the debt ratio of the company. A large debt ratio could mitigate the positive effect of profitability on firm value (Li Ju & Shun Yu, 2011). Leverage will be measured with the debt-to-asset ratio.

The regression model

The hypothesis in this study was examined with moderated regression analysis (MRA). The regression model formulated as follows.

$$MCAP_{it} = \alpha + \beta_1 CD_{it} + \beta_2 FOWN_{it} + \beta_3 CD_{it} * FOWN_{it} + \beta_4 Leverage_{it} + \beta_5 Size_{it} + \beta_6 Profit_{it} + \varepsilon$$

In that regression model, MCAP is market capitalization firm *i* at year *t*; CD is carbon disclosure firm *i* at year *t*; FOWN is foreign ownership firm *i* at year *t*; Leverage is debt-to-asset ratio firm *i* year *t*; Size is a total asset in logarithmic form (Ln) firm *i* year *t*; Profit is net income firm *i* at year *t*, and ε is the error term. In that model, we realized that the carbon disclosure for the current data would not available to the market until few months by next year; therefore, the impact of such disclosure should be in the next year. However, following Matsumura et al.,

(2014), we treat subsequent realization of the carbon disclosure as to our best estimate of market expectations. This possible rise to a look-ahead bias, but this is not a concern to our study as we test an average firm-value effect.

4. Results and discussion

Population and sample

We use all firms listed on the Indonesia Stock Exchange between 2016 and 2018. The sample selection can be seen in Table 2

Table 2. Sample selection

Criteria	Total
The company listed in BEI 2016-2018	629
Not listed throughout 2016-2018	(90)
Delisting	(12)
Did not release carbon disclosure	(455)
Observed company	72
Firm-year observation	216
Outlier	(22)
Total Sample	194

As shown in Table 2, there are 629 companies listed on Indonesia Stock Exchange (BEI) in the period 2016-2018, and 102 companies are not

listed and delisted throughout the period. Four hundred fifty-five companies released carbon disclosures neither in the annual report nor in the

sustainability report published by the company each year. Based on the criteria, only 72 companies were observed in this study with a total year-firm sample of 216.

Due to the outlier of extreme value, which could disturb analysis (Gujarati & Porter, 2008; Saka & Oshika, 2014), 22 samples were removed; thus the final sample is 194 firm-year.

Descriptive statistic

Table 3 and Table 4 show descriptive statistics before and after data transformation. Table 3, shows that MCAP as the dependent variable has an average value of Rp33,460T. After

transformation (as listed in Table 4), the natural logarithm (LN) becomes 30.1311 with a standard deviation of Rp62,470T and post-transformation to 1.4254. The maximum amount of MCAP is Rp373.33T and 33.5534 after transformation, and the minimum amount is Rp0.397T and 26.7077 after transformation. The independent variable carbon disclosure (CD) has an average value of 0.4854 with a standard deviation of 0.2567 with a maximum value is 1 and the minimum is 0.0909. The CD*FOWN moderation variable has an average value of 0.2166 and a standard deviation of 0.2350. The maximum and minimum value is 0.9418 and 0 respectively.

Table 3. Descriptive statistic before transformation

Variable	N	Mean	Std. Deviation	Minimum	Maximum
MCAP	194	Rp33.460T	Rp62.470T	Rp0.397T	Rp373.33T
CD	194	0.4854	0.2567	0.0909	1
FOWN	194	0.3789	0.3375	0	0.9947
CD*FOWN	194	0.2166	0.2350	0	0.9418
Leverage	194	0.5428	0.1999	0.1130	0.09365
Size	194	Rp75.575T	Rp168.23T	Rp1.197T	Rp1,202.2T
Profit	194	0.0892	0.0997	-0.1979	0.3147

Table 4. Descriptive statistic after transformation

Variable	N	Mean	Std. Deviation	Minimum	Maximum
MCAP	194	30.1311	1.4524	26.7077	33.5534
CD	194	0.4854	0.2567	0.0909	1
FOWN	194	0.3789	0.3375	0	0.9947
CD*FOWN	194	0.2166	0.2350	0	0.9418
Leverage	194	0.5428	0.1999	0.1130	0.9365
Size	194	30.7826	1.5725	34.7229	27.811
Profit	194	0.0892	0.0997	-0.1979	0.3147

Regression results

In this study, before testing the hypothesis, an estimation model selection test was performed to determine the best model to use. After performing the Chow test and Hausmann test, the result showed that the best estimation model used in this study is the random effect model. Therefore, no further classic assumption test is needed (Gujarati & Porter, 2008).

In this study, we do three kinds of hypothesis testing, which are coefficient determination (R^2),

F-test, and partial test (t-test). As shown in Table 5, the coefficient determination test result shows 0.4605 or 46.05%. It means the model can explain the dependent variable by 46.05% while the rest is explained by other factors or variables. F-Test result shows a significant result ($0.0000 < 0.05$) with coefficient F-statistic 28.4612. This result suggests that the independent variable and control variable used in this study simultaneously affecting the dependent variable.

Table 5. Regression results

Variable	Coefficient	Probability
CD	-0.8522	0.0135**
FOWN	-1.3605	0.0012***
CD*FOWN	2.1687	0.0004***
Leverage	-2.4838	0.0000***
Size	0.8282	0.0000***
Profit	1.8704	0.0001***
Adjusted R2	0.4605	
F-Statistic	28.4612	
Prob. (F-Statistic)	0.0000	

Notes: Significant at ***1% **5% *10%

The result in Table 5 shows that carbon disclosure negatively affects firm value as it can be seen from the coefficient which has a negative value (-0.8522) and the probability is below 0.05 (0.0135). Therefore, our argument that carbon disclosure positively impacts firm value (H_1) is not supported by the data. This result is similar to (Alsaifi, Elnahass, & Salama, 2020; Lee et al., 2015; Matsumura et al., 2014) studies that fail to prove the argument of carbon disclosure has a positive impact on firm value. Investors regard carbon disclosure as a cost/investment without an offsetting benefit (Alsaifi et al., 2020; Lee et al., 2015; Matsumura et al., 2014).

According to Matsumura et al. (2014), investors penalized companies who do carbon disclosure, but they penalized companies that do not do carbon disclosure even more. Investors penalized the company who does carbon disclosure because when investors evaluating the company, they combine or use information from carbon disclosure and carbon performance simultaneously. Thus, it is very likely the company that does carbon disclosure has a bad carbon emission performance; therefore it will not meet investor expectations and leads to the fall of firm value. Lee et al. (2015) explained that carbon disclosure has a negative impact on firm value because investors recognized information from carbon disclosure as bad news due to concerns of the costs incurred to overcome global warming would outweigh the benefits. Alsaifi et al. (2020) also explain that investors perceived climate-related environmental initiatives as an

investment/cost offsetting the benefit received and reducing the competitive advantage.

As stated in Table 5, foreign ownership significantly moderates the relationship between carbon disclosure and firm value showed by positive coefficient value (2.1687) and probability below 0.01 (0.0004). This result support H_2 . The result implies that foreign ownership can mitigate the negative effect of carbon disclosure on firm value. If we compare the direct relation coefficient value of carbon disclosure (-0.8522) with the coefficient value of the moderation effect (2.1687), we can conclude that the moderation effect outweighs the direct value.

The result of foreign ownership also implies that foreign ownership is a quasi-moderator that not only can moderate the relationship but also can affect the dependent variable directly (Sekaran & Bougie, 2016). Therefore, foreign ownership not only moderates the carbon disclosure and firm value relation but can also directly impact negatively on firm value. This result still in line with research conducted by (Al-Gamrh, Al-Dhamari, Jalan, & Afshar Jahanshahi, 2020; Bayrakdaroglu, Ersoy, & Citak, 2012; Ferris & Park, 2005; Makhija & Spiro, 2000). The explanation of foreign ownership could negatively affect firm performance is due to two possible reasons. First, the corruption and high bureaucracy in developing countries could hinder foreign investors from giving their full potential in influencing the companies. Second, emerging markets are still not concentrated and suffer from

information asymmetry which lower foreign investor ability to monitor firms.

Based on the result, in the Indonesia context, carbon disclosure has a negative effect on firm value because the investor in general still regards information from carbon disclosure as bad news resulted from concern that the cost incurred to prevent global warming or climate change would outweigh the benefit received by the company and reducing the competitive advantage. However, foreign ownership in the company can mitigate/change that effect. Foreign ownership in the company will mitigate the negative effect and give a positive effect to the firm value as the foreign investor appreciates company carbon disclosure. This appreciation may come due to carbon disclosure decreasing information asymmetry, which reduces the uncertainty about the impact of environmental activities on the firm's financial (Borghei, Leung, & Guthrie, 2018;

Krishnamurti & Velayutham, 2018; Schiemann & Sakhel, 2019; Velte, Stawinoga, & Lueg, 2020; Zhou, Zhou, Peng, Chen, & Li, 2018). Carbon disclosure can also reduce the negative effect of foreign ownership on firm value due to the decrease in information asymmetry.

Robustness test

For further analysis, we are conducting a robustness test by removing the negative profit or loss company in the sample. The result, as shown in Table 6, carbon disclosure negatively affects firm value at 1% significance level. Foreign ownership as mediators also mediating the relationship by changing the effect from negative into a positive relationship at 1% significance level. This result provides consistent evidence on the relationship between carbon disclosure and firm value.

Table 6. Regression result without negative profit company

Variable	Coefficient	Probability
CD	-0.9176	0.0072***
FOWN	-1.4223	0.0011***
CD*FOWN	1.8897	0.0025***
Leverage	-3.9093	0.0000***
Size	0.9700	0.0000***
Profit	2.9716	0.0000***
Adjusted R2	0.5660	
F-Statistic	36.4431	
Prob. (F-Statistic)	0.0000	

Notes: Significant at ***1% **5% *10%

5. Conclusions

The increasing attention and concern for the environment from stakeholders lead to new pressure for the company to make adjustments in their operational activity, which can impact the environment. This pressure raises by the stakeholders as they need the information on carbon emission to assess the firm emission performance and to supplement financial information. As a result, firms recently adjust their operational activity to reduce carbon emission and

disclose it. This action is in line with the legitimacy theory. The result of this study shows that carbon disclosure negatively affects firm value. The negative effect of carbon disclosure, possibly due to investors unsure whether the benefit of doing carbon disclosure will greater than the cost incurred for such disclosure (Lee et al., 2015).

This study also shows that foreign ownership significantly impacts the relationship between carbon disclosure and firm value. The result

implies that foreign ownership can mitigate the negative effect of carbon disclosure and bring benefits to the company. This is possible because foreign investors understand and concern more about the environmental problem. When the companies disclose their carbon emission activity, they appreciate it more than the punishment given by the local investor.

This study contributes management to understand the impact of carbon disclosure on firm value, especially to the company's management, which is owned by foreign investors. This study also contributes theoretically by giving empirical evidence and explanations about the impact of carbon disclosure on firm value and the moderation effect of foreign ownership.

However, the result of this study should be generalized carefully as it has limitations. The limitation includes: 1) we only measure carbon disclosure in the annual report and sustainability reports of each company. we do not include companies that disclose carbon disclosures through other media, such as newspapers. This limitation provides an opportunity to further explore carbon disclosure in other media in addition to annual reports and sustainability reports. 2) We only testing foreign ownership as the moderating variable. Future research also can examine other possible moderation variables, such as corporate governance.

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