

Corporate Environmental Consciousness and Cost of Financing: Case of Indonesian Listed Firms

Ainindita* and Yunieta Anny Nainggolan

School of Business and Management, Institut Teknologi Bandung, Indonesia

E-mail address: ainindita@sbm-itb.ac.id

Abstract - In the last decade, there has been a growing concern towards corporations that uphold environmental consciousness thus increasing sustainable finance. Literature shows that corporate's environmental awareness acts such as corporate's disclosure of sustainability report and carbon emission strategy have reduced the cost of financing. This is due to environmental awareness is expected to minimize the risk of investing and information asymmetry. However, concerns on similar issues have just raised recently in Indonesia. Thus, this paper aims to examine the evidence in Indonesia and whether by implementing responsible business has reduced the firm's cost of financing. Examining the sample of KOMPAS 100 firms during the period of 2015-2019, using panel regression, and analyzing the sustainability report disclosure, type of emitting industry, emission count, and environment programs to measure environment activities, the researcher finds a negative and significant relationship between carbon emission intensity and low emitting industries to cost of financing. However, sustainability report disclosure and number of environmental programs are found insignificant. This leads to conclusion that environmental performance is a significant risk factor in valuing cost of financing, but in valuing the environmental programs and sustainability report disclosure, it is required to add more proxies and measurements.

Keywords - *Cost of Financing; Environmental Performance; Sustainability Report; Green Corporate; Responsible Firms; Sustainable Finance*

I. INTRODUCTION

BACKGROUND

There has been a growing concern towards corporations that uphold environmental consciousness in the last decades thus increasing the practice of sustainable finance or green financing. The term 'sustainable finance' highly correlates with green finance and ESG (Environmental Social and Governance) principles. The term green finance and ESG has been developed in 1990s globally with a main concern on governance which also include environment (Inderst, Kaminker and Stewart, 2012). Thus, sustainable finance becomes the broader financing trend and highly linked to other financing kinds such as the responsible financing, impact financing, or thematic financing. Sustainable finance fulfils the concept

of shifting the one focus of business (profit) into the triple bottom line (profit, people, and planet). A firm that implements sustainable financing has consciousness to invest and create projects with a defined environmental and social impact. This provides investors and market players an option to act responsibly and reinforce the positive environmental change. Investing in environmental cause is argued to create a long-term growth and high return of an investment (Kim et al, 2015). Cost of financing, including cost of equity, cost of capital, and cost of debt is believed to have additional explanation factors, despite the market beta (Fama and French, 1993), book to market ratio (Dhaliwal et al, 2008), return on asset (Hope et al, 2009), and firm's size (Mendelson, 1986). The mentioned variable commonly used to measure financial parts but recently, there are researches that study the relationship of climate change risks (environmental risks) with cost of financing. The environmental risks may include but not limited to the environmental risk management (Sharfman, 2008), Carbon emission intensity, Disclosure of Sustainability Report, and High-Low Emitting Industry (Kim, 2011). The Studies in developed countries has proven that firms that uphold environmental consciousness will generate lower cost of financing, thus the negative association is expected (Sharman et al, 2008). The negative relation is expected due to additional risks when investors calculate return premium, in which firms that has poor environmental performance may suffer from higher cost of financing (Kim, 2011). Another reason is firms that disclose their environmental performance may lower its information asymmetry and thus lower cost of financing. However, insignificant relationship is also expected which argues investors did not value environmental information as additional risks to calculate the return premium (Qiu, 2011). Meanwhile, Indonesia's current situation is also showing growth on environmental investment proven by OJK (Otoritas Jasa Keuangan) regulations and growing demand from green investors. Furthermore, there is a strong need to develop Indonesia's sustainable finance system, however, it is not easy to identify study on sustainable finance in developing countries, including Indonesia, since majority of the studies are conducted in developed countries. Thus, the urgency of this paper is to analyze the relationship of firms that upholds environmental consciousness towards its cost of financing in Indonesia.

The author has one research question in regards to the previous study finding; Is there a relationship between environmental performance and cost of financing in Indonesian firms?; According to the question, the researcher's objective is to find out the relationship between environmental performance and cost of financing in Indonesian firms.

LITERATURE REVIEW

Carbon emission, Intensive carbon emission industry, and Cost of Financing

Corporates with outstanding environmental practices and good carbon strategies are responding well to threats from carbon risk (regulation, litigation, reputation, competition risk) compared to corporates with bad environmental system and strategies (Kim, An and Kim, 2015). Another studies conducted by Sharfman and Fernando (2008) show carbon emission has a positive relationship to the capital asset pricing model (CAPM) or cost of equity. Li, Eddie and Liu (2014) argues that the most important factor is the level of information. The study indicates that the environmental plans that companies had is considered to be an essential information for market participants to use when determining return premium, this way investors tend to ask for a higher return for firms with firms that do not disclose information. This statement is also supported by Sharfman and Fernando (2008) that improved environmental risk management reduces the cost of equity. The relationship of carbon emission to cost of debt is also found positive (Graham et al, 2001). When a company belongs to high emitting industry, lenders will charge the firm a higher risk premium. The firm's default premium increases in line with credit rating downgrades the debt as a response to pay attention to carbon intensive firms (Liu, 2015).

Environmental disclosure and Cost of Financing

A higher level of transparency results in a reduced cost of equity (Botosan, 1997). Firms require cost of equity since it is frequently utilized in assessing financing options (Beneda, 2003). Dhaliwal's study (2006) states that the implementation of disclosure of sustainability report results in a decrease in the cost of equity capital of corporates, that corporates with a high cost of equity capital in the previous year appear to start the disclosure of environmental activities in current year, and that the initiation of higher environmental output enjoys a corresponding reduction in the cost of equity capital. On the other hand, Ann and Kim (2011) states that the voluntary disclosure of sustainability report is not really recognized as a component of exceptional carbon management system in the stock market, and the data on the report is not reliable since the regulations doesn't obligate the report to be audited by third party. In addition, a study by Sharfman and Fernando (2008) concluded that

there is insignificant relationship between voluntary environmental disclosure and cost of financing. But this research also noted that empirical results showed positive relationship between bad environmental performance and cost of equity.

Environmental Programs and Cost of Financing

Firms that pay efforts to improve environmental risk management are considered valuable in the financial market. The result is proven by the reduction in cost of equity and cost of debt, especially in lowering the volatility of the firm (Kim, 2011). Emission reduction plan of a company by implementing some environmental programs has proven to improve its environmental risk management that results in efficiency of raw materials, and it has a payoff on the risk profile and thus explain a well-managed environmental firm generates lower cost of financing. One of the highest regarded components of environmental scores is the activities conducted to preserve the environment (Li et al, 2008). Thus, the negative association is expected between the number of environmental programs and cost of financing.

Sustainable Finance in Indonesia

Indonesia has been actively trying to promote the implementation of sustainable finance through regulations established by Indonesia's financial service authority (OJK). OJK through POJK regulation 51 Chapter 4 has been obliging financial service institutions, companies listed on stock market, and public companies to disclose sustainability report. Although this regulation is mandatory, a large number of companies has not obeyed this regulation. OJK also conducted sustainable finance agenda for three phases, but there are also some setbacks that the action plans are failed to be implemented. There are only few corporations in Indonesia that fully implement sustainability and environmental practices in their operations (Maghribi, 2019). Thus, it becomes a question whether the disclosure of sustainability report and environmental performance affect cost of financing of a company.

PREVIOUS STUDY

Most of the previous study shows that the good environmental performance has negative effect to the investor's required return such as cost of debt, cost of capital, and cost of equity. As for the carbon intensity, most study shows that carbon emission is positively related with firm's performance such as cost of equity capital. The studies also suggested the use of control variables in order to support the dependent variable such as the return on asset, market beta, and type of industry. The result of the previous studies can be seen on the table below:

Table 1 Previous Study

Paper	Variable	Finding	Methodology
1.Voluntary environmental disclosure quality (VEDQ) and firm value	<i>Dependent :</i> Stock price, expected future cash flow, cost of equity capital (COEC) <i>Independent :</i> Voluntary environmental disclosure (Disclosure type and disclosure nature)	Voluntary environmental quality is associated with firm value through the cash flow and cost of equity components that lowered the cost of equity and cost of capital.	Panel data and regression models.
2.The effect of carbon risk on the cost of equity capital	<i>Dependent :</i> Cost of equity capital <i>Independent :</i> Carbon intensity, disclosure of voluntary sustainability reports , industry <i>Control :</i> Market beta, ROA	Carbon intensity is positively related with the cost of equity capital and its effect has nothing to do with environmental disclosure.	Regression model
3.Carbon emissions and the cost of capital: Australian evidence	<i>Dependent :</i> Disclosure, cost of debt, cost of equity <i>Independent:</i> Carbon emission intensity, EL (dummy variable), natural logarithm of total asset, leverage ratio, book to market ratio, net profit, beta, interest coverage ratio, risk free rate	The cost of capital, including the cost of debt and the cost of equity, will increase for emissions-labile companies.	Regression model
4.Firm size, disclosure, and cost of equity capital	<i>Dependent :</i> Cost of equity <i>Independent :</i> Disclosure <i>Moderating :</i> Firm size <i>Control :</i> Beta, book to market, leverage	There is a significant negative relationship between disclosure and cost of equity capital for large firms and not significant for small firms.	Multiple regression
5.Environmental risk management and the cost of capital	<i>Dependent :</i> WACC <i>Independent :</i> SIC (Standard Industrial Classification) <i>Control :</i> industry, firm size, leverage Tax shield from debt, beta, dispersed share ownership, percentage of institutional shareholders, cost of debt capital, cost of equity capital	Improved environmental risk management has positive relationship with a lower cost of capital.	Hierarchical regression
6.Revisiting the Relation Between Environmental Performance and Environmental Disclosure: An	<i>Dependent :</i> Disclosure scores (hard disclosure and soft disclosure) , profitability of firms	A positive association between environmental performance and the extent of discretionary	Regression model

Empirical Analy	<i>Independent :</i> Environmental performance	environmental disclosures.	
-----------------	--	----------------------------	--

HYPOTHESIS DEVELOPMENT

Most studies indicate that the environmental plans that companies had can be regarded as important information for investors to use when calculating return premium, this way investors tend to ask for a higher rate of return for firms' according to level of information risk. This statement is also supported by Sharfman and Fernando (2008) that improved environmental risk management reduces the cost of equity. Kim et al (2011) also mentioned that carbon intensity of a firm can be an additional risk when market participants are trying to calculate the return premium, thus firms that belong to high emitting industries may have higher cost of financing. The researcher intends to test the environmental performance by having carbon intensity variable, disclosure of sustainability report, activities of environment programs, and higher and lower emitting industries in order to discover its relationship to cost of financing.

Previous studies suggest that there is negative relation between environmental performance and cost of financing. As a result, there is a significant need to enhance Indonesia's sustainable finance system; however, finding research on sustainable finance in developing countries, such as Indonesia, is difficult because most of studies are undertaken in developed countries. Thus, driving the researcher to develop and test hypothesis on whether or not corporate's environmental performance may be one of the risks factors of cost of financing in Indonesian listed firms. The hypothesis is declared as:

H1 = Environmental performance has a negative relationship with cost of financing.

II. METHODOLOGY

Data Collection

In order to calculate the cost of financing using the regression model, the researcher uses different measurements of cost of financing, which are WACC Cost of Capital (Kim et al, 2015), WACC Cost of Equity, WACC Cost of Debt, and Capital Asset Pricing Model (CAPM) (Li, Eddie and Liu, 2014). The data for these dependent variables is collected from Refinitiv database. The data for carbon emission is derived from sustainability report. Sustainability report disclosure in a respective year will be checked through corporate's website. The green programs conducted by the firm will be counted manually from the sustainability report. Next, the beta for each firm, return on asset, and total asset as the firm size, are also derived from Refinitiv Eikon database. The book to market value data is calculated by multiplying the P/BV per share and number of shares from annual report. To collect the data of risk-free rate, 10Y Gov-Bond monthly data is used.

The researcher used data available from CNBC Indonesia website, the researcher considers using data from Indonesian Bond Pricing Agency (IBPA) website, however the data of 10Y Gov-Bond from 2017 is unavailable, there is only 1-year data.

The industry classification will be conducted according to IDX website and the classification of high and low emitting industry is based on WRI (World Resource Institute) 2019 data. The sample of the firm is from KOMPAS100 index. KOMPAS 100 index is an index that consists of firms' with high liquidity and market capitalization. The 25 companies listed on Sri Kehati index (firms that highly values sustainability) is also listed on the Kompas 100 firms. Thus, the researcher will get the samples of the KOMPAS 100 firms to be analyzed in 2015-2019 time range.

Data Analysis Method

The data analysis procedure will utilize Stata 14.0. with panel regression. Panel dataset is utilized for it provides a more comprehensive and thorough result since it contains more information, variability, and efficiency. In addition, using panel dataset also minimizes estimation biases that arise from aggregating groups into a single time series.

Research Models

In order to analyze the relationship between environmental performance and the cost of financing, the dependent variables, the cost of financing, which consists of the cost of equity (CoE), cost of capital (CC), cost of debt (COD), and CAPM is regressed by independent variables which are; number of environmental programs (GREEN), sustainability report disclosure (REPORT), carbon intensity (CARBON), and low emitting industries (LowEmitIND) along with the control variables by panel regression. Adopting Kim et al (2015) and Li (2015), the main model of regression is to study the effect of environmental performance on cost of financing for four different measurements of dependent variables. The model is as follows,

$$\begin{aligned} \text{Cost of Financing}_t &= \beta_0 + \beta_1 \text{GREEN}_t + \beta_2 \text{Beta}_t + \beta_3 \ln B/M_t + \beta_4 \text{SIZE}_t + \beta_5 \text{ROA}_t + \text{YD} + \varepsilon \end{aligned}$$

$$\begin{aligned} \text{Cost of Financing}_t &= \beta_0 + \beta_1 \text{REPORT}_t + \beta_2 \text{Beta}_t + \beta_3 \ln B/M_t + \beta_4 \text{SIZE}_t + \beta_5 \text{ROA}_t + \text{YD} + \varepsilon \end{aligned}$$

$$\begin{aligned} \text{Cost of Financing}_t &= \beta_0 + \beta_1 \text{LOWCARBON}_t + \beta_2 \text{Beta}_t + \beta_3 \ln B/M_t + \beta_4 \text{SIZE}_t + \beta_5 \text{ROA}_t + \text{YD} + \varepsilon \end{aligned}$$

$$\begin{aligned} \text{Cost of Financing}_t &= \beta_0 + \beta_1 \text{LOWEmitIND}_t + \beta_2 \text{Beta}_t + \beta_3 \ln B/M_t + \beta_4 \text{SIZE}_t + \beta_5 \text{ROA}_t + \text{YD} + \varepsilon \end{aligned}$$

Where :

Dependent variables : Cost of Financing, measurements :
CCt : Cost of Capital in year t
CoEt : Cost of Equity in year t
CAPMt : Capital Asset Pricing Model (CAPM) in year t
CODt : Cost of Debt in year t

Independent Variables

CARBON_t : The amount of carbon emission produced in year t deflated by net income
REPORT_t : Disclosure of Sustainability Report in year t
GREEN_t : Number of Environmental Programs in year t
LowEmitIND_t : Type of Emitting Industry (High or Low Emitting Industry)

Control Variables

Beta_t : Beta for company
lnB/M_t : Natural log of book value/market value
SIZE_t : Firm's size
ROA_t : Return on Asset
 $\sum$ YD : Year Dummy
 ε : Error term

Before conducting regression, some classical assumption test is done. The tests are Shapiro Wilk, Breusch-Pagan, and VIF. The tests are used to identify the normality, heteroscedastic, and multicollinearity, respectively. Two models that will be used are Fixed Effect Regression model and Random Effect Model with robust test.

III. RESULTS

(1) Descriptive Statistics

Table 2 Descriptive Statistics

Descriptive Statistics for Indonesian firms at KOMPAS 100 index for FY 2015-2019

Variable	N	Mean	SD	Min	Median	Max
Panel (A) Descriptive Statistics for Dependent Variables						
CoE	476	12,30%	0,046	0,10%	12,24%	24,90%
CAPM	500	10,10%	0,162	56,20%	10,12%	14,10%
CC	473	10,10%	0,039	0,50%	9,70%	21,70%
COD	473	3,40%	0,024	0,05%	2,90%	22,90%
Panel (B) Descriptive Statistics for Independent Variables						
Carbon	230	0,093100	0,558300	0,000000	0,000003	8,057000
GREEN	500	2,448	3,295	0,000	4,000	13,000
REPORT	500	0,400	0,490	0,000	0,000	1,000
LowEmit IND	500	0,690	0,462	0,000	1,000	1,000
Panel (C) Descriptive Statistics for Control Variables						
Beta	476	1,185	0,648	0,145	1,1258	2,855
lnbvmv	481	23,3300	3,4	0	14,5600	29,2
SIZE	498	30,509	2,819	0	15,865	34,887
ROA	487	7,10%	8,40%	-54,60%	5,46%	23,70%

Figure 1. Sustainability Report Disclosure in High vs Low Emitting Industry

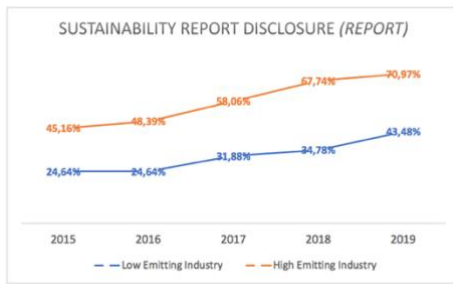
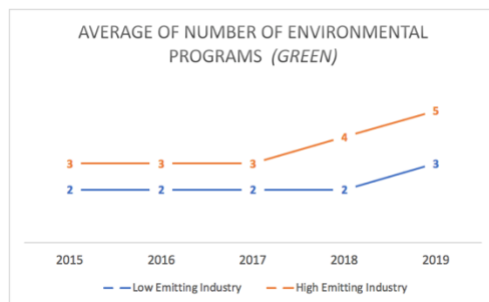


Figure 2. Average Number of Environmental Programs in High vs Low Emitting Industry



Adhering to Table 1 on descriptive statistics result, the means (medians) of the cost of equity (CoE) and CAPM are 12,3% (12,24%) and 10,10% (10,12%), respectively, consistent with result by other studies of cost of equity in Indonesian firms. (Joni et al, 2019). *CARBON* variable which measures carbon intensity/sales has mean of 0,0931, meaning that respected firm emit an average of 0,0931 tons of CO₂/ million rupiah of sales. The mean values of firm's beta, book to market value, SIZE (total asset), and ROA are 1,185 ; 0,1481; 7,53 trillion rupiah; and 7,10%, respectively. All statistics results appear to be similar with other studies of listed Indonesian firms (Joni et al, 2019). Figure 1 shows that high emitting industries (high or low emitting industry type can be seen on Appendices 4) publish sustainability reports more intensively compared to low emitting firms. . Until 2019, around 71% of firms in high emitting industry at KOMPAS100 publish its sustainability report and there is only around 44% that do so in low emitting industries. Both high and low emitting industry shows an increasing trend of sustainability report disclosure, over 5 years from 2015-2019. Figure 2 shows the average number of environmental programs that a firm conducted (details on various environmental programs can be seen on Appendices 3). Similar with sustainability disclosure's result, firms in high emitting industries, on average, did more environmental preservation programs compared to low emitting industries.

Correlation Matrix

Table 3 Correlation Matrix

	LOWCARBON	GREEN	REPORT	LowEmitIND	INDEX	Beta	Inbvmv	SIZE	ROA
LOWCARBON	1								
GREEN	0,1478**	1							
REPORT	0,1438**	0,9107*	1						
LowEmitIND	-0,0966	0,2161*	-0,2383*	1					
INDEX	0,0141	0,7392*	0,7659*	0,2589*	1				
Beta	-0,0744	-0,0216	0,0375	-0,035	0,0466	1			
Inbvmv	-0,679*	0,0434	0,055	0,1955*	0,2057*	-0,0415	1		
SIZE	-0,067	0,2881*	0,316*	0,0277	0,3829*	0,1541*	0,4982*	1	
ROA	-0,037	-0,1701*	-0,1898*	0,122*	-0,0788	-0,1639*	0,3036*	-0,2638*	1

According to table 2, multicollinearity happens between two independent variables of *REPORT* and *GREEN*. This correlation is as expected, because both of the variables are measuring environmental performance. The availability of sustainability report (*REPORT*) highly impacts the variables *GREEN* since the only way to identify the environmental programs conducted by a firm is through its sustainability report. Therefore, later on the regression, the researcher substitutes the variable not to be in one regression model. However, this study also takes into account the mean VIF as an alternative test for multicollinearity for each model as it gives a more accurate result for models with more than two explanatory variables (Gujarati & Porter, 2013). The variable *GREEN* (number of environment programs conducted) has positive coefficient with the variable *CARBON* (carbon intensity/sales). *LowEmitIND* variable has value of 1 for firms in low emitting industries and 0 otherwise and the variable results in negative coefficient with carbon intensity, environment programs, and disclosure of sustainability report meaning that firms in low emitting industries do not necessarily did more environmental programs and disclose its sustainability report as shown in figure 1.

Regression Analysis

Table 4 Summary Table of Regression Analysis

Variables	Expected Relationship	Results
Independent Variables		
Carbon	+	+
GREEN	-	Insignificant
REPORT	-	Insignificant
LowEmitIND	-	-
Control Variables		
Beta	+	+
Inbvmv	+	Mixed
SIZE	-	-
ROA	-	-

In order to test the hypothesis of whether or not firm's environmental performance has the effect on cost of financing, the researcher uses several proxies to measure environmental performance which will be performed in four different regression models. Model 1 will regress independent variable *GREEN*, Model 2 will regress independent variable *REPORT*, Model 3 will regress independent variable *CARBON*, and Model 4 will regress independent variable *LowEmitIND* .Each of the regression model measures four different dependent variables, which intended to define Cost of Financing, they are WACC Cost of Capital (Kim et al, 2015), WACC Cost of Equity, WACC Cost of Debt, and Capital Asset Pricing Model (CAPM) (Li, Eddie and Liu, 2014). Units of measurement for (1) Carbon is ton CO₂/ million Rupiah of sales. (2) *GREEN* is number of environmental programs. (3) *REPORT* is value of 1 for publishing sustainability report, 0 otherwise. (4) *LOWEmitIND* is value of 1 for low

emitting industries, 0 otherwise. The measurement for dependent variables is in percentage and for the control variables beta is in decimal, *lnbvmv* is in decimal, *SIZE* is total asset, and *ROA* is in percentage. Hausman Test is used to calculate fixed and random effects. The purpose of the mean VIF is to detect multicollinearity. Heteroscedasticity is detected using the BP (Breusch-Pagan) test. To avoid heteroscedasticity and autocorrelation issues, all models employ robust and clustered standard error.

Based on table 3, variable *CARBON* that describes carbon intensity is positively related with cost of financing, which means the higher the carbon intensity, the higher firm's cost of financing. Variable *LowEmitIND* has significant and negative relationship with cost of financing, meaning that industries that belong on low carbon emitting type generates lower cost of financing. While the variable *GREEN* and *REPORT* is found insignificant. The control variables *firm's Beta*, has positive and significant relationship with cost of financing, *SIZE* and *ROA* is found negative and significant, while book to market ratio (*lnbvmv*) has both positive and negative relationship.

IV. DISCUSSION

The panel regression tests show that out of four variables to measure environmental performance, two are significant (*CARBON* and *LowEmitIND*) and the other two are found insignificant (*REPORT* and *GREEN*).

CARBON variable shows positive and significant result to cost of financing. This finding is robust to various alternative measurements of cost of financing. These findings are consistent with Sharfman and Fernando (2008) that supports positive relationship between environmental risk and cost of capital. Australian research shows that both cost of debt and cost of equity that is included in cost of capital will increase for high intensive emission firms (Liu, 2015). The emissions reduction plan is a signal that may imply asymmetry in information about carbon emissions among existing management and investors. Managers may suppress this knowledge, giving them an advantage over outsiders when appraising the risks associated with the emissions reduction strategy. As a result, when lending money to emissions-related enterprises, private investors and financial institutions may incur additional costs and risks. *LowEmitIND* variable shows negative and significant result to all measurement of dependent variables; The result significantly shows negative relationship, meaning that when firms emit less carbon emission which makes them belong to low emitting industries, its cost of financing will decrease. This means that investors regard industry type in concern with environmental impact as an additional risk of investing. *REPORT* (sustainability report disclosure) variable is

found insignificant. Although Kim et al argues that sustainability report may reflect firm's ability to manage carbon and environmental risk, Sharfman et al (2008) stated that publication of the report is a mechanical activity to compete with competitors especially on large emitting industries and Joni et al argues that the content on the sustainability report is not verified by third parties. *GREEN* (number of environmental program) variable is also found insignificant. The researcher believes the environmental programs alone will not accurately explain the environmental programs. Variables like environmental program expense and the extent and measurement of each program may play a great contributing factor in determining the environmental program that a firm has and therefore explaining its relationship with cost of financing. In terms of control variables, the coefficient for business size (*SIZE*) is negatively and significantly linked with Cost of Equity, Cost of Capital, and CAPM, indicating that bigger businesses have lower cost of equity and cost capital. This research also finds that firm's beta (*BETA*) positively affect the cost of financing, which means the higher the volatility/ systematic risk, the higher the cost of financing, which is in line with previous research (Sharpe, 1964; Linter, 1965; Fama and French, 1992). Book to Market Ratio (*lnbvmv*) variable shown mixed result towards cost of financing, this is based on some research that also shows both positive and negative result. Although Fama and French (1995) anticipate a positive connection, Dhaliwal et al. (2008) predict a negative correlation because they believe it is a proxy for future growth. *ROA* (return on asset) shows negative association with cost of equity supported by Kim et al, 2011.

V. CONCLUSION

This research examines the relationship of environmental performance towards cost of financing in KOMPAS 100 index, Indonesia. To answer the hypothesis, environmental performance has significant and negative effect to cost of financing (Kim et al, 2015; Li, Eddie and Liu, 2014; Sharfman et al, 2008). However, out of four main independent variables, there are only two variables that are significant, which are *CARBON* and *LowEmitIND*. *CARBON* has positive and significant relationship to cost of financing, at 10% level and *LowEmitIND* has negative and significant effect to cost of financing, at 1% level. This means that firms that emit high carbon intensity and belong in high emitting industry may suffer from higher cost of financing. This is due to additional risk in calculating return premium, in which market participants perceive high polluting firms not to have long term growth and sustainability performance (Sharfman Fernando, 2008). In addition, the emissions reduction strategy and the carbon emission information for each particular firm might be considered crucial information for investors to consider when estimating their return premium (Kim et al, 2015; Sharfman et al, 2008). While the variable *GREEN* and *REPORT* is found insignificant.

This study implies that environmental performance can be a risk factor to determine cost of financing in Indonesia. However, it is important to further elaborate the extent of sustainability report disclosure and the number of environmental programs that a firm conducted by adding the environmental expense and elaborate the measurement and result of the environmental programs and therefore explaining its relationship with cost of financing. This result is essential to firms that belong in high emitting industry, considering that the result shows high emitting industry firms face significant risk of financing because of their emission.

The firms are recommended to undertake emissions reduction plan to mitigate the carbon related risks by reforming its business activities into a more ecology friendly and sustainable approach such as, utilize alternative energy and fuels, green mining practice, green banking operations, water and waste management, biodiversity conservation, peatland management, and responsible raw material sourcing.

REFERENCES

- (1) Al-Tuwaijri, S.A., Christensen, T.E., Hughes, K.E. (2004). The relations among environmental disclosure, environmental performance, and economic performance: a simultaneous equations approach. *Accounting, Organizations and Society*, 29(5-6), 447– 471.
- (2) Armitage, S., Marston, C. (2008). Corporate disclosure, cost of capital and reputation: Evidence from finance directors. *British Accounting Review*, 40(4), 314-336.
- (3) Arora, P., Dharwadkar, R. (2011). Corporate governance and corporate social responsibility (CSR): the moderating roles of attainment discrepancy and organization slack. *Corporate Governance: An International Review*, 19(2), 136–152.
- (4) Botosan, C.A., Plumlee, M.A., 2005. Assessing alternative proxies for the expected risk premium. *Account. Rev.* 80 (1), 21e54.
- (5) Botosan, C. (1997), “Disclosure level and the cost of equity capital”, *The Accounting Review*, Vol. 72 No. 3, pp. 323-349.
- (6) Brammer, S., Pavelin, S. (2006). Voluntary environmental disclosures by large UK companies. *Journal of Business Finance and Accounting*, 33(7-8), 1168–1188.
- (7) Brammer, S., Pavelin, S. (2008). Factors influencing the quality of corporate environmental disclosure. *Business Strategy and the Environment*, 17(2), 120–136.
- (8) Campbell, K., Sefcik, S.E. and Soderstrom, N.S. (2003), “Disclosure of private information and reduction of uncertainty: environmental liabilities in the chemical industry”, *Review of Quantitative Finance and Accounting*, Vol. 21 No. 4, pp. 349-378.
- (9) Clarkson, P., Li, Y., Richardson, G., Vasvari, F., 2008. Revisiting the relation between environmental performance and environmental disclosure: an empirical analysis. *Account. Organ. Soc.* 33, 303e327.
- (10) Cooper, S., (2006). Discussion of ‘Disclosure and the cost of capital: what do we know?’ *Accounting and Business Research, International Accounting Policy Forum*, 36(1), 41–42.
- (11) Cormier, D., Magnan, M. (1999). Corporate environmental disclosure strategies: determinants, costs and benefits. *Journal of Accounting, Auditing and Finance*, 14 (3), 429– 451.
- (12) Cormier, D., Magnan, M. (2003). Environmental reporting management: a European perspective. *Journal of Accounting and Public Policy*, 22(1), 43–62.
- (13) Cormier, D., Magnan, M. (2007). The revisited contribution of environmental reporting to investors’ valuation of a firm’s earnings: An international perspective. *Ecological Economics*, 62(3-4), 613-626.
- (14) Dhaliwal, D., Gleason, C., Heitzman, S., Melendrez, K., 2008. Auditor fees and cost of debt. *J. Account. Auditing Finance* 23 (Winter), 1e22.
- (15) Dhaliwal, D.S., et al., 2011. Voluntary nonfinancial disclosure and the cost of equity capital: the initiation of corporate social responsibility reporting. *Account. Rev.* 86 (1), 59e100.
- (16) Easton, P., 2004. PE ratios, PEG ratios, and estimating the implied expected rate of return on equity capital. *Account. Rev.* 79, 73e96.
- (17) Embong, Z., Mohd-Saleh, N. and Hassan, M. S. (2012) ‘Firm size, disclosure and cost of equity capital’, *Asian Review of Accounting*, 20(2), pp. 119–139. doi: 10.1108/13217341211242178.
- (18) Fama, E.F., French, K.R., 1992. The cross-section of expected stock returns. *J. Finance* 47, 427e465.
- (19) Fama, Eugene F., French, Kenneth R., 1993. Common risk factors in the returns on bonds and stocks. *J. Financ. Econ.* 33, 3e53.
- (20) Fama, Eugene F., French, Kenneth R., 1995. Size and book-to-market factors in earnings and returns. *J. Finance* 50, 131e155.
- (21) Fonseka, M., Rajapakse, T., & Richardson, G. (2019). The effect of environmental information disclosure and energy product type on the cost of debt: Evidence from energy firms in China. *Pacific Basin Finance Journal*, 54, 159–182. <https://doi.org/10.1016/j.pacfin.2018.05.001>
- (22) Gebhardt, W., Lee, C. and Swaminathan, B. (2001), “Toward an implied cost of capital”, *Journal of Accounting Research*, Vol. 39 No. 1, pp. 135-176.
- (23) Greenpeace (2019) ‘The True Cost of Palm Oil and Pulp’, (September). Available at: <https://www.greenpeace.org/international/20191205-true-cost-of-palm-oil-and-pulp/>.
- (24) Heinkel, R., Kraus, A. and Zechner, J. (2001) ‘The Effect of Green Investment on Corporate Behavior’, *The Journal of Financial and Quantitative Analysis*, 36(4), p. 431. doi: 10.2307/2676219.
- (25) Inderst, G., Kaminker, C. and Stewart, F. (2012) ‘Defining and Measuring Green Investments INVESTORS’ ASSET ALLOCATIONS’, (24), p. 2012.
- (26) Joni, J., Ahmed, K., & Hamilton, J. (2020). Politically connected boards, family and business group

affiliations, and cost of capital: Evidence from Indonesia. *British Accounting Review*, 52(3), 100878. <https://doi.org/10.1016/j.bar.2019.100878>

(27) Kim, Y. B., An, H. T. and Kim, J. D. (2015) 'The effect of carbon risk on the cost of equity capital', *Journal of Cleaner Production*, 93, pp. 279–287. doi: 10.1016/j.jclepro.2015.01.006.

(28) Lee, M., Shin, H., 2010. Voluntary disclosure and cost of capital. *Korea Account. Inf. Assoc.* 28 (4), 1e23.

(29) Li, Y. *et al.* (2011) 'Revisiting the Relation Between Environmental Performance and Environmental Disclosure: An Empirical Analysis', *SSRN Electronic Journal*, pp. 1–41. doi: 10.2139/ssrn.873630.

(30) Li, Y., Eddie, I. and Liu, J. (2014) 'Carbon emissions and the cost of capital: Australian evidence', *Review of Accounting and Finance*, 13(4), pp. 400–420. doi: 10.1108/RAF-08-2012-0074.

(31) Maghribi, B. A. (2019) 'Sustainable Finance in Indonesia: How the Financial Services Industry Contributes to Environmental, Social and Governance Issues', pp. 9–13.

(32) Orens, R., Aerts, W., & Cormier, D. (2010). Web-Based Non-Financial Disclosure and Cost of Finance. *Journal of Business Finance and Accounting*, 37(9–10), 1057–1093. <https://doi.org/10.1111/j.1468-5957.2010.02212.x>

(33) Plumlee, M. *et al.* (2015) 'Voluntary environmental disclosure quality and firm value: Further evidence', *Journal of Accounting and Public Policy*, 34(4), pp. 336–361. doi: 10.1016/j.jaccpubpol.2015.04.004.

(34) Qiu, Y., Shaukat, A., & Tharyan, R. (2016). Environmental and social disclosures: Link with corporate financial performance. *British Accounting Review*, 48(1), 102–116. <https://doi.org/10.1016/j.bar.2014.10.007>

(35) Richardson, Florin P. Vasvari, Revisiting the relation between environmental performance and environmental disclosure: An empirical analysis, *Accounting, Organizations and Society*, Volume 33, Issues 4–5, 2008, Pages 303-327, ISSN 0361-3682,

(36) Schoenmaker, D. (2018) 'A Framework for Sustainable Finance', *SSRN Electronic Journal*, (January 2018). doi: 10.2139/ssrn.3125351.

(37) Setijawan, E. (2019). What are the determinants for the implementation of sustainable finance policy in Indonesia? *OJK Working Paper*, December.

(38) Sharfman, M. P. and Fernando, C. S. (2008) 'Environmental risk management and the cost of capital', *Strategic Management Journal*, 29(6), pp. 569–592. doi: 10.1002/smj.678.

(39) Soppe, A. (2004) 'Sustainable corporate finance', in *Journal of Business Ethics*. doi: 10.1023/B:BUSI.0000039410.18373.12.

(40) UNEP (2019) 'Programme Performance Report 2018', *UN Environment Programme*, pp. 1–78. Available at: https://wedocs.unep.org/bitstream/handle/20.500.11822/27734/PPR_2018_FINAL.pdf.