

# The Effect of Environmental Costs, and Environmental Disclosure on Firm Value Moderated by Corporate Governance. Case Study on Mining Companies

Giovany Kurnia Widyawan  
Department of Accounting  
Polytechnic of State Finance STAN  
Bintaro Main Street 5<sup>th</sup> Sector, Bintaro Jaya  
South Tangerang, Banten, Indonesia, 15222  
Email: 1401170002\_giovany@pknstan.ac.id

Sopian  
Department of Accounting  
Polytechnic of State Finance STAN  
Bintaro Main Street 5<sup>th</sup> Sector, Bintaro Jaya  
South Tangerang, Banten, Indonesia, 15222  
Email: sopian@pknstan.ac.id

## Abstract

**Purpose** – This study aims to find out the effect of the environmental costs and environmental disclosure toward firm value and the role of corporate governance in moderating these effects. The author wishes to learn more about how Indonesian companies deal with environmental challenges.

**Methodology** – The analysis was conducted on 29 mining industry companies listed on the IDX and selected using the purposive sampling method with a research period of 2017-2020. This study uses quantitative methods with three models of panel data regression analysis.

**Findings** – Economic development makes humans exploit natural resources to meet their needs, having an impact on environmental quality degradation. One of the environmental pollutions comes from hazardous and toxic waste produced by the mining industry. Environmental management needs to be measured to minimize the impact of environmental damage to create sustainability. Environmental costs is carried out by companies to manage the environment. In addition, the environmental disclosure is also needed to find out how the company manages the environment. The results show that the environmental costs have a positive effect toward firm value, the environmental disclosure has no effect toward firm value, corporate governance proxied by the proportion of independent commissioners does not moderate the effect of environmental costs and environmental disclosure toward firm value, corporate governance proxied by the number of audit committees weakens the effect of environmental costs toward firm value, but does not moderate the effect of the environmental disclosure toward firm value.

**Research limitations** – There are several limitations to this study that cannot be ignored. Due to a lack of company data, the number of companies in the population cannot be used as study samples. The method of content analysis used to score the variable index of the company's environmental information disclosure is tied to the issue of researcher subjectivity. The scope of the research is limited due to time restrictions. In corporate governance, only a few proxies are implemented.

**Practical implications** – From the results of this study, ecoefficiency through environmental costs should be continued by the company, and the obligation to disclose environmental information should be regulated clearly.

**Keywords:** environmental costs, environmental disclosure, corporate governance, firm value

## I. Introduction

The world economy continues to grow. Although there are fluctuations in the growth rate from year to year, in the long term economic growth cannot be avoided. Based on the Organization for Economic Co-operation and Development (OECD) report in the *Tinjauan OECD Terhadap Kebijakan Pertumbuhan Hijau Indonesia 2019*, Indonesia's economic performance is the largest in Southeast Asia and ranks 16th globally. Several world crises can cause a contraction in economic growth, but when the crisis is over, the world economy will grow again. In 2020,

the Covid-19 pandemic crisis caused the world economy to collapse. world economic growth in 2020 contracted by 3.3% after experiencing an expansion of 2.8% in 2019. Projections in 2021, economic growth will experience an expansion of 6% (IMF, 2021).

Rapid economic development forces humans to exploit natural resources as much as possible to fulfill their needs. The impact of the exploration and exploitation of these natural resources results in a decrease in the quality of the environment. The OECD (2019) stated that in 2016, Indonesia was

among the top ten emitters in the world. Greenhouse Gas (GHG) emissions are dominated by forestry emissions from forest and land conversion to agricultural land and logging. In addition to forestry emissions, the energy sector is the largest sector that contributes to GHG emissions. In total, energy accounts for 37% of GHG emissions, or 65% of emissions if forestry emissions are not included. From 2000 to 2016, the amount of emissions generated by the energy sector increased by almost 70%. In air pollution, large forest and peat fires cause pollution peaks in Indonesia as well as Malaysia and Singapore. Nearly 90% of the haze is caused by peat fires and releases three times more particulates than fires on other soil types. Turning to plastic pollution, there is a study that states that Indonesia is one of the largest producers of marine plastic pollution in the world (Jambeck et al., 2015 in OECD, 2019). Approximately 80% of plastic waste is disposed of without further processing from the mainland.

The Indonesian government seeks to realize green economic growth through Government of Indonesia Green Growth Program (BAPPENAS & GGGI, 2015). This program is in collaboration with the Global Green Growth Institute (GGGI), which is an international intergovernmental organization that has concluded an agreement to support and promote strong, inclusive and sustainable economic growth in developing countries. The main reason behind the development of the concept of green economy and green growth is the movement towards a more integrated and comprehensive approach to incorporating environmental and social factors into economic processes that ultimately achieve sustainable development. Green growth will contribute and create opportunities to improve social welfare through a green economy, and ultimately achieve sustainable development so that the three terms green growth, green economy, and sustainable development cannot be separated. (Kasztelan, 2017).

Environmental pollution originating from hazardous and toxic waste (B3), one of which comes from the mining industry. Disposal of B3 waste has an impact on air and water pollution as well as soil contamination. The OECD (2019) stated that in 2016 of the 73 million tons of B3 waste recorded, most of it came from mining with a share of 89%. On the other hand, industry contributes 41% to GDP, the second largest sector after the services sector (OECD, 2019). The largest added value is obtained from the manufacturing, construction, mining and quarrying industries. Globally, Indonesia is one of the largest energy suppliers in the world because it has abundant resources. In 2016 Indonesia became the fifth largest coal producer as well as the second largest exporter in the world. Because the economic dependence on mining is quite large, good management is needed so that environmental pollution does not occur so that sustainability is formed.

There are costs for managing waste and preventing environmental pollution incurred by the company. These costs are then referred to as environmental costs. Hansen and Mowen (2007) mentioned that environmental costs are costs incurred due to poor or potentially poor environmental quality. Based on this definition, environmental costs are divided into 4 categories, namely prevention costs, detection costs, internal failure costs, and external failure costs. The category can be divided into environmental prevention activities, and environmental failure activities. Recording of these environmental costs can be used as a means of controlling the environmental performance of the company.

Disclosure of environmental information is valuable information for stakeholders because it indicates that the company has allocated costs to maintain environmental sustainability which will have an impact on business sustainability. Information on environmental management must be submitted by a public company through OJK Regulation Number 29/POJK.04/2016 concerning the Annual Report of Issuers or Public Companies. The regulation states that one of the information that must be included in the Annual Report is the social and environmental responsibility of the Issuer or Public Company.

Good corporate business governance or corporate governance (CG) is needed so that companies can maintain business sustainability and carry out good environmental management. The failure of large companies in the United States in the 2001-2002 period led to the implementation of the Sarbanes-Oxley Act of 2002 (SOX) and various regulatory changes in stock transactions. This aims to ensure that the information received by investors does not differ from those within the company, as well as to reduce the possibility of errors and fraud in the company (Chhaochharia & Grinstein, 2007). The goal of CG is to establish a transparent, trusted, and accountable environment needed to maintain long-term investment, financial stability, and business integrity.

The company's long-term goal is to optimize the firm value. If the firm value is higher, it indicates that the owner is more prosperous (Wahyudi & Pawestri, 2006). Investors' assessment of the company's success rate is influenced by the firm value because it reflects the company's performance (Suharli, 2006 in Indrayani et al., 2021). Every company will always show potential investors that their company is the right investment alternative. Therefore, managers will try to continue to increase the firm value. Effective CG is considered to be able to limit the personal interests of managers and protect the interests of investors or shareholders. CG can manage all interests of stakeholders and can resolve conflicts of interest between shareholders and non-investor stakeholders (Jo & Harjoto, 2011).

Current study's writing was inextricably linked to the author's past research's observations and analysis, which were still relevant to this study. Buana and Nila (2017) looked at the first segment of the Japan Exchange Group's chemical companies. The goal of the study is to determine the impact of environmental costs on the firm's profitability and value. This research yielded a number of conclusions. First, the environmental costs are substantially lower than the return on investment. Second, environmental costs are negligible in comparison to ROE. Third, the environmental costs are overwhelmingly in favor of NPM. Fourth, environmental costs are negligible in comparison to PER. Fifth, the environmental costs are significantly negative towards Tobin's Q. Haporo and Adyaksana (2020) conducted research to see if environmental disclosure moderated the impact of environmental performance and costs on a company's value. Environmental performance has no effect on firm values, but environmental costs have a negative and significant effect on firm values, and environmental disclosure moderates the effect of environmental performance and environmental costs on firm value. Pedron et al. (2021) conducted research on companies listed on the Brazilian Stock Exchange in order to determine the impact of environmental disclosure on profitability and firm value. The findings show that while environmental information disclosure has no significant impact on profitability, it does have a significant positive impact on firm value. Retno dan Priantinah (2012) conducted research to evaluate how corporate governance (CG) and CSR disclosure affect firm value. The companies listed on the Indonesia Stock Exchange from 2007 to 2010 are the subject of this study. The study's findings show that CG has a positive impact on firm value, while CSR disclosure has no significant impact. From 2012 to 2014, Yanti (2015) studied public companies in Indonesia and concluded that corporate governance has no substantial impact on firm value. Falikhatun et al. (2020) conducted study with the goal of obtaining empirical proof of corporate governance's impact on business value. The findings show that CG, as measured by independent commissioners and the board of directors, has a positive impact on company value, whereas independent commissioners have no impact.

The authors have not discovered any research that combines environmental variables with corporate governance variables in one study, based on existing research. The author provides a framework for thinking about the interaction between CG and environmental information based on Naude's (2009) research, which reveals that there is an interrelationship between CSR and CG. As a result, the focus of this study is on environmental management and the impact of good CG implementation on company value.

## **II. Theoretical Analysis and Research Hypothesis**

Stakeholder theory requires companies to take into account the many parties who receive the impact of the company (Lin, 2018). These parties consist of internal and external stakeholders. Investors and creditors demand the company to ensure business continuity. The government requires companies to comply with regulations, one of which is regulations related to the company's environmental management. Employees demand the company to ensure the safety of their work in an environment that is not polluted by hazardous materials.

Based on the theory of legitimacy, companies must also get legitimacy from the surrounding environment to carry out their business activities (Delgado & Castelo, 2013). To fulfill this social contract, the company will carry out several activities that are useful for the environment around the company. Activities can be in the form of social, economic, or environmental activities.

Agency theory suggests that agents can act against the will of the principal (Godfrey et al., 2010). Therefore, the principle is necessary to unify every business activity carried out by the agent to be under the wishes of the principal. One of the monitoring instruments can be in the form of a company report as an evaluation tool by the principal.

Based on signaling theory, managers will signal potential investors and creditors that managers make good business decisions (Connelly et al., 2011). This will certainly attract investors and creditors to invest and provide loans to companies. Companies can continue to grow their business from the new funds they get.

Environmental costs incurred by the company indicate that the company is trying to manage its environment. This environmental management will have an impact on the company's business. Ecoefficiency essentially maintains that organizations can produce more useful goods and services while simultaneously reducing negative environmental impacts, resource consumption, and costs (Hansen & Mowen, 2007). Environmental management is also a form of fulfilling stakeholder demands for business sustainability as well as a means for companies to gain legitimacy as the fulfillment of social contracts with the surrounding environment.

Disclosure of information is important for companies to have a dialogue with stakeholders about the condition of the company (Lindawati & Puspita, 2015). This management will certainly have a good impact on the business. This disclosure is a form of signal to potential investors and creditors that the company is managing the environment properly and its business is more secure. In addition, it can be used as evaluation material by the principal, informing stakeholders which their interests have been accommodated, as well as informing the environment

around the company that the company has fulfilled the social contract.

**Hypothesis 1:** Environmental costs have a positive effect on firm value

**Hypothesis 2:** Environmental disclosure in the previous period has a positive and significant effect on the firm value for the current period

Agency theory suggests that there is a possibility that the agent may act against the wishes of the principal (Godfrey et al., 2010). Therefore, it is necessary to establish a good corporate governance system to ensure that there is no conflict of interest between managers, owners, and other stakeholders. The goal of CG is to establish a transparent, trusted, and accountable environment needed to maintain long-term, financial, and business integrity.

Corporate governance in this study is proxied by the proportion of independent commissioners and the number of audit committees. Independent commissioners play an important role so that all shareholders do not lack and have the resources and information to carry out potential abuse of authority. The number of independent commissioners must ensure that the control mechanism runs effectively and under the laws and regulations. An independent commissioner can strengthen assurance for investors that the considerations and decisions of the Board of Commissioners will be free from bias. Of course, it is included in the supervision of environmental management by the company whether it has been running properly or not. In addition to independent commissioners, the Audit Committee has a critical role in assisting independent commissioners to supervise adequate and effective risk management, control, reporting, and governance (IFC & OJK, 2018). This audit committee is tasked with ensuring that the company's business activities comply with applicable regulations, from operations to financial reporting.

**Hypothesis 3:** The proportion of independent commissioners moderates the effect of environmental costs on firm value

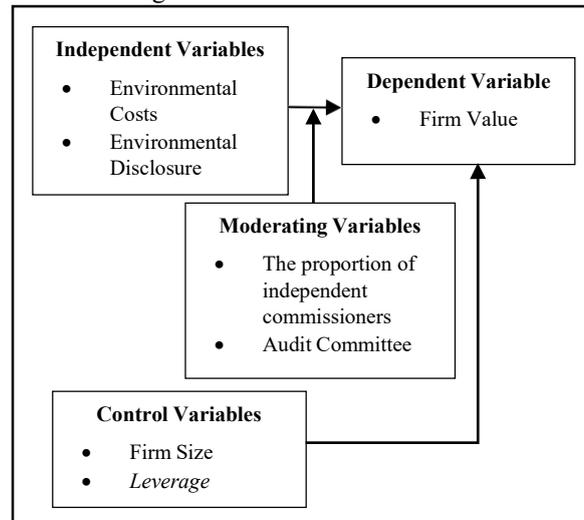
**Hypothesis 4:** The proportion of independent commissioners moderates the effect of the previous period's environmental disclosure on the firm value of the current period

**Hypothesis 5:** The Audit Committee moderates the effect of environmental costs on firm value

**Hypothesis 6:** The Audit Committee moderates the effect of the previous period's environmental disclosure on the firm value for the current period.

The framework of this research is as follows.

Figure I. Research Framework



### III. Research Design

#### A. Sample selection and data sources

The types of data used in this study are secondary data on company environmental costs, company environmental information, the proportion of independent commissioners of the company, the number of audit committees, firm value, firm leverage, and firm size for the 2017-2020 period. The data sources are taken from financial reports, annual reports, and company sustainability reports for the period 2017-2020. The data were obtained from the sample firm sites, the Indonesia Stock Exchange website, and other data sources related to the research.

The population in this study are all companies in the mining industry listed on the Indonesia Stock Exchange as of December 31, 2020. We use the purposive sampling method in selecting the sample. The purposive sampling criteria in this study are companies that have been listed on the Indonesia Stock Exchange in the 2017-2020 period and are under the criteria for the mining product sub-industry. The selected sub-industries from the energy sector are Oil & Gas Production & Refinery, Coal Production, and Oil & Gas Drilling Service, while from the basic materials sector, namely Aluminum, Copper, Gold, Iron & Steel, and Diversified Metals & Minerals. The 2017-2020 period was chosen as the research period with consideration of the up-to-date information and the OJK Regulation Number 51/POJK.03/2017 which requires listed companies to issue sustainability reports containing environmental reports.

The sampling criteria are companies listed on the stock exchange at least since 2016, disclosing the environmental costs incurred by the company, and having published a complete annual report from 2016 to 2020. Environmental disclosure that takes into account latency factors requires the annual report of

the previous period to be variable. If there are companies that do not meet one of the sample criteria, they are not used as sample data. The results of

sample selection based on the aforementioned criteria can be seen in Table I.

Table I. Sample Selection Results

No	Research Sample Criteria	Quantities
1	Companies with selected sub-industry as of 31 December 2020	54
2	Companies that do not meet the minimum listed period	(8)
3	Companies that do not disclose environmental costs	(12)
4	Companies that have the potential to be delisted because they have operational problems	(3)
5	Companies that have not published an annual report for the 2020 period	(1)
6	Companies that use different reporting fiscal periods	(1)
7	Quantity of research sample companies	29
8	Number of samples for the period 2017-2020	116

## B. Operational definition of variables

### 1) Independent variables

The first independent variable used in this study is the environmental cost variable. Environmental costs (EC) are costs that are incurred because poor environmental quality exists or because poor environmental quality may exist. (Hansen & Mowen, 2007). Environmental costs must be included in the company's sustainability report under OJK Regulation Number 51/POJK.03/2017. The environmental costs variable is measured using the ratio between total environmental costs and total net profit after tax (Dewata et al., 2018; Egbunike & Okoro, 2018; Fitriani, 2013; Hapsoro & Adyaksana, 2020). If the environmental costs are not listed, then the CSR costs for the environmental development program are used (Dewata et al., 2018; Egbunike & Okoro, 2018; Fitriani, 2013). The formula for the environmental cost variable is as follows.

$$EC = \frac{\Sigma \text{Environmental Costs}}{\text{Net Income After Tax}}$$

The second independent variable used in this study is the environmental disclosure (ED) variable. This variable uses the previous year with the

consideration that the disclosure of information from the previous year will affect the firm value in the current year according to research by Pedron et al., (2021) and Anggraeni, (2015). Information disclosure is measured using a checklist of indicators based on the Global Reporting Index (GRI) Standards 2016, with 32 disclosure indicators divided into 8 different categories, namely materials, energy, water and effluents, diversity, emissions, waste, environmental compliance, and supplier environmental assessment. GRI Standards 2016 was the most recent standard at the time this research was conducted. There is an indicator adjustment used in the GRI Standards 2016 from the G4 GRI Standards 2013. However, this adjustment has been accommodated by GRI so that companies that are still using the G4 GRI Standards 2013 can be assessed with the new standard. Indicators of environmental information disclosure can be seen in Table II. The measurement of environmental information disclosure is carried out based on the ratio of the level of disclosure (Hapsoro & Adyaksana, 2020; Pedron et al., 2021) with the following formula.

$$ED = \frac{\text{Number of Disclosed Indicators}}{\text{Total Indicator}}$$

Table II. Indicators in Environmental Disclosure

No.	Category	Number of Indicators	No.	Category	Number of Indicators
1.	Materials	3	5.	Emissions	7
2.	Energy	5	6.	Waste	5
3.	Water and Effluents	5	7.	Environmental Compliance	1
4.	Biodiversity	4	8.	Supplier Environmental Assessment	2

### 2) Dependent variable

The dependent variable that is the focus of the research is firm value. Firm value is measured using

Tobin's Q (TBQ) ratio. Tobin's Q ratio is used because it can provide an overview of the fundamental aspects of the company and the market

view of the company. The Tobin's Q ratio can reflect the current value of cash flows that will be obtained by the company in the future, which is based on information both at present and information in the future. (Ganguli dan Agrawal, 2009; Wahla, Shah dan Hussain, 2012 in Singh et al., 2018). The formula for calculating Tobin's Q ratio (Ethika et al., 2019; Nguyen & Tran, 2019; Pedron et al., 2021; Sawitri, 2017) is as follows.

$$TBQ = \frac{MVE + Debt}{TA}$$

### 3) Moderating variables

The moderating variable in this study is corporate governance. Managers' interests can be limited by implementing effective CG to protect the interests of investors or shareholders. CG can resolve conflicts of interest between shareholders and non-investor stakeholders and can manage all stakeholder interests (Jo & Harjoto, 2011). Because the implementation of CG can ensure good corporate governance, the quality of the company's business activities can be guaranteed in its implementation compared to companies that do not implement CG.

In this study, the moderating variable, corporate governance, uses two proxies based on research by Falikhhatun et al., (2020), that is the proportion of independent commissioners and the number of audit committees. Independent commissioners add to

investors' assurances that the considerations and decisions of the board of commissioners will be free from bias, including in the supervision of environmental management by the company whether it has been carried out properly or not. The proportion of independent commissioners is measured by the ratio of the total independent commissioners to the total of the entire company's board of commissioners. The audit committee has a critical role in assisting independent commissioners to exercise adequate and effective oversight of risk management, control, reporting, and governance (IFC & OJK, 2018). The audit committee is measured by the total number of members of the company's audit committee.

### 4) Control variables

There are two control variables used in this study, those are firm size and market leverage. The firm value can depend on the firm size so that it can bias the results (Najid & Rahman, 2011). Therefore, this study uses firm size as one of the control variables. Firm size is measured by the logarithm of the Market Value of Equity (MVE). (Dang et al., 2018). Considering that debt can solve some of the agency costs, leverage is determined as a control variable so as not to generate bias (Najid & Rahman, 2011). *Leverage is measured by dividing total liabilities by total equity, known as market leverage* (Dang et al., 2018).

Table III. Operational Definition of Variables

Variables	Type	Code	Operational Definitions
Environmental Costs	Independent Variable	EC	$EC = \frac{\Sigma Environmental Costs}{Net Income After Tax}$
Environmental Disclosure	Independent Variable	ED	$ED = \frac{Number of Disclosed Indicators}{Total Indicator}$
Firm Value	Dependent Variable	TBQ	$TBQ = \frac{MVE + Debt}{TA}$
Proportion of Independent Commissioners	Moderating Variable	KI	$KI = \frac{\Sigma Independent Commissioners}{\Sigma Board of Commissioner}$
Number of Audit Committees	Moderating Variable	KA	$KA = \Sigma Audit Committees$
Firm Size	Control Variable	SIZE	$SIZE = \log(MVE)$
Market Leverage	Control Variable	LEV	$LEV = \frac{Total Liabilities}{Total Equity}$

### C. Model design

In order to verify the correctness of the hypotheses, the following models are built for the regression analysis.

$$1) TBQ_{i,t} = \alpha + \beta_1 EC_{i,t} + \beta_2 ED_{i,t-1} + \beta_3 SIZE_{i,t} + \beta_4 LEV_{i,t} + e$$

$$2) TBQ_{i,t} = \alpha + \beta_1 EC_{i,t} + \beta_2 ED_{i,t-1} + \beta_3 KI_{i,t} + \beta_4 (EC_{i,t} \cdot KI_{i,t}) + \beta_5 (ED_{i,t-1} \cdot KI_{i,t}) + \beta_6 SIZE_{i,t} + \beta_7 LEV_{i,t} + e$$

$$3) TBQ_{i,t} = \alpha + \beta_1 EC_{i,t} + \beta_2 ED_{i,t-1} + \beta_3 KA_{i,t} + \beta_4 (EC_{i,t} \cdot KA_{i,t}) + \beta_5 (ED_{i,t-1} \cdot KA_{i,t}) + \beta_6 SIZE_{i,t} + \beta_7 LEV_{i,t} + e$$

A regression model was chosen before to performing regression analysis. Pooled Least Square, Fixed Effect Model, and Random Effect Model are the panel data regression models of choice. The Chow Test, the Lagrange Breusch-Pagan Multiplier Test, and the Hausman Test were used to conduct the test. Furthermore, the classic assumption test is utilized to check that the regression model used for this study is feasible, valid, and consistent, and that it can be used to reach a conclusion. Normality, multicollinearity, heteroscedasticity, and autocorrelation are the four tests that must be performed.

The model is subjected to goodness of fit testing in order to get reliable research conclusions. The F-test is used to determine the level of significance and influence of all independent variables on the dependent variable simultaneously with a significance level of 0.05 in the goodness of fit test. Before proceeding on to the T-test, the model must pass the F-test. With a significance level of 0.1, a T-

test was used to determine the level of significance and influence of each independent variable on the dependent variable, and an analysis of the coefficient of determination R-Squared (R<sup>2</sup>) was used to determine the independent variable's ability to explain the variation of the dependent variable. The higher the R<sup>2</sup> number, the better the independent variable predicts the dependent variable.

Some software is used to support data processing and writing this research. The software used to process the data are Microsoft Excel and STATA 16. The software used for writing is Microsoft Word.

#### IV. Empirical Analysis

##### A. Descriptive statistics analysis

Descriptive statistical analysis was performed using STATA 16. The analysis was carried out on all research variables. The statistical results are shown in Table IV.

Table IV. Descriptive Statistics of Variable

Variable	N	Minimum	Maximum	Mean	Std. Deviation
EC	116	-1.067383	9.205512	0.134774	0.8744695
ED	116	0	0.6875	0.2198276	0.1485854
TBQ	116	0.5653767	4.451508	1.309384	0.6895621
KI	116	0.2	0.6666667	0.3961959	0.0876633
KA	116	0	5	3.155172	0.5985991
SIZE	116	10.91041	13.82119	12.63502	0.7189873
LEV	116	-12.24266	23.0944	1.929307	4.35364

The value of the environmental cost sample in this study is in the range of the minimum number of -1.067383 to the maximum number of 9.205512 with an average value of 0.134774 and a standard deviation of 0.8744695. The company with a minimum environmental cost value of -1.067383 is PT Vale Indonesia Tbk in the 2017 period. A negative value of environmental costs indicates that the company has suffered losses in that period. On the other hand, the company with the maximum environmental cost value of 9.205512 is PT Bumi Resources Tbk in the 2019 period. This value indicates the company's strategy to incur environmental costs.

The sample value of environmental information disclosure in this study is in the range of a minimum number of 0 to a maximum number of 0.6875 with an average value of 0.2198276 and a standard deviation of 0.1485854. The company with a minimum environmental information disclosure value of 0 is PT Golden Eagle Energy Tbk in 2017 and 2018. A value of 0 from the disclosure of environmental information indicates that the company did not disclose any environmental information by the 2016 GRI Standards for that period. On the other hand, the company with maximum environmental information disclosure of 0.6875 is PT Adaro Energy Tbk in 2020.

The sample firm value value in this study is in the range of a minimum number of 0.5653767 to a maximum number of 4.451508 with an average value of 1.309384 and a standard deviation of 0.6895621. The company with a minimum company value of 0.5653767 is PT Bumi Resources Minerals Tbk in 2018. On the other hand, the company with a maximum company value of 4.451508 is PT Bayan Resources Tbk in 2018.

The sample value of the proportion of independent commissioners in this study is in the range of a minimum number of 0.2 to a maximum number of 0.6666667 with an average value of 0.3961959 and a standard deviation of 0.0876633. Companies with a minimum proportion of independent commissioners of 0.2 are PT Vale Indonesia Tbk in 2019 and PT Timah Tbk in 2017. This violates the provisions of the Financial Services Authority (OJK) which requires the proportion of independent commissioners to be at least 30% of the total number of commissioners. The board of commissioners in OJK Regulation Number 33/POJK.04/2014 concerning the Board of Directors and Board of Commissioners of Issuers or Public Companies. On the other hand, the company with a maximum proportion of independent commissioners

of 0.6666667 is PT Bumi Resources Minerals Tbk in 2017, 2018, and 2019.

The value of the audit committee sample in this study is in the range of a minimum number of 0 to a maximum number of 5 with an average value of 3.155172 and a standard deviation of 0.5985991. A company with a minimum number of audit committees of 0 is PT J Resources Asia Pacific Tbk from 2017 to 2018. This case violates the provisions of the Financial Services Authority (OJK) which requires the number of audit committees to be at least three people in OJK Regulation Number 55/POJK. 04/2015 concerning the Establishment and Guidelines for the Work Implementation of the Audit Committee. Only one company violated these provisions. On the other hand, the company with a maximum number of audit committees of 5 is PT Indika Energy Tbk in 2020.

The value of the sample size of the company in this study is in the range of a minimum number of 10.91041 to a maximum number of 13.82119 with an average value of 12.63502 and a standard deviation of 0.7189873. The company with a minimum company size of 10.91041 is PT Betonjaya Manunggal Tbk in the period 2017. On the other hand, the company with a maximum company size of 13.82119 is PT Bayan Resources Tbk in 2018.

The leverage sample value in this study is in the range of a minimum number of -12,24266 to a maximum number of 23.0944 with an average value

of 1.929307 and a standard deviation of 4.35364. Before further analysis of the leverage data, Winsor was conducted on 2 data samples at the 1% and 99% percentiles because there were outliers that could potentially affect the results of data calculations, as done by Belot and Serve (2018). There are two companies with a minimum leverage value of -12,24266, namely PT Alumindo Light Metal Industry Tbk in the 2018 period and PT Apexindo Pratama Duta Tbk in the 2017 period. On the other hand, the company with a maximum leverage value of 23.0944 is PT Atlas Resources Tbk in the 2018 period and PT Bumi Resources Tbk in 2020.

## B. Regression model selection

After performing the Chow test, Hausman test, and Breusch-Pagan Lagrange Multiplier test, the best panel data regression was used for each model. The result of the best regression model is Fixed Effect Model (FEM) for all research models used. It can be seen from the Chow tests and Hausman tests that consistently produce the FEM model to be used. The Breusch-Pagan Lagrange Multiplier test also consistently resulted in the REM model being used, indicating that none of the regression models in this study matched the POLS model. A summary of the results of the selection of the model used for the selected panel data regression can be seen in Table V.

Table V. Regression Model Selection Results

Model	<i>Chow Test</i>	<i>Hausman Test</i>	BPLM Test	Chosen Model
Model 1	FEM	FEM	REM	FEM
Model 2	FEM	FEM	REM	FEM
Model 3	FEM	FEM	REM	FEM

## C. Classic assumption test

### 1) Normality Test

The normality test examines the distribution of the regression model's residual variables. The Shapiro-Wilk, Shapiro-Francia, and Skewness/Kurtosis tests were utilized to determine normality in this work. Table VI shows the test results for each model.

The test is carried out by observing the probability value with a significance level of 0.05. If the probability value is above the significance value, then the data is normally distributed, and vice versa if

the probability value is below the significance value, then the data is not normally distributed.

The three test values are below the significance value, so it can be concluded that the residual data are not normally distributed. If a study uses sample data of less than 100 observations, the assumption of normality plays an important role. However, if the sample data is large, more than 100, the normality assumption can be left (Gujarati & Porter, 2009). In this study, the total number of observational sample data is 116 so that the assumption of normality can be ignored.

Table VI. Normality Test Results

Model	<i>Shapiro-Wilk Test</i>	<i>Shapiro-Francia Test</i>	<i>Skewness/Kurtosis Test</i>
Model 1	0.00000	0.00001	0.00000
Model 2	0.00000	0.00001	0.00000
Model 3	0.00000	0.00001	0.00000

### 2) Multicollinearity Test

Multicollinearity is the existence of a linear relationship between the explanatory variables of a

regression model (Gujarati & Porter, 2009), so it is necessary to have a multicollinearity test to ensure that the independent variables are not related.

Multicollinearity test was conducted by observing the value of variance influence factor (VIF) and the correlation between independent variables. VIF values above 10 and correlation values above 0.9 indicate that there is an indication of multicollinearity in the variable (Gujarati & Porter, 2009).

Tables VII and VIII show the results of the multicollinearity test model I. According to the table, no independent variables or control variables have a correlation value greater than 0.9 or a VIF greater than 10. It may be inferred that model 1 has no multicollinearity issues..

Table VII. Model 1 Correlation Matrix

	TBQ	EC	ED	SIZE	LEV
TBQ	1.0000				
EC	-0.0688	1.0000			
ED	-0.0188	0.0678	1.0000		
SIZE	0.4695	0.0006	0.5003	1.0000	
LEV	-0.1130	0.1097	0.0484	-0.0615	1.0000

Table VIII. Model 1 VIF Value

Variable	VIF	1/VIF
EC	1.02	0.739939
ED	1.35	0.741771
SIZE	1.02	0.977262
LEV	1.02	0.983255

Tables IX and X show the results of the model II multicollinearity test. The environmental cost variable (EC) and its interaction with the variable proportion of independent commissioners as moderating (EC\* KI), as well as the variable of environmental information disclosure (ED) and its

interaction with the proportion of independent commissioners as moderating (ED\*KI), both have correlation values greater than 0.9 and VIF values greater than 10. The presence of multicollinearity symptoms in the regression equation model 2 may be seen here.

Table IX. Model 2 Correlation Matrix

	TBQ	EC	ED	KI	EC*KI	ED*KI	SIZE	LEV
TBQ	1.000							
EC	-0.069	1.000						
ED	-0.019	0.068	1.000					
KI	-0.167	-0.036	-0.260	1.000				
EC*KI	-0.070	0.999	0.062	-0.028	1.000			
ED*KI	-0.069	0.062	0.935	0.035	0.059	1.000		
SIZE	0.470	0.001	0.500	-0.165	-0.002	0.451	1.000	
LEV	-0.113	0.110	0.048	-0.062	0.108	0.105	-0.062	1.000

Table X. Model 2 VIF Value

Variable	VIF	1/VIF
EC	819.59	0.001220
EC*KI	818.37	0.001222
ED	25.87	0.038657
ED*KI	23.69	0.042211
KI	3.13	0.319209
SIZE	1.35	0.740690
LEV	1.06	0.943768

Tables XI and XII show the results of the model II multicollinearity test. The environmental cost variable (EC) and its interaction with the number of audit committees as a moderating variable (EC\*KA), as well as the environmental information disclosure variable (ED) and its interaction with the number of

audit committees as a moderating variable (ED\*KA), both have correlation values greater than 0.9 and VIF values greater than 10. The presence of multicollinearity symptoms in the regression equation model 3 may be seen here.

Table XI. Model 3 Correlation Matrix

	TBQ	EC	ED	KA	EC*KA	ED*KA	SIZE	LEV
TBQ	1.000							
EC	-0.069	1.000						
ED	-0.019	0.068	1.000					
KA	0.154	-0.009	0.417	1.000				
EC*KA	-0.071	0.998	0.076	0.001	1.000			
ED*KA	-0.001	0.062	0.973	0.542	0.058	1.000		
SIZE	0.470	0.001	0.500	0.258	0.003	0.490	1.000	
LEV	-0.113	0.110	0.048	0.023	0.102	0.057	-0.062	1.000

Table XII. Model 3 VIF Value

Variable	VIF	1/VIF
EC	219.13	0.004563
EC*KA	218.67	0.004573
ED	27.74	0.036045
ED*KA	32.03	0.031216
KI	2.08	0.481913
SIZE	1.36	0.736800
LEV	1.04	0.957673

In models 2 and 3, symptoms of multicollinearity arise as a result of the interaction between factors, which is the product of the independent and moderating variables. Mean centering was used on the sample data to alleviate the symptoms of multicollinearity. On a micro size, this is effective for minimizing the symptoms of multicollinearity, but not on a macro scale (Iacobucci et al., 2016). On a micro-scale, reducing multicollinearity symptoms

lessens the linear correlation between explanatory or independent factors, resulting in a better relationship between variables. On a macro scale, mean centering is insignificant; for example, it has little effect on the value of R<sup>2</sup>. Mean centering is achieved by removing the sample mean from each variable data sample. Tables XIII to XVII demonstrate that there are no signs of multicollinearity.

Table XIII. Model 2 Correlation Matrix After Mean Centering

	TBQ	EC	ED	KI	EC*KI	ED*KI	SIZE	LEV
TBQ	1.000							
EC	-0.069	1.000						
ED	-0.019	0.068	1.000					
KI	-0.167	-0.036	-0.260	1.000				
EC*KI	0.126	-0.804	-0.005	-0.341	1.000			
ED*KI	0.051	-0.002	-0.331	-0.173	0.127	1.000		
SIZE	0.470	0.001	0.500	-0.165	0.042	-0.181	1.000	
LEV	-0.113	0.110	0.048	0.119	-0.172	0.035	-0.062	1.000

Table XIV. Model 2 VIF Value After Mean Centering

Variable	VIF	1/VIF
EC	4.15	0.241060
EC*KI	4.76	0.210202
ED	1.62	0.038657
ED*KI	1.25	0.042211
KI	1.82	0.319209
SIZE	1.35	0.740690
LEV	1.06	0.943768

Table XV. Model 3 Correlation Matrix After Mean Centering

	TBQ	EC	ED	KA	EC*KA	ED*KA	SIZE	LEV
TBQ	1.000							
EC	-0.069	1.000						
ED	-0.019	0.068	1.000					
KA	0.154	-0.009	0.418	1.000				

EC*KA	-0.059	-0.447	-0.088	0.001	1.000			
ED*KA	-0.109	-0.029	0.268	-0.166	0.175	1.000		
SIZE	0.470	0.001	0.500	0.258	-0.069	0.093	1.000	
LEV	-0.113	0.110	0.048	0.023	-0.153	0.058	-0.062	1.000

Table XVI. Model 3 VIF Value After Mean Centering

Variable	VIF	1/VIF
EC	1.29	0.772733
EC*KA	1.42	0.703088
ED	1.75	0.570563
ED*KA	1.23	0.813720
KA	1.44	0.694148
SIZE	1.36	0.736800
LEV	1.04	0.957673

### 3) Heteroscedasticity Test

The next assumption test that must be met in the research model is homoscedasticity (Gujarati & Porter, 2009). A constant value variance from the residual is required in the research model. The Modified Wald test was used to determine heteroscedasticity. With a significance level of 0.05, the test is done out by examining the probability value. If the probability value is more than or equal to the significance value, there is no problem with

heteroscedasticity; however, if the probability value is less than or equal to the significance value, there is a problem with heteroscedasticity. Table XVII shows the results of heteroscedasticity testing on the research regression model. The test findings reveal that all models have problems with heteroscedasticity. In the Fixed Effect Model (FEM) the addition of a robust option is needed to overcome this problem (StataCorp, 2021).

Table XVII. Heteroscedasticity Test Results

Model	Test Results	Conclusion
Model 1	chi2 (29) = 2.5e+05 Prob>chi2 = 0.0000	There is a heteroscedasticity problem
Model 2	chi2 (29) = 1.7e+06 Prob>chi2 = 0.0000	There is a heteroscedasticity problem
Model 3	chi2 (29) = 1.7e+05 Prob>chi2 = 0.0000	There is a heteroscedasticity problem

### 4) Autocorrelation Test

The correlation between a sample of a set of observations arranged by time or space is known as autocorrelation (Gujarati & Porter, 2009). The Wooldridge test can be used to discover autocorrelation issues. With a significance level of 0.05, the test is done out by examining the probability value. There is no autocorrelation if the probability

value is greater than the significance value, and vice versa if the probability value is less than the significance value. Table XVIII shows the results of the autocorrelation test on the research regression model. All models have autocorrelation, according to the test results. To solve this problem, a robust option must be added to the Fixed Effect Model (FEM) (StataCorp, 2021).

Table XVIII. Autocorrelation Test Results

Model	Test Results	Conclusion
Model 1	F( 1, 28)= 14.199 Prob > F = 0.0008	There is autocorrelation
Model 2	F( 1, 28)= 15.904 Prob > F = 0.0004	There is autocorrelation
Model 3	F( 1, 28)= 14.767 Prob > F = 0.0006	There is autocorrelation

## D. Regression Analysis

Before a partial test could be done, the F statistic test was used to examine the effect of the independent

variable on the dependent variable at the same time. If the probability value of the F-statistic is smaller than the significance value, or the F-count value is more than the F-Table value, the independent variable is shown to effect the dependent variable concurrently. The probability value of the F-statistics of all models in Table XIX is 0.0000. This result is less than the 0.05 significant level, indicating that all independent variables in the study model had an impact on company value at the same time.

The effect of environmental costs on firm value is significant with a significance level of 10%, according to the results shown in Table XIX. With a probability value of 0.019, the coefficient of environmental costs is positive at 0.0330316. Hypothesis 1 was proven by the study model, implying that environmental expenses have a beneficial impact on business value.

With a significance level of 10%, the effect of the previous period's environmental disclosure on the current period's firm value was not significant, according to the results shown in Table XIX. With a probability value of 0.340, the coefficient of environmental information disclosure has a negative value of -0.2451352. The study model failed to verify Hypothesis 2 since the test provided insignificant findings, implying that environmental costs had no positive impact on business value.

With a significance threshold of 10%, the interaction between environmental costs (EC) and the proportion of independent commissioners (KI) has no significant effect on firm value during the current period, according to the results shown in Table XIX. The EC\*KI interaction variable has a positive coefficient of 1.180474 and a probability value of 0.336. The KI moderating variable has a coefficient of -0.0615777 and a probability value of 0.833. The probability value is bigger than the 10% significance level, indicating that it has no bearing on the firm's worth. Environmental costs, the independent variable, has a considerable positive effect on firm value, while the moderating and interaction variables have little effect. As a result, Hypothesis 3 is not supported by the study model, implying that the fraction of independent commissioners has no effect on the effect of environmental costs on firm value. According to the proportion of independent commissioners acts as a homologizer moderator when it comes to the impact of environmental costs on firm value. The dependent variable is unaffected by this form of moderator, but it can affect the coefficient values of other independent variables (Sharma et al., 1981).

With a significance threshold of 10%, the interaction between the previous period's environmental disclosure (ED) and the proportion of independent commissioners (KI) had no significant effect on the current period's firm value, according to the results shown in Table XIX. The ED\*KI interaction variable's coefficient has a positive value

of 0.0020737 and a probability value of 0.998. The KI moderating variable has a coefficient of -0.0615777 and a probability value of 0.833. The probability value is bigger than the 10% significance level, indicating that it has no effect on the firm's worth. Moderation and interaction variables had no bearing on the outcome. As a result, the study model fails to prove Hypothesis 4, implying that the proportion of independent commissioners has no effect on the effect of environmental information disclosure from the previous period on the current period's firm value. According to Sugiono (2004), the fraction of independent commissioners acts as a homologizer moderator on the impact of previous period's environmental information disclosure on current period's business value.

The interaction between environmental costs (EC) and the number of audit committees (KA) has a significant effect on firm value for the current period, according to the results shown in Table XIX, with a significance level of 10%. With a probability value of 0.038, the coefficient of interaction variable EC\*KA has a negative value of -0.1209386. The independent variable of environmental costs, as well as the interaction variable, both have a considerable impact on company value. As a result, Hypothesis 5 was proven by the study model, indicating that the number of audit committees moderates the influence of environmental costs on firm value. According to Sugiono (2004), the number of audit committees acts as a pure moderator of the impact of environmental costs on firm value. This form of moderator interacts with the independent variable but doesn't have a significant effect on the dependent variable (Sharma et al., 1981).

With a significance level of 10%, the interaction between the previous period's environmental information disclosure (ED) and the number of audit committees (KA) has no significant effect on the current period's firm value, according to the results shown in Table XIX. The positive coefficient of the interaction variable ED\*KA has a probability value of 0.387 and a positive value of 0.1319319. With a probability of 0.609, the variable number of audit committees has a coefficient of -0.0139231. The probability value is bigger than the 10% significance level, indicating that it has no effect on the firm's value. The independent variable environmental disclosure, as well as the interaction and moderating variables, show no significant effect on firm value. As a result, Hypothesis 6 is not confirmed by the study model, implying that the number of audit committees has no effect on the effect of previous period's environmental information disclosure on current period's business value. According to Sugiono (2004), the proportion of independent commissioners can act as a homologizer moderator when it comes to the effect of previous period's environmental disclosure on current period's firm value.

The coefficient of determination, or  $R^2$ , is a brief indicator of how well a regression model explains the data (Gujarati & Porter, 2009). The coefficient of determination is one of the factors that influence a regression model's goodness of fit. The corrected  $R^2$  value is used as the coefficient of determination in this research. Model 1's adjusted  $R^2$  value is 0.5072, model 2's is 0.4953, and model 3's is 0.4976, as

shown in Table XIX. Based on these findings, it can be inferred that the variables in model 1 explain 50.72% of the variation in company value, model 2 explains 49.53%, and model 3 explains 49.76% of the variation in firm value. The remaining 49.28% in model 1, 50.47% in model 2, and 50.24% in model 3 are explained by other variables that are not used in this research model.

Table XIX. Regression Analysis Results

Variable	Model 1		Model 2		Model 3	
	Coefficient	Probability	Coefficient	Probability	Coefficient	Probability
C	-18.96688	0.000***	-18.97708	0.000***	-19.15487	0.000***
EC	0.0330316	0.019**	0.0589822	0.062*	0.0225551	0.082*
ED	-0.2451352	0.170	-0.2340177	0.387	-0.2311359	0.380
KI			-0.0615777	0.833		
KA					-0.0139231	0.609
EC*KI			1.180474	0.336		
ED*KI			0.0020737	0.998		
EC*KA					-0.1209386	0.038**
ED*KA					0.1319319	0.387
SIZE	1.607067	0.000***	1.609455	0.000***	1.624886	0.000***
LEV	0.0105691	0.171	0.0114611	0.310	0.0104272	0.357
<i>R-Squared</i>	0.5243		0.5260		0.5282	
<i>Adj. R-Squared</i>	0.5072		0.4953		0.4976	
<i>F-Stat</i>	9.95		17.96		81.72	
<i>Prob F</i>	0.0000		0.0000		0.0000	
Remarks: *) significant at 0.1 level; **) significant at 0.05 level; ***) significant at 0.01 level						

## V. Conclusions, Limitations, and Implications

### A. Conclusions

#### 1) The Effect of Environmental Costs on Firm Value

Environmental costs are inextricably linked to the concept of ecoefficiency, which is the idea that businesses can provide higher-quality goods and services while decreasing negative environmental consequences. (Hansen & Mowen, 2007). This study shows that a company's environmental costs can improve both its economic and environmental performance. Environmental costs imply that the business practices environmental management in order to achieve long-term sustainability and efficiency. According to Dina et al. (2016), the corporation will get legitimacy from the surrounding environment because it can fulfill the social contract in terms of environmental management and limiting environmental damage. The corporation is also able to conform to the Triple Bottom Line guidelines. This responsibility can be viewed in two ways. First, there is the issue of responsibility as a moral and legal commitment that must be followed. Customers expect ecologically friendly products, governments require corporations follow environmental standards, and employees need a safe and clean work environment, and all of these demands are met. Stakeholders who are concerned about the environment will support the company (Septiadi,

2016). The consistency of environmental care is demonstrated by a clear allocation of costs for environmental management, which builds public trust (Tunggal & Fachrurrozie, 2014). Companies aren't just economic actors; they're also social ones. Second, this accountability can be observed in the company's long-term investment strategy, which places the organization in a favorable and competitive business climate.

#### 2) The Effect of Environmental Disclosure on Firm Value

Information disclosure is a type of corporate signaling theory aimed at reducing information imbalance between interested parties (Spence, 2002 in Connelly et al., 2011). Environmental disclosure is important for stakeholders to understand how the company manages its environment, as well as to comply with regulatory rules. However, according to the findings of the study, environmental information is insufficient to raise the company's worth, therefore investment decisions that cause stock prices to rise are dependent on other financial and non-financial information. Furthermore, not all corporations have disclosed environmental information through sustainability reports. Only 13 companies out of 54 registered companies published sustainability reports as of December 31, 2020, accounting for 24% of the total, according to Anjarwasana (2018), who claims

that environmental disclosure in Indonesia is still rare due to a lack of awareness of the long-term positive impact of the environment, and Yanti (2015), who claims that the quality of disclosure is poor because there are still few companies that use the GRI standard. As a result, using GRI Standards for disclosure has no impact on firm value (Retno & Priantinah, 2012). Even though the OJK requires it, ACGA and CLSA (2021) recently highlighted in the CG Watch 2020 report that environmental, social, and corporate governance reporting in Indonesia is still inadequate and limited. Furthermore, the Indonesia Stock Exchange does not yet mandate listed companies to submit a sustainability report as part of their disclosure requirements.

### **3) The Effect of the Proportion of Independent Commissioners in Moderating the Effect of Environmental Costs on Firm Value**

The proportion of independent commissioners is the number of commissioners who are not related to the majority shareholder of all existing commissioners. Independent commissioners are intended to cut agency costs in order to prevent directors from making business decisions that benefit individuals and majority shareholders. Although descriptive statistics show that the company has an average proportion of independent commissioners of 0.3961959 or 39.62 percent, the proportion of independent commissioners is still insufficient to influence every business decision made by the directors (Prastuti & Budiasih, 2015). This statement is backed up by reports from ACGA and CLSA (2018), which claim that minority shareholder rights and protection are still lacking. According to the Corporate Governance Watch study (ACGA & CLSA, 2016), the notion of independence was still debatable in 2016, and independence became a serious issue in the board structure of the organization. As a result, environmental management monitoring, particularly on environmental expenses, is reduced.

### **4) The Effect of the Proportion of Independent Commissioners in Moderating the Effect of Disclosure of Environmental Information in the Previous Period on the Firm value for the Current Period**

The proportion of independent commissioners is still insufficient to influence every business decision made by the directors (Prastuti & Budiasih, 2015), as indicated by ACGA and CLSA (2018) investigations stating that minority shareholder rights and protection are still lacking. The role of independent commissioners is to represent minority shareholders. According to Christanti and Mahastanti (2011), one of the reasons for independent commissioners' incapacity to improve environmental reporting is the behavior of retail investors who do not evaluate the company's environmental concern.

### **5) The Effect of the Audit Committee in Moderating the Effect of Environmental Costs on Firm Value**

The audit committee's role is to assist the board of commissioners with their oversight. Compliance with regulations, especially environmental regulations, is monitored. Environmental management oversight results in the directors decreasing environmental costs incurred, either for savings or for repair expenses that can be avoided from the start through such supervision, so weakening the impact of environmental costs on firm value for the audit committee. One of the criteria in the usage of restricted environmental costs is the disclosure of sustainability, which is currently lacking in Indonesia. (ACGA & CLSA, 2021).

### **6) The Effect of the Audit Committee in Moderating the Effect of Disclosure of Environmental Information in the Previous Period on the Firm value for the Current Period**

Even in other industries, the audit committee has not concentrated on checking the quality of environmental reporting, as seen by the unequal disclosure of environmental information in mining businesses. This comes after concerns that Indonesia's disclosure of environmental information is still lacking (ACGA & CLSA, 2021). The audit committee is intended to be able to oversee the entire operation of the organization, not just the financial elements.

## **B. Limitations**

There are several limitations to this study that cannot be ignored. Due to a lack of company data, the number of companies in the population cannot be used as study samples. The method of content analysis used to score the variable index of the company's environmental information disclosure is tied to the issue of researcher subjectivity. The scope of the research is limited due to time restrictions. In corporate governance, only a few proxies are implemented.

## **C. Implications**

From the results of this study, ecoefficiency through environmental costs should be continued by the company, and the obligation to disclose environmental information should be regulated clearly.

## **References**

- ACGA, & CLSA. (2016). *CG Watch 2016 Ecosystems matter: Asia's Path to Better Home-Grown Governance* (Issue September).
- ACGA, & CLSA. (2018). *CG Watch 2018 Hard Decisions: Asia Faces Tough Choices in CG Reform*.  
<http://www.cfapubs.org/doi/full/10.2469/cfm>.

- v16.n3.2996
- ACGA, & CLSA. (2021). *CG Watch 2020 Future Promise: Aligning Governance and ESG in Asia*.
- Anggraeni, D. Y. (2015). Pengungkapan Emisi Gas Rumah Kaca, Kinerja Lingkungan, Dan Nilai Perusahaan (Greenhouse Gas Emission Disclosure, Environmental Performance, and Firm Value). *Jurnal Akuntansi Dan Keuangan Indonesia*, 12(2), 188–209.
- Anjarwasana, Y. L. (2018). *Pengaruh Environmental Management Accounting (EMA) terhadap Nilai Perusahaan dengan Kinerja Keuangan sebagai Variabel Intervening*. Universitas Katolik Widya Mandala Surabaya.
- BAPPENAS, & GGGL. (2015). *Mewujudkan Pertumbuhan Ekonomi Hijau untuk Indonesia yang Sejahtera*. www.ggp.bappenas.go.id
- Buana, V. A., & Nila, F. N. (2017). *PENGARUH ENVIRONMENTAL COST TERHADAP PROFITABILITAS DAN NILAI PERUSAHAAN (Studi Pada Perusahaan Kimia First Section yang Terdaftar di Japan Exchange Group Periode 2013 – 2015)*. 50(1), 46–55.
- Chhaochharia, V., & Grinstein, Y. (2007). *Corporate Governance and Firm Value: The Impact of the 2002 Governance Rules*. LXII(4). <https://doi.org/doi.org/10.1111/J.1540-6261.2007.01257.X>
- Christanti, N., & Mahastanti, L. A. (2011). FAKTOR-FAKTOR YANG DIPERTIMBANGKAN INVESTOR DALAM MELAKUKAN INVESTASI. *Jurnal Manajemen Teori Dan Terapan*, 3, 37–51.
- Connelly, B. L., Certo, S. T., Ireland, R. D., & Reutzel, C. R. (2011). Signaling Theory: A Review and Assessment. *Journal of Management*, 37(1), 39–67. <https://doi.org/10.1177/0149206310388419>
- Dang, C., (Frank) Li, Z., & Yang, C. (2018). Measuring firm size in empirical corporate finance. *Journal of Banking & Finance*, 86(519), 159–176. <https://doi.org/10.1016/j.jbankfin.2017.09.006>
- Delgado, C., & Castelo, B. M. (2013). Encyclopedia of Corporate Social Responsibility. In *Encyclopedia of Corporate Social Responsibility* (Vol. 21). <https://doi.org/10.1007/978-3-642-28036-8>
- Dewata, E., Jauhari, H., Sari, Y., & Jumarni, E. (2018). PENGARUH BIAYA LINGKUNGAN, KEPEMILIKAN ASING DAN POLITICAL COST TERHADAP KINERJA PERUSAHAAN PERTAMBANGAN DI INDONESIA. *Jurnal AKSI (Akuntansi Dan Sistem Informasi)*, 3(2), 122–132. <https://doi.org/10.32486/aksi.v2i2.271>
- Dina, F., Sari, L., & Asamaranti, Y. (2016). Environmental Management Activity toward Financial Performance in Indonesian Mining Companies. *International Journal of Environment and Sustainability*, 5(1). <https://doi.org/10.24102/ijes.v5i1.667>
- Egbunike, A., & Okoro, G. (2018). Does green accounting matter to the profitability of firms? A canonical assessment. *Ekonomski Horizonti*, 20(1), 17–26. <https://doi.org/10.5937/ekonhor1801017E>
- Ethika, Azwari, M., & Muslim, R. Y. (2019). Analisis Pengaruh Pengungkapan Akuntansi Lingkungan dan Kinerja Lingkungan terhadap Nilai Perusahaan (Studi Empiris pada Perusahaan Indeks LQ-45 yang Terdaftar di BEI). *Jurnal Kajian Akuntansi Dan Auditing*, 14(2), 122–133. <https://doi.org/10.37301/jkaa.v14i2.15>
- Falikhatun, F., Kumalasari, D. M., & Wijayanto, A. (2020). CORPORATE GOVERNANCE AND FIRM VALUE. *Stability: Journal of Management and Business*, 3(2), 1–7. <https://doi.org/10.26877/sta.v3i2.7776>
- Fitriani, A. (2013). Pengaruh Kinerja Lingkungan dan Biaya Lingkungan terhadap Kinerja Keuangan pada BUMN. *Jurnal Ilmu Manajemen (JIM)*, 1(1), 137–148. <https://jurnalmahasiswa.unesa.ac.id/index.php/jim/article/view/1501>
- Godfrey, J., Hodgson, A., Tarca, A., Hamilton, J., & Holmes, S. (2010). *Accounting Theory* (7th ed.). John Wiley & Sons Australia, Ltd.
- Gujarati, D. N., & Porter, D. C. (2009). Basic Econometrics. In *Introductory Econometrics: A Practical Approach* (5th ed.). Mass: McGraw-Hill.
- Hansen, D. R., & Mowen, M. M. (2007). *Managerial Accounting, 8 Ed* (8th ed.). Thomson South-Western.
- Hapsoro, D., & Adyaksana, R. I. (2020). Apakah Pengungkapan Informasi Lingkungan Memoderasi Pengaruh Kinerja Lingkungan Dan Biaya Lingkungan Terhadap Nilai Perusahaan? *Jurnal Riset Akuntansi Dan Keuangan*, 8(1), 41–52. <https://doi.org/10.17509/jrak.v8i1.19739>
- Iacobucci, D., Schneider, M. J., Popovich, D. L., & Bakamitsos, G. A. (2016). Mean centering helps alleviate “micro” but not “macro” multicollinearity. *Behavior Research Methods*, 48(4), 1308–1317. <https://doi.org/10.3758/s13428-015-0624-x>
- IFC, & OJK. (2018). *INDONESIA CORPORATE GOVERNANCE MANUAL* (2nd ed.). International Finance Corporation. [www.ifc.org/wps/wcm/connect/topics\\_ext\\_content/ifc\\_external\\_corporate\\_site/ifc+cg/resources/toolkits+and+manuals/indonesia+corporate+governance+manual%2C+2nd+edition](http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/ifc+cg/resources/toolkits+and+manuals/indonesia+corporate+governance+manual%2C+2nd+edition)
- IMF. (2021). *World Economic Outlook* (Issue April).

- International Monetary Fund.
- Indrayani, N. K., Endiana, I. D. M., & Pramesti, I. G. A. A. (2021). *Pengaruh Ukuran Perusahaan, Profitabilitas, Kebijakan Dividen, Akuntansi Lingkungan, Leverage dan Likuiditas Terhadap Nilai Perusahaan*. 3(1), 52–62.
- Jo, H., & Harjoto, M. A. (2011). Corporate Governance and Firm Value: The Impact of Corporate Social Responsibility. *Journal of Business Ethics*, 103(3), 351–383. <https://doi.org/10.1007/s10551-011-0869-y>
- Kasztelan, A. (2017). Green Growth, Green Economy and Sustainable Development: Terminological and Relational Discourse. *Prague Economic Papers*, 26(4), 487–499. <https://doi.org/10.18267/j.pep.626>
- Lin, T. C. W. (2018). Incorporating social activism. *98 BOSTON UNIVERSITY LAW REVIEW* (2018), 1535–1605. <https://ssrn.com/abstract=3294317>
- Lindawati, A. S. L., & Puspita, M. E. (2015). Corporate Social Responsibility: Implikasi Stakeholder dan Legitimacy Gap dalam Peningkatan Kinerja Perusahaan. *Jurnal Akuntansi Multiparadigma*, 157–174. <https://doi.org/10.18202/jamal.2015.04.6013>
- Najid, N. A., & Rahman, R. A. (2011). Government ownership and performance of Malaysian government-linked companies. *International Research Journal of Finance and Economics*, 61(April), 42–56.
- Naude, M. (2009). Corporate governance, CSR and using mental models in employee retention. *Corporate Ownership and Control*, 7(1 A), 73–83. <https://doi.org/10.22495/cocv7i1p7>
- Nguyen, L. S., & Tran, M. D. (2019). Disclosure levels of environmental accounting information and financial performance: The case of Vietnam. *Management Science Letters*, 9(4), 557–570. <https://doi.org/10.5267/j.msl.2019.1.007>
- OECD. (2019). Tinjauan OECD Terhadap Kebijakan Pertumbuhan Hijau Indonesia 2019. In *Tinjauan OECD Terhadap Kebijakan Pertumbuhan Hijau Indonesia 2019* (Vol. 0). OECD. <https://doi.org/10.1787/5668086d-id>
- Pedron, A. P. B., Macagnan, C. B., Simon, D. S., & Vancin, D. F. (2021). Environmental disclosure effects on returns and market value. *Environment, Development and Sustainability*, 23(3), 4614–4633. <https://doi.org/10.1007/s10668-020-00790-2>
- Prastuti, N. K. K., & Budiasih, I. G. A. N. (2015). Pengaruh Good Corporate Governance pada Nilai Perusahaan dengan Moderasi Corporate Social Responsibility. *E-Jurnal Akuntansi Universitas Udayana*, 13(1), 114–129. <https://ojs.unud.ac.id/index.php/Akuntansi/article/download/11647/10712>
- Retno, R. D., & Priantina, D. (2012). PENGARUH GOOD CORPORATE GOVERNANCE DAN PENGUNGKAPAN CORPORATE SOCIAL RESPONSIBILITY TERHADAP NILAI PERUSAHAAN (STUDI EMPIRIS PADA PERUSAHAAN YANG TERDAFTAR DI BURSA EFEK INDONESIA PERIODE 2007-2010). *Nominal, Barometer Riset Akuntansi Dan Manajemen*, 1(2). <https://doi.org/10.21831/nominal.v1i2.1000>
- Sawitri, A. P. (2017). *Analisis Pengaruh Pengungkapan Akuntansi Lingkungan Dan Kinerja Lingkungan Terhadap Nilai Perusahaan*. 177–187.
- Septiadi, N. L. E. I. (2016). Pengaruh Kinerja Lingkungan, Biaya Lingkungan, dan Luas Pengungkapan Corporate Social Responsibility Terhadap Kinerja Keuangan Perusahaan. *Jurnal Akuntansi Profesi*, 6(1), 21–25.
- Sharma, S., Durand, R. M., & Gur-Arie, O. (1981). Identification and Analysis of Moderator Variables. *Journal of Marketing Research*, 18(3), 291–300. <https://doi.org/10.1177/002224378101800303>
- Singh, S., Tabassum, N., Darwish, T. K., & Batsakis, G. (2018). Corporate Governance and Tobin's Q as a Measure of Organizational Performance. *British Journal of Management*, 29(1), 171–190. <https://doi.org/10.1111/1467-8551.12237>
- StataCorp. (2021). *Stata: Release 17*. TX: StataCorp LLC.
- Sugiono. (2004). Konsep, Identifikasi, Alat Analisis dan Masalah Penggunaan Variabel Moderator. *Jurnal Studi Manajemen Organisasi*, 1(2), 61–70. <https://doi.org/10.14710/jsmo.v1i2.4175>
- Tunggal, W. S. P., & Fachrurrozie. (2014). PENGARUH ENVIRONMENTAL PERFORMANCE, ENVIRONMENTAL COST DAN CSR DISCLOSURE TERHADAP FINANCIAL PERFORMANCE. *Accounting Analysis Journal*, 3(3), 310–320. <https://doi.org/10.15294/aaaj.v3i3.4200>
- Wahyudi, U., & Pawestri, H. P. (2006). Implikasi Struktur Kepemilikan Terhadap Nilai Perusahaan: dengan Keputusan Keuangan Sebagai Variabel Intervening. *Simposium Nasional Akuntansi 9 Padang*, 9, 1–25.
- Yanti, A. A. (2015). Pengaruh Good Corporate Governance dan Corporate Environmental Disclosure Terhadap Nilai Perusahaan BUMN Periode 2012-2014. *Jurnal Akuntansi AKUNESA*, 4(1), 1–25.