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## The Effect of Environmental Costs, Governance Risk Compliance (GRC) on Financial Performance with Company Size as Moderating Variable

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**Abstract:** Financial performance measurement is crucial in assessing a company's success. A company's financial performance must be continuously monitored year after year. This study aims to examine and analyze the influence of environmental costs and GRC on financial performance, with company size as a moderating variable. This study employed a quantitative method with Moderated Regression Analysis (MRA) as the data analysis technique. This study was conducted on companies in the Energy and Basic Materials Industry sectors listed on the Indonesia Stock Exchange (IDX) consecutively during the 2021-2023 period. The sampling technique used was purposive sampling, with a total sample size of 39 companies. The results show that environmental costs have a significant and positive effect on financial performance, GRC has a significant and positive effect on financial performance, company size can moderate or strengthen the effect of environmental costs on financial performance, and company size moderates or strengthens the effect of GRC on financial performance. These results indicate that disclosure of environmental costs and GRC can improve a company's financial performance, with company size as a moderating variable.

**Keywords:** Environmental Cost, Governance Risk Compliance (GRC), Financial Performance, Company Size.

### INTRODUCTION

Current corporate activities are not only focused on the company's financial condition, but also on the condition of the surrounding community and the preservation of the surrounding environment (Dewayani & Ratnadi, 2021). The government, through the Ministry of Environment and Forestry, established the Corporate Performance Rating Program in Environmental Management (PROPER) to enhance companies' role in environmental conservation programs. The PROPER rating is divided into five colors: gold, green, blue, red, and black. The mechanisms and provisions related to PROPER were updated with Ministerial Regulation No. 01 of 2021 concerning the Corporate Performance Rating Program in Environmental Management. In 2023-2024, the Ministry of Environment and Forestry

(KLHK), through Ministerial Decree No. 129 of 2025, indicated that 1,313 companies received a red rating, indicating that their environmental management performance needed significant improvement, and 16 companies received a black rating, indicating that the companies were not managing the environment well or were damaging the environment.

An environmental issue that occurred in Indonesia was the basic materials industry company PT Vale Indonesia Tbk which had a tension with the Towuti community, East Luwu, South Sulawesi in 2023. The local community protested the expansion of the nickel mine carried out by PT Vale Indonesia which would have an impact on ecosystem damage (CNBC Indonesia, 2023). A similar thing also happened to PT Adaro Energy Indonesia Tbk which is included in the energy sector. The Dirty 30 analysis by the Toxic Bond Initiative placed PT Adaro Energy Indonesia Tbk as one of the dirtiest bond issuers in the world, this is because Adaro is considered to have a long track record of environmental damage and left community conflicts (Greenpeace, 2024).

Measuring performance from a financial perspective is crucial in assessing a company's success, determining whether it is meeting targets (Safriani & Utomo, 2020). Poor financial performance will impact a company success, as seen in companies in the energy and basic materials sectors, which experienced a significant decline in performance (CNBC Indonesia, 2023). According to a factsheet released by the IDX, the energy sector had the worst performance, falling 25% from January to May 2023, or year-to-date (YTD), and the basic materials sector saw a 19.1% decline (CNBC Indonesia, 2023). Furthermore, according to CNBC Indonesia, the financial performance of coal companies in the energy sector also declined in 2024.

Stakeholder Theory (Freeman, 1984) states that organizations should not only focus on generating value and profits for the company, owners, or shareholders, but should also consider the best interests of all stakeholders involved in the business, such as employees, customers, and suppliers. To improve a company's financial performance, one of the things that must be done is to disclose the company's environmental and GRC costs. Environmental costs are costs that must be set aside by the company because the production process carried out by the company results in a decline in environmental quality (Cahyani and Puspitasari, 2023). Disclosure of environmental costs is expected to provide confidence to stakeholders and investors that the company has been responsible for the surrounding environment and improve the company's financial performance. GRC is a dynamic concept in every organization, in accordance with the uncertain developments in the business environment that an organization must operate (Pradipta and Siaahaan, 2024). Effective GRC implementation is expected to help the company achieve its vision and mission while minimizing risks and ensuring compliance with applicable regulations. The implementation of GRC in a company can improve company performance and prevent inefficient cost management that impacts the company's financial performance.

The influence of environmental costs and GRC on a company's financial performance can be strengthened or weakened by company size. Legitimacy theory emphasizes that companies must ensure all their activities align with prevailing social values and norms in the communities where they operate, with the goal of gaining legitimacy (Safriani & Utomo, 2020). The larger a company, the greater its legitimacy, or public recognition and trust. If a company gains legitimacy or recognition from the public, it will gain public support. Conversely, if a company lacks legitimacy, public trust and support will diminish. This is evident in large companies, where they are driven to maintain social legitimacy due to increasing public expectations. Therefore, company size can provide an incentive for a company to pay attention to all its activities. A company that ignores its environmental responsibilities, this will also result in losses for the company and impact its financial performance.

This study aims to examine the influence of environmental costs and GRC on the financial performance of companies in the energy and basic materials sectors listed on the Indonesia

Stock Exchange (IDX) during the 2021-2023 period, with company size as a moderating variable. The novelty of this study is the development of the simultaneous use of environmental costs and GRC to determine whether they can help influence a company's financial performance. Furthermore, this study also explores the use of company size as a moderating variable.

**METHOD**

This study uses a quantitative approach. The research method used is causal-comparative research. This causal-comparative research aims to draw conclusions about the existence of a causal relationship between the variables studied. This study uses secondary data. The secondary data sources were collected, processed, and published by other parties, namely the Indonesia Stock Exchange, in the form of financial reports and annual reports, accessed online at www.idx.co.id or the respective company websites.

The sampling technique used in this study was purposive sampling, which is a sampling technique based on specific considerations. This method utilizes data selected by the researcher based on the specific characteristics of the sample (Werastuti, 2021). The study population comprised 173 companies in the energy and basic materials sectors listed on the IDX during the 2021-2023 period. 39 companies met the research criteria and were used in the study.

The data collected from the research results will then be analyzed. The data analysis technique used in this study is Moderated Regression Analysis (MRA). The research model used is a statistical model that functions to test the research hypothesis. Multiple linear regression analysis is used to predict how the dependent variable will behave when associated with two or more independent variables. The tool used for data processing is STATA software version 12.0. The advantage of STATA software compared to other tools is that STATA uses commands with a syntax type that is not limited to menus. In addition, the resulting output is also divided into each test so that it is easier to interpret the results using STATA software.

**RESULTS AND DISCUSSION**

Before conducting data analysis, descriptive statistical testing was first conducted. Descriptive statistical analysis was used to measure the sample size, minimum value, maximum value, average value, and standard deviation of the study.

**Table 1. Test Results of Descriptive Statistics**

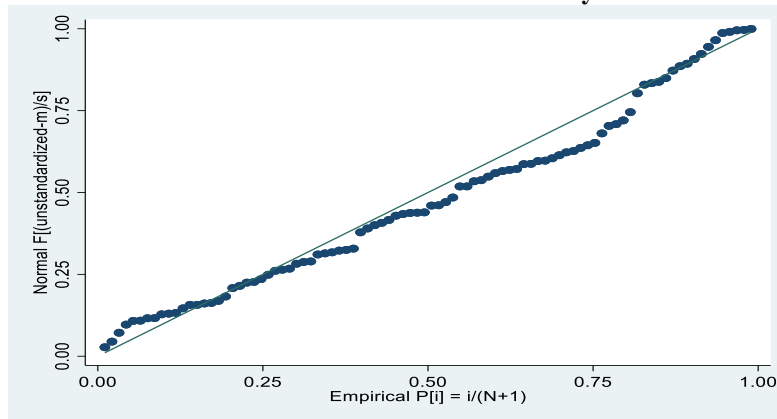
```
. summarize tobinsq biaya_lingkungan grc size
```

Variable	Obs	Mean	Std. dev.	Min	Max
tobinsq	117	24.95928	145.3243	.4447685	1034.181
biaya_ling~n	117	.0706546	.4407356	-1.364207	3.518261
grc	117	.9496676	.0939821	.5555556	1
size	117	28.24899	1.669748	23.88063	31.44563

Source: Research data (2025)

Based on the results of the descriptive statistical analysis in Table 1, it is known that the number of observational data used in this study was 117 data obtained from 39 company samples during the 3 research periods from 2021 - 2023. Next, Classical assumption tests are conducted to ensure that the model or equation being tested does not violate the applicable assumption rules.

**Table 2. Test Results of Normality**



Source: Research data (2025)

Table 2 shows that most of the data points follow or are on a straight diagonal line, so it can be concluded that the residuals from the regression model in this study are normally distributed. Next, a multicollinearity test is performed to determine whether there is a strong or perfect relationship between the independent variables.

**Table 3. Test Results of Multicollinearity**

. vif

Variable	VIF	1/VIF
size	1.05	0.955088
biaya_ling~n	1.04	0.960337
grc	1.02	0.979838
Mean VIF	1.04	

Source: Research data (2025)

Therefore, it can be concluded that all research variables have VIF values <10 and tolerance values >0.1, thus indicating that the model is free from multicollinearity. Next, a heteroscedasticity test is carried out to test whether the data distribution is the same or homogeneous.

**Table 4. Test Results of Heteroscedasticity**

. hettest

Breusch-Pagan/Cook-Weisberg test for heteroskedasticity

Assumption: Normal error terms

Variable: Fitted values of x1

H0: Constant variance

chi2(1) = 1.23

Prob > chi2 = 0.2670

Source: Research data (2025)

Based on the results of the heteroscedasticity test, the chi2 Prob value is 0.2670 > 0.05, thus concluding that there is no heteroscedasticity problem in the research data. The analytical

method used in this study is multiple linear regression analysis. The results of the multiple linear regression analysis using panel data in this study are:

**Table 5. Test Results of Multiple Linear Regression Analysis**

```
. . reg tobinsq biaya_lingkungan grc, beta
```

Source	SS	df	MS	Number of obs	=	117
Model	769336.2	2	384668.1	F(2, 114)	=	26.09
Residual	1680484.15	114	14741.0891	Prob > F	=	0.0000
				R-squared	=	0.3140
				Adj R-squared	=	0.3020
Total	2449820.35	116	21119.141	Root MSE	=	121.41

tobinsq	Coefficient	Std. err.	t	P> t	Beta
biaya_lingkungan	183.0235	25.6502	7.14	0.000	.5550689
grc	70.93168	120.2884	0.59	0.557	.045872
_cons	-55.3337	114.6627	-0.48	0.630	.

Source: Research data (2025)

Based on Table 5, the regression equation model in this study is:

$$Y = -55.3337 + 183.0235 X_1 + 70.93168 X_2 + e$$

From the regression equation model above, the following can be explained:

The constant -55.3337 indicates that if the independent variables Environmental Costs (BL) and GRC, along with their interaction variables, are considered constant, then the average Financial Performance (Tobin's Q) is -55.3337.

The coefficient value  $\beta_1 = 183.0235$  indicates that there is a positive direction between the Environmental Costs (BL) variable ( $X_1$ ) and Financial Performance (Tobin's Q) ( $Y$ ) 183.0235. This means that if the Environmental Cost (BL) variable ( $X_1$ ) increases by one unit, Financial Performance (Tobin's Q) ( $Y$ ) will increase by 183.0235, provided that other variables remain constant.

The coefficient value  $\beta_2 = 70.93168$  indicates a positive correlation between the GRC variable ( $X_2$ ) and Financial Performance (Tobin's Q) ( $Y$ ). This means that if the GRC variable ( $X_2$ ) increases by one unit, Financial Performance (Tobin's Q) ( $Y$ ) will increase by 70.93168, provided that other variables remain constant.

Next, a Goodness of Fit Model test and a Determinant Coefficient ( $R^2$ ) test were performed. Goodness of Fit Model tests are conducted to determine whether the obtained model accurately describes the relationship between the variables being studied and can therefore be categorized as a good model (Ghozali, 2018). The Determinant Coefficient ( $R^2$ ) test is used to determine the percentage influence of the independent variables on changes in the dependent variable. This test determines how much of the dependent variable can be explained by the independent variables.

**Table 6. Test Results of Goodness of Fit Model and Determinant Coefficient**

. reg tobinsq biaya\_lingkungan grc size x1z x2z, beta

Source	SS	df	MS	Number of obs	=	117
Model	1150239.59	5	230047.917	F(5, 111)	=	19.65
Residual	1299580.77	111	11707.9348	Prob > F	=	0.0000
				R-squared	=	0.4695
				Adj R-squared	=	0.4456
Total	2449820.35	116	21119.141	Root MSE	=	108.2

Source: Research data (2025)

The results of the Goodness of Fit Model test indicate that the f-prob value is  $0.0000 < 0.05$ , thus concluding that the model obtained in this study is feasible. This result indicates that all independent variables are able to explain or predict the phenomenon of Financial Performance. In other words, Environmental Costs (BL), GRC, and other interaction variables simultaneously have a significant positive influence on Financial Performance.

The results of the coefficient of determination ( $R^2$ ) test in this study showed an Adjusted R Square value of 0.4456. This means that the variation in Environmental Costs (BL), GRC, and Company Size (SIZE), along with their interaction variables, has a 44.56% impact on Financial Performance, while the remaining 55.44% is explained by various other factors not included in the research model.

This study further uses a moderating variable regression analysis with a Moderated Regression Analysis interaction model. A research hypothesis can be declared accepted if it meets certain criteria, namely when the probability value from the z-statistic test is below the 5% significance level ( $p < 0.05$ ) or when the calculated z-value exceeds the tabulated z-value. This condition indicates that, partially or individually, the independent variable has a significant influence on the dependent variable. Therefore, the proposed hypothesis is considered valid and acceptable.

**Table 7. Test Results of Moderated Regression Analysis**

. reg tobinsq biaya\_lingkungan grc size x1z x2z, beta

Source	SS	df	MS	Number of obs	=	117
Model	1150239.59	5	230047.917	F(5, 111)	=	19.65
Residual	1299580.77	111	11707.9348	Prob > F	=	0.0000
				R-squared	=	0.4695
				Adj R-squared	=	0.4456
Total	2449820.35	116	21119.141	Root MSE	=	108.2

tobinsq	Coefficient	Std. err.	t	P> t	Beta
biaya_lingkungan	138.0296	24.79975	5.57	0.000	.4186127
grc	2866.568	1039.161	2.76	0.007	1.853827
size	46.97455	29.2566	1.61	0.111	.5397286
x1z	8.370705	3.998598	2.09	0.039	.1533456
x2z	2182.049	828.448	2.63	0.010	2.050183
_cons	3141.043	949.0366	3.31	0.001	.

Source: Research data (2025)

Based on the data above, it can be concluded that:

The results of the hypothesis test calculation in Table 7 show a regression coefficient of Environmental Costs (X1) of 138.0296 and a Prob. Z value of 0.000 below 0.05. This indicates that Environmental Costs have a significant and positive influence on Financial Performance.

So it can be said that environmental costs are not only a company's operational burden, but the environmental costs incurred by the company are investment costs for the company to improve the company's image and have an impact on the company's financial performance. Disclosure of a company's environmental costs also reflects a company's continued commitment to maintaining trust and increasing transparency with the public and stakeholders. This transparency not only positively impacts stakeholders but also strengthens sustainable production relationships and the company's financial performance (Mondal et al., 2024). The results of this study align with previous research conducted by (Al-Naser et al., 2021), which showed that environmental costs impact financial performance, and research by (Putri, 2023), which showed that environmental costs positively impact financial performance.

The results of the hypothesis test calculation in Table 7 show a regression coefficient of GRC (X2) of 2866.568 and a Prob. Z value of 0.007 below 0.05. This indicates that GRC has a significant and positive influence on Financial Performance. GRC can help companies ensure that company objectives are clearly defined, company management is well developed, and existing regulations are properly complied with so that companies can improve their financial performance. GRC information presented to stakeholders demonstrates management's strong commitment to running the company through good governance, robust risk management, and reliable compliance (Yosege et al., 2022). Companies that implement GRC effectively will achieve strong financial performance. The results of this study are consistent with previous research conducted by (Al Habsyi et al., 2021) which showed that GRC has a positive effect on company performance and research by (Pertiwi & Muslih, 2023) which showed that GRC has a positive but insignificant effect on financial performance.

The results of the moderation analysis show a Prob. The Z-value for the interaction variable Environmental Costs with Company Size is 0.039, below 0.05. This indicates that Company Size can moderate or strengthen the influence of Environmental Costs on Financial Performance. Company size also reflects the company's ability to fund profitable operating and investment activities for the company, so the larger a company is, the greater its sales will be and this will have an impact on the company's profits (Dewi and Purnamawati, 2024). This is supported by legitimacy theory, which suggests that large companies generally have gained legitimacy or public recognition for their activities. Larger companies are more likely to provide better environmental cost disclosures because larger companies generally have more effective resources for disclosing environmental costs, which can improve their financial performance.

The results of the moderation analysis show that the Z-value for the interaction variable GRC with Company Size is 0.010, below 0.05. This indicates that Company Size can moderate or strengthen the influence of GRC on Financial Performance. GRC refers to an organization's ability to effectively achieve its objectives by managing uncertainty and acting with integrity (Pudjianto et al., 2021). A well-integrated GRC implementation within a company will create synergy in quality, information availability, and oversight in achieving corporate objectives. Large companies have far more complex organizational, operational, and regulatory structures. Given this complexity, the benefits of GRC integration are much more pronounced and significant in streamlining operations, managing diverse risks, and ensuring compliance across multiple units/branches. When a large company's GRC is seen as sound and effective, it reassures stakeholders (including investors, creditors, and regulators) that significant risks have been well managed. Well-integrated GRC will secure legitimacy, and as a result, drive higher financial performance in return for adherence to the social contract.

## CONCLUSION

The results of this study indicate that environmental costs and GRC have a positive and significant impact on the financial performance of companies in the energy sector and the basic materials industry sector listed on the IDX for the 2021-2023 period. This indicates that disclosure of environmental costs and GRC by companies can improve financial performance.

Also company size can moderate or strengthen the influence of environmental costs and GRC on the financial performance of companies in the energy sector and the basic materials industry sector listed on the IDX for the 2021-2023 period. This shows that the larger the company size, the better the disclosure of environmental costs and GRC will be, this is because large companies need support and public trust in carrying out their operational activities so that disclosure of environmental costs and GRC provides evidence that the company has protected the environment in its operational activities and increased stakeholder trust so that the company's financial performance will improve.

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