



DOI : [https://doi.org/10.14505/jemt.v10.3\(35\).10](https://doi.org/10.14505/jemt.v10.3(35).10)

## Environmental Disclosure on Cost of Capital: Environmental Risk as a Moderator Variable

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### Suggested Citation:

Haninun, H. *et al.* (2019). Environmental Disclosure on Cost of Capital: Environmental Risk as a Moderator Variable. *Journal of Environmental Management and Tourism*, (Volume X, Summer), 3(35): 554 - 561. DOI:10.14505/jemt.v10.3(35).10

### Article's History:

Received April 2019; Revised April 2019; Accepted May 2019.  
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### Abstract:

The goal of this research is to test the effect of environmental disclosure on cost of capital. Also, to examines the environmental risk on its relationship on cost of capital. This study is derived on the stakeholder theory, legitimacy theory, and signaling theory. To implement the stakeholder theory, the companies can inform their environmental issues by disclosing their environmental management (Meng *et al.* 2014). They also disclose their environmental issue to fulfill both national and international regulation on environment to implement the legitimacy theory. Disclosure of environmental issue also indicates investor reliance. The larger disclosure will increase the more investor reliance (El Ghouli *et al.* 2011). Disclosure also indicate the signal of management to the investor. The design of this study is an explanatory research with quantitative approach. The populations in this study are the companies that listed on Indonesia Stock Exchange. The sampling technique based on purposive sampling. The data used is secondary data; consist of annual report of the company and financial report. The authenticity of this research is the first accounting study in Indonesia that examines environmental risks. The result shows that environmental risk can moderate the relationship between environmental disclosure and cost of capital.

**Keywords:** environmental disclosure; environmental risk; cost of capital.

**JEL Classification:** Q56.

### Introduction

As the company attempts to attract more investors, the company voluntarily increases disclosure (Embong *et al.* 2012; Gunardi *et al.* 2016; Ghani *et al.* 2018). Some studies analyze the effect of corporate disclosure on cost of

capital (Botosan 1997; Richardson and Welker 2001; Hail 2002; Petrova *et al.* 2012; Core *et al.* 2015; Cuadrado-Ballesteros *et al.* 2016). Companies can report its environmental management activities through the environmental disclosure (Meng *et al.* 2014; Bachev 2018; Yusoff *et al.* 2018). Environmental disclosure shows the company's concern for the environment and can affect investor decisions (Ailwan *et al.* 2013; El Ghouli *et al.* 2011). The disclosure can be in the form of financial data or non-financial data, current corporate conditions, predictions of future corporate conditions including risks and other factors that can be used to understand a company's business. Disclosure of financial and nonfinancial information and other relevant information in the annual report of a company is an important aspect of financial accounting that can increase company value. Environmental disclosure is a part of the financial statements disclosure (Deegan 2002; Al-Tuwaijri *et al.* 2004; Tasios and Bekiaris 2014; Odoemelam and Okafor 2018). Disclosure index is very useful for the market (Coluccia *et al.* 2016).

Results of the research (Diamond and Verrecchia 1991; Botosan and Plumlee 2005; Petrova *et al.* 2012; Cuadrado-Ballesteros *et al.* 2016) shows an increase in voluntary disclosure will increase the liquidity of market prices so as to reduce the cost of capital; which stands for a negative relationship of voluntary disclosure to cost of capital. Mallouh and Tahtamouni (2018) states there is a negative relationship between disclosure and liquidity. While Clarkson *et al.* (1996); Handa and Linn (1993); Richardson and Welker (2001) suggest that an increase in the voluntary disclosure can reduce the risk estimation so the return assets will increase, which mean there is positive relationship of voluntary disclosure to the cost of capital. Botosan (1997) states that in companies that get a lot of attention from financial analysts, there are no significant relationship of voluntary disclosure to cost of equity capital. Sarumpaet (2005); Lindrianasari (2007) in their research concluded that environmental performance and environmental disclosure have a positive relationship to financial performance but this relationship does not have sufficient significance because the test results are not statistically significant.

Environmental risk is a consequence of an event that has a negative impact on the environment (Sharfman and Fernando 2008; Dobler *et al.* 2014). The company's activities according to the type of activity will pose a risk to the environment. Environmental risks can determine corporate sustainability which will increase investor confidence about the existence of the company, so that may increase the chances of investors in increasing their investments (El Ghouli *et al.* 2011). Corporate risk disclosure affects the cost of capital (Nahar *et al.* 2016). Therefore, the environmental risk could be expected to strengthen or weaken the relationship of environmental performance, and environmental disclosure with cost of capital.

The difference of this research with previous research is previous research examined the effect of voluntary disclosure on cost of capital, while in this research takes focus on the environmental disclosure and add the environmental risk variable as a moderator variable. So far, environmental risks in accounting field have not been studied. Environmental risk research has been widely used in the environmental health management research which is case study and qualitative research. For the same variable as previous research will use different measurement methods. Disclosure in previous studies used voluntary disclosure based on the Global Reporting Initiative (GRI) standard, in this research will use environmental disclosure (Clarkson *et al.* 2008). Cost of capital in previous research used measurement standard by WACC or CAPM, in this research will use Price Earning Growth (PEG).

This research concludes that there is negative effect of environmental disclosure on cost of capital and environmental risk can moderate the effect of both variables. This research is expected to contribute as addition to empirical evidence of research on environmental accounting so it can spur better research in the future. For the company is expected to provide knowledge about the importance of maintaining the environment that can be taken into consideration for policy-making companies related to environmental sustainability.

## 1. Literature Review and Hypothesis Development

This research is based on the stakeholder theory, signal theory and legitimacy theory. Stakeholder theory is a theory that describes to whichever company is responsible (Freeman 1984). Companies should be able to maintain relationships with stakeholders, by accommodating the desire and needs of stakeholders, especially stakeholders who have power over the availability of resources which used for the companies operational activities, such as labor, market for company products and others (Ghozali and Chariri 2007). Signal theory explains the companies' motivation to provide information to reduce information asymmetry between companies and the investor. This can happen because of the companies know more about the companies and the upcoming prospect compared with outsiders (Scott 2012). The theory of legitimacy is derived from the coherence of organizational legitimacy. Legitimacy is a common perception or assumption that the action of an entity is

expected, appropriate, or in accordance with the norm, social value that have been built. The legitimacy theory explains organization's behavior in implementing and developing voluntary disclosure of social and environmental to fulfill corporate social contracts (Guthrie *et al.* 2007).

The current economic conditions, makes investors to think carefully before making an investment, therefore information from the company's management which can help them to predict the risk level is needed (Ali *et al.* 2018). One of delivering medium of company's financial information to company's outside parties is through the financial statements. The information disclosed in the financial statements is about CSR activities, in accordance with the signal theory. Signal theory explains the company's motivation to provide financial information to internal and external parties. Cost of capital is the rate of return that required by shareholders of the company's common stock (Brigham and Houston 2016), thus means cost of capital is the cost which has to be incurred to finance fund source. Cost of capital can also be affected by voluntary disclosure, such as CSR disclosure. Francis *et al.* (2008) argues that there is a negative relationship between the level of disclosure and cost of equity capital means that disclosure can increase the liquidity of the stock market thereby lowering the cost of equity capital, either through reduced transaction costs or through increased demand for stock securities. Research result by Diamond and Verrecchia (1991); Botosan (1997); Botosan and Plumlee (2005); Dhaliwal *et al.* (2011); El Ghouli *et al.* (2011); Petrova *et al.* (2012); Cuadrado-Ballesteros *et al.* (2016) found a negative relationship between disclosure and cost of capital. Based on the description then put forward the hypothesis:

*H1: Environmental disclosure negatively affects the cost of capital.*

Disclosure of corporate social responsibility is based on the idea that the company not only have economic and legal obligations to shareholders, but also obligations to other concerned parties, especially people around the company environment, this is in accordance with the theory of legitimacy. Higher environmental risks cause public concerns to be higher for corporate sustainability, therefore companies should pay more attention to the public to gain legitimacy from the public. Public recognition of the existence of company can maximize stock value. Additionally, based on signal theory through managers disclosure can give a signal about the condition of the company to the investor. The wider disclosure made by the company as a signal given to investors will lower the transaction costs and risks set by the investor against the company that will finally lower the company's cost of equity capital (Cuadrado-Ballesteros *et al.* 2016).

The concept of cost of equity (COE) is the cost paid to attract investors to invest funds in the company's stock and keep the investor. COE deals with the risk of investing in the company's stock. If the company risk is low then it will make the investor interested in investing in the company. So, COE is important for investors in considering investment decisions against the company. Various empirical studies ever conducted on the disclosure of information on cost of capital, such as El Ghouli *et al.* (2011) suggested that theoretical research that supports the negative relationship between the level of disclosure and cost of capital means that disclosure can increase the liquidity of the stock market thus reducing the cost of equity capital. Diamond and Verrecchia (1991) showed that by disclosing private information, the investor's demand for compensation is reduced because transaction costs decreased so that the adverse selection component of the bid-ask spread is reduced and in the end the cost of capital also decreased. Semenova and Hassel (2008) showed that environmental risks differ significantly across industries. Botosan (1997) found that there was no significant relationship in companies' disclosure that gets a lot of analysts' attention with the cost of capital. Based on the description above, the hypothesis is proposed:

*H2: Environmental risks can moderate relationship between environmental disclosure and the cost of capital.*

## 2. Methods

The type of this research is an explanatory research that is a study that explains the relationship of causality between variables, aims to test a theory or hypothesis to reinforce or even reject the theory or hypothesis of the results of existing research (Sekaran 2003). The approach used in this research is quantitative approach. Quantitative approaches are used to test theory, construct facts, show relationships between variables, and descriptive statistics (Neuman 2006). Deductive approach is used by placing several theories as the basis of research that supports the relationship between variables. The population of this research is the companies that listed on the Indonesia Stock Exchange (IDX). The sample was taken by using purposive sampling method. The criteria of companies that will be used as sample is 84 companies that listed on the Indonesia Stock Exchange in 2016 which follow the environmental management assessment program (PROPER).

Research variables consist of dependent variable, independent variable, moderator variable and control variable. The dependent variable is Cost of Capital (COC). COC is the real cost that companies must incur to

obtain funds, such as debt, preferred stock, ordinary stock, or retained earnings to finance a company's investment (Keown *et al.* 2005). In this study, COC is proxied by Price Earnings Growth Ratio (PEG). PEG is used because it is considered more representative to test the relationship between the level of disclosure and cost of equity capital (Easton 2004). PEG has been widely used by previous researchers (Botosan and Plumlee 2005; Francis *et al.* 2008; Mangena *et al.* 2010; El Ghouli *et al.* 2011; Cuadrado-Ballesteros *et al.* 2016). PEG model is a fit model to be used in calculating cost of capital based on several studies (Botosan and Plumlee 2005; Easton and Monahan 2005; Mangena *et al.* 2010).

The formula used to calculate Price Earnings Growth (PEG):

$$rPEG = \sqrt{\frac{EPS_2 - EPS_1}{P_0}}$$

Description:

$rPEG$	=	Price Earnings Growth Ratio (cost of capital proxy).
$EPS_2$	=	Earnings per Share in one year after annual report publication.
$EPS_1$	=	Earnings per Share in year of annual report publication.
$P_0$	=	Stock price in one year before annual report publication.

The independent variable is the variable that can affects other variables (Sekaran 2003). In this study the independent variable is the environmental disclosure. Environmental disclosure is in the part of sustainability report, CSR report, or financial statement in the company's annual report. Many companies use the Global Reporting Initiative version (GRI) for environmental disclosure format, or a separate standard issued by the relevant authorities in their respective countries. In this research we will use the disclosure index that will be calculated from the number of disclosure items made by the company divided by the number of disclosure items (Clarkson *et al.* 2008), with the reason of the disclosure item is a development of GRI which expressed in more detail and complete. The disclosure index will be calculated from the number of disclosure items made by the company divided by the number of required disclosure items. The following formula used to calculate the disclosure index:

$$EDI_j = \frac{\sum X_{ij}}{n_j} \times 100\%$$

Description:

$EDI_j$	=	Environmental disclosure index of j company
$\sum X_{ij}$	=	Total disclosure item of j company
$n_j$	=	Total required disclosure item of j company

The moderator variable in this study is environmental risk. Environmental risk measured by using the recommended categories by the Financial Services Authority (FSA), which refers to the International Finance Corporation (IFC), and synchronized with the assessment of the environmental performance management in Indonesia known as PROPER (Ministry of Environment regulations KLH no.3/2014). PROPER has a value with a color rating, ranging from the best to the worst, which consists of: gold, green, blue, red and black. Five groups of these warrants then grouped into three by the FSA, gold and green are for more obedient companies in implementing environmental management, blue for the obey companies, black and red are for the companies that has not been obeyed.

Table 1. Environmental Risk (ER) measurement

OJK Criteria	PROPER Criteria	Assessment Criteria	Score
A, high risk	Red dan Black	Not Obedient < 3	3
B, medium risk	Blue	Obey = 3	2
C, minimum risk	Gold dan Green	More Obedient > 3	1

Source: FSA, 2016: KLH, 2016: Green Level 3, 2011.

Data analysis uses descriptive statistics analysis, and to find know the influence of independent variable to dependent variable with quantitative analysis method by using equation model.

$$COC_{it} = \alpha + \beta_1 EDI + \beta_2 ERISK + \beta_3 EDI * ERISK + \beta_4 TA + \varepsilon$$

### 3. Results and Discussion

Descriptive statistics analysis is used to provide an overview or description of the variables consisted of: Environmental Disclosure (ED), Cost of Capital (COC), Environmental Risk (ER), Total Assets (TA). This study uses a sample of 84 manufacturing companies which listed on the Stock Exchange, following the PROPER program in 2016. From the sample, descriptive statistical analysis is conducted as follows.

Table 2. Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
EDI	84	.022	.630	46534	.235433433
ERISK	84	1.000	3.000	2.19048	.630093009
COC	84	.032	1.845	.49075	.360137137
TA	84	5.811	30.248	15.14853	5.538972.972

Table 2 explains that the variable cost of capital as the dependent variable has a minimum value of 0.032 and a maximum value of 1.845, the mean value of 0.49075 and the standard deviation of 0.360 viewed from the value of COC based on the measurement of price earnings growth, most of the sample companies have a value below the average this indicates uneven stock price growth. Environmental disclosure as an independent variable has a minimum value of 0.022 and a maximum value of 0.630, a mean value of 0.465 and a standard deviation of 0.2354, most firms that have above average value are companies with high environmental damage potential such as mining companies this can be caused on the demands of stakeholders for the company to engage in activities related to environmental management and to maintain environmental sustainability. Environmental risk has a minimum value of 1 and a maximum value of 3, a mean value of 2.1904 and a standard deviation of 0.6301, most firms having below average values indicating that most sample firms have been managing the environment to reduce environmental risks. However, there are still many companies doing the management as required in the so-called regulatory obey.

To determine the effect of independent variables on dependent variable then statistically test is conducted, afterwards the test results as follows:

Table 3. Summary of Test Result (t-test)

Predictor	Dependent	T	Sig.	Conclusion
Environmental Disclosure	COC	-1.732	0.08	Negative significant**
Environmental Disclosure*Environmental Risk	COC	-1.926	0.05	Negative significant*

\* Significance level of 5%

\*\* Significance level of 10%

Based on t test results obtained information that the variables disclosure of the environment negatively affect the cost of capital, which is indicated by the value of t -1.732 with significant 0.08. Test results  $0.08 > 0.05$  but  $0.05 < 0.10$  which means not significant at 5% level but significant at 10% level, thus H1 accepted. These results provide the meaning of increasing the disclosure of the environment can reduce the cost of capital. This means that the demand for environmental sustainability is very important to gain investor confidence and the sustainability of the company. The results of this study is in accordance with the theory of stakeholders and signal theory, the company disclose information to fulfill the needs of information by stakeholders, especially those from outside the company as well as a signal for the company to get the attention of investors. The results of this study support the research by Diamond and Verrecchia (1991); Botosan (1997); Botosan and Plumlee (2005); Dhaliwal *et al.* (2011); El Ghouli *et al.* (2011); Petrova *et al.* (2012); Cuadrado-Ballesteros *et al.* (2016).

The environmental risk in this study a role as a moderator variable. Based on the result of environmental risk test as a moderating variable, the influence of environmental disclosure on COC obtained t value of -1.926 and significance level at 0.03. The results of this test indicate that the moderator variable can strengthen the relationship between independent variables and dependent variable. Environmental risk is one factor that can determine the environmental sustainability that may affect corporate sustainability. The results of this study support the research by Sharfman and Fernando (2008); Dobler *et al.* (2014), which said environmental risks are a consequence of an event that negatively impacts the environment, therefore it is very important for companies that have the potential to damage the environment to conduct environmental management so it can minimize environmental risks.

## Conclusion

Environmental disclosure as measured by disclosure index has negative effect on cost of capital. The results of this research is in accordance with the theory of stakeholders, signaling theory, environmental disclosure in the annual report as a tool to convey strategic information to the investors in decision making of invest. The results of this study is in accordance with the results of previous studies by Diamond and Verrecchia (1991); Botosan (1997); Botosan and Plumlee (2005); Dhaliwal *et al.* (2011); El Ghouli *et al.* (2011); Petrova *et al.* (2012); Cuadrado-Ballesteros *et al.* (2016), in the research proves the negative effect of environmental disclosure on cost of capital.

Environmental risk is proven to moderate the relationship between the environmental disclosure and the cost of capital, which makes the relationship between the two become stronger by looking at the sig. test results before there is moderation variable and after the addition of moderation variable.

COC measurements are represented only by cost of equity capital, rather than using total COC thoroughly. Measurement of environmental risks using quantitative methods alone, does not make qualitative measurements, for reasons of difficult to apply because of the sample is more than one company.

From the limitations, future research should use different theories, measurements of different COC variables, integrate environmental risk measurements with quantitative and qualitative methods to obtain better test results, and it is advisable to examine other variables outside of this research variable that may affect cost of capital.

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