# *THE ROLE OF PROFITABILITY IN MODERATING THE RELATIONSHIP BETWEEN LEVERAGE AND COMPANY SIZE ON ENVIRONMENTAL PERFORMANCE*

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***Abstract***

*The purpose of this study is to examine the effect of leverage and company size on environmental performance, moderated by profitability. This study used a purposive sampling method, taking samples from raw material sub-sector manufacturing companies listed on the Indonesia Stock Exchange (IDX) from 2021 to 2023. The sample consisted of 30 companies, yielding 90 secondary data points. The analysis method employed in this research was PLS-SEM, including descriptive statistical analysis and path coefficient analysis, tested using SmartPLS 4.0. The study's results indicate that leverage significantly affects environmental performance, and company size significantly affects environmental performance. However, profitability does not moderate the influence of leverage on environmental performance, nor does it moderate the influence of company size on environmental performance.*

***Keywords:*** *Leverage; Firm Size; Environmental Performance; Profitability*

## INTRODUCTION

Environmental issues are increasing worldwide, threatening environmental sustainability. Environmental pollution, contamination, and global warming are environmental issues generated by manufacturing companies, particularly those in the raw materials subsector. Environmental issues such as air pollution, which are not addressed properly, are caused by insufficient funding and inadequate infrastructure, leading to increased air pollution (Robinson & Igini, 2025). When running a company, it's essential to consider the potential environmental impacts. By paying attention to environmental performance, environmental sustainability is maintained. The government uses the PROPER (Company Performance Rating Program in Environmental Management) to encourage companies to be more committed to environmental conservation programs. The Company Environmental Management Performance Rating (PROPER) program is used by the government to assess environmental performance. In dealing with environmental impacts, good environmental performance shows that the company can be relied on and trusted by the community and investors.

Environmental pollution cases, among others, originate from manufacturing companies in the raw materials sub-sector due to non-compliance with applicable procedures and regulations. This has made investors interested in Indonesia wary of working with problematic entities. Industries such as chemicals, pulp and paper, fertilizers, petrochemicals, food and beverages, ceramics, and textiles can produce harmful carbon emissions. Furthermore,

industrial companies that ignore the environment can contribute to landslides, global warming, and erosion. (Putra, 2022). Both small and large companies can negatively impact the environment through their operations. Environmental repair and maintenance require significant funding, while companies often have other obligations, such as debt payments, to maintain their operations. Companies generate profits from their operations, which can be used to fund additional environmental repair and maintenance. However, some companies use these profits not for environmental preservation but for their own business purposes.

This research was conducted because there was a research gap in previous studies. The research was conducted by Luciawati & Efendi (2021) that leverage does not affect environmental performance Whereas according to Juliani & Parapat (2024), Tania & Herawaty (2019), (Nursalim, 2022)) and Wihandoko dkk. (2022) that there is an influence between variables. The relationship between company size and environmental performance according to Tanjung & Kurnia (2020) and Krisdiyanti & Hermanto (2022) does not have an influence between variables, whereas according to (Juliani & Parapat, 2024). Research on profitability that moderates the relationship between leverage and company size on environmental performance has the opinion that the influence of leverage and company size on environmental performance cannot be moderated, which was carried out by Tania & Herawaty (2019). Based on the results of this previous study, due to inconsistencies, it can be reviewed to determine the influence between variables on companies in the raw materials sub-sector. Furthermore, this study differs from previous studies in terms of the object of study, namely companies in the raw materials sub-sector. Therefore, the researcher is interested in examining the effect of leverage and company size on environmental performance, with profitability as a moderating variable in companies in the raw materials sub-sector.

Several companies in the raw materials sector ignore the negative impacts that can pollute the environment in order to maximize profits. Environmental issues are becoming increasingly important as more companies are established. Companies whose capital is derived from debt and high leverage require vigilance due to the potential risk of default, resulting in no profits and only environmental harm. Both large and small companies need to utilize their profits to preserve the environment and avoid harming others, as most companies focus solely on maximizing profits without considering their impact on the surrounding environment.

This study aims to analyze the influence of independent variables, namely leverage and company size, on the dependent variable, namely environmental performance, with profitability as a moderating variable. This research is expected to raise awareness of the surrounding environment. Even though companies, whether small or large, incur debt in running their businesses and retain profits as additional funding, they are expected to maintain environmental stewardship. By paying attention to the surrounding environment, the public can maintain trust in the company and ensure its continued operations. With the research background that has been explained and supported by the existence of research gaps from previous research, the researcher wants to review the Effect Of Leverage And Company Size On Environmental Performance With Profitability As A Moderating Variable in manufacturing companies in the raw goods sub-sector listed on the Indonesia Stock Exchange (IDX) in the 2021-2023 period. The hypotheses in this study are: (1) does leverage have a significant effect on environmental performance, (2) does company size have a significant effect on environmental performance, (3) does profitability moderate leverage on environmental performance, (4) does profitability moderate company size on environmental performance.

## METHOD

This causality study uses the quantitative causal approach. Quantitative research uses numerous numbers to collect, analyze, and report data. Longitudinal studies examine causality

research data by understanding how one variable can influence another. Causality research can be designed by considering the influence of independent variables on dependent variables. In this study, moderating variables are used to strengthen or weaken the relationship between the independent and dependent variables.

The population of this study was all raw materials sub-sector companies listed on the Indonesia Stock Exchange (IDX) from 2021 to 2023. The population of raw materials sub-sector companies was 91. The population was drawn from raw materials sub-sector companies because, according to the Indonesia Environment and Energy Center (IEC), emissions are also caused by industrial activities. Metal smelting, cement production, and chemical processing are examples of manufacturing processes that produce greenhouse gases and other pollutants. This study uses purposive sampling, which considers certain criteria. The sampling criteria in this study are as follows: (1) Raw material sub-sector companies listed on the IDX for the 2021-2023 period consecutively, (2) Raw material sub-sector companies that released annual reports or financial reports in 2021-2023 consecutively through the IDX website (www.idx.co.id) or on their respective company websites, (3) Raw material sub-sector companies listed on the IDX that used PROPER in 2021-2023 consecutively. Based on these criteria, 30 companies with 90 data can be obtained.

This study used Smart Partial Least Square (SmartPLS) software for data analysis. With data less than 200 and not normally distributed, SmartPLS software assumes nonparametric validity (Sayyida, 2023). The purpose of PLS is to prove theories and analyze how certain variables interact with each other. This analysis used Structural Equation Modeling (SEM). SEM is an analytical technique that examines the relationship between latent constructs and their indicators, latent constructs with other latent constructs, and direct measurement errors (Putlely dkk., 2021). The analytical methods used in this study were descriptive statistical analysis, an outer model (convergent validity), an inner model (adjusted R-square test and goodness of fit test), and hypothesis testing using path coefficient analysis.

## RESULT AND DISCUSSION

### Result

The description and information of the variables in this study can be analyzed using descriptive statistics. Using a sample of 90 companies from the raw materials sub-sector between 2021 and 2023, the following is a descriptive analysis of each variable used in this study:

**Table 1 Results of Descriptive Statistical Analysis**

| Variabel | N | Mean | Minimum | Maximum | Standard deviation |
|---|---|---|---|---|---|
| Leverage (DER) | 90 | 1,128 | 0,070 | 6,230 | 1,210 |
| Company SIze (LN_TA) | 90 | 19,984 | 12,120 | 30,020 | 5,181 |
| Enfiromental Perfomance (PROPER) | 90 | 3,166 | 2,000 | 4,500 | 0,573 |
| Profitability (ROA) | 90 | 0,037 | -0,160 | 0,200 | 0,064 |

**Source: Processed data, 2025**

Table 1 shows that the average (mean) leverage, measured by DER, for companies in the raw materials sub-sector from 2021 to 2023 was 1.128, with a standard deviation of 1.210,

which is greater than the average (mean), indicating significant fluctuations or increases in leverage. Leverage had a minimum (lowest) value of 0.070 and a maximum (highest) value of 6.230, indicating a significant gap among companies in the raw materials sub-sector. Some companies expanded their businesses with little debt, while others used substantial debt to expand their businesses.

The company size of the raw materials sub-sector companies for the 2021-2023 period, measured using the natural logarithm of total assets, in the table shows a mean value of 19.984, which is greater than the standard deviation of 5.181. This indicates that the size has not experienced significant increases or fluctuations. Furthermore, the company size has a minimum (lowest) value of 12.120 and a maximum (highest) value of 30.002. This indicates a significant gap in company size, indicating that the raw materials sub-sector companies in this study consist of both small and large companies.

The table shows that the environmental performance of raw materials sub-sector companies in the period 2021 to 2023 as measured by PROPER has an average value (mean) of 3.166, greater than the standard deviation value of 0.573. This indicates that the data from the environmental performance values of raw materials sub-sector companies does not fluctuate or increase with homogeneous data. The highest (maximum) value of environmental performance is 4.500 and the lowest (minimum) value is 2.000, this indicates a gap that differentiates the environmental performance of companies, there are still companies with poor environmental performance and there are companies with good environmental performance. With an average environmental performance of 3.166, it shows that the average sample in this study has quite good environmental performance.

Profitability in the raw materials sub-sector for the 2021-2023 period, as measured by ROA, showed a mean value of 0.037, smaller than the standard deviation of 0.064. This indicates that profitability data is heterogeneous, with varying data and significant fluctuations or increases. The profitability in this study had a minimum value of -0.160 and a maximum value of 0.200, indicating a large gap and indicating some companies experienced losses and profits. The average value of 0.037 indicates that raw materials sub-sector companies made a profit.

***Convergent Validity***

| | Leve-rage | Company Size | Enviromental Perfomance | Profita-bility | Information |
|---|---|---|---|---|---|
| **DER** | 1.000 | | | | Valid |
| **TA** | | 1.000 | | | Valid |
| **PROPER** | | | 1.000 | | Valid |
| **ROA** | | | | 1.000 | Valid |

**Table 2 Convergent Validity Test Results**

**Source: Processed data, 2025**

Convergent validity is a tool for accurately, consistently, and precisely identifying variable indicators by measuring their outer loading values. Table 2 shows that the indicators for the variables leverage, company size, environmental performance, and profitability have convergent validity values exceeding 0.7, with a value of 1.0. Therefore, based on the analysis, the variables leverage, company size, environmental performance, and profitability have valid values.

**Uji *Adjusted R Square***

**Table 3 Adjusted R Square Test Results**

| | R-square | R-square adjusted |
|---|---|---|
| **Enviromental Perfomance** | 0,198 | 0,149 |

**Source: Processed data, 2025**

The study used the adjusted R-square test to measure the influence of independent variables on the dependent variable. Table 3 shows the results of the adjusted R-square analysis, with a value of 0.149 for the environmental performance variable (Y). This indicates that the variables leverage (X1), company size (X2), and profitability (Z) can explain environmental performance by 14.9% and 85.1%, respectively, which are not included in the study or explained by other research methods.

## Uji *Goodness of Fit*

***Table* 1 Goodness of Fit Test Results**

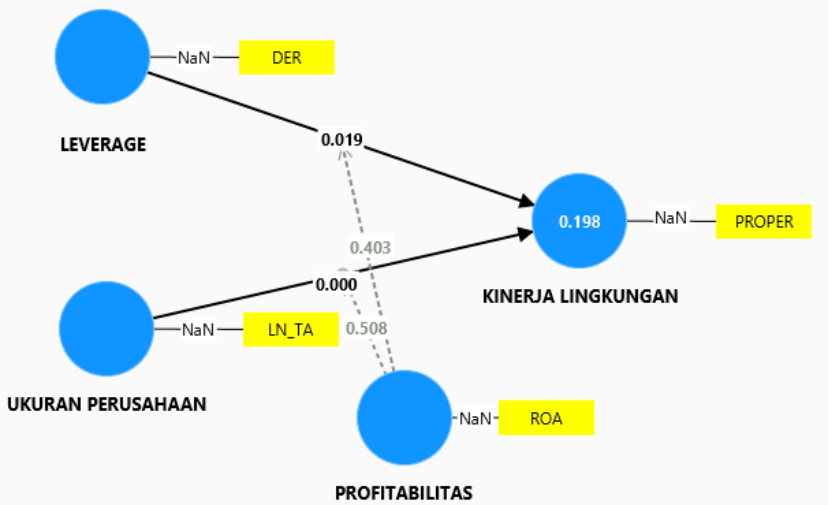
| | Saturated model | Estimated model | Model |
|---|---|---|---|
| **SRMR** | 0.000 | 0.003 | Fit |
| **NFI** | 1.000 | 1.000 | Fit |

source:Processed data, 2025

The goodness of fit study was conducted to test the validity of the measurement and structural models. Based on Table 4, the SRMR value of 0.000 < 0.08 indicates a good fit for the research model. Furthermore, an NFI value of 1.0 > 0.8 indicates a good fit for the research model. By obtaining a good fit for the research model, the hypothesis can be tested.

## *Path Coefficients Analysis*

**Figure 1 Results of Path Coefficients Analysis**



Testing with path coefficients analysis to show the structural model and test the hypothesis as an analysis of the causal relationship both directly and indirectly between variables with other variables in this study using the bootstrapping method to show significant influences. Figure 1 shows the results of the path coefficients analysis to show the structural model in this study with the results of p values. The effect of leverage on environmental performance is significant at 0.019 or 1.9% <0.05 so that the first hypothesis is accepted. The effect of company size on environmental performance has a significant effect with the result of 0.000 or 0.00% <0.05 so that the second hypothesis is accepted. The effect of profitability cannot moderate between leverage and environmental performance with a value of 0.403 or 40.3% >0.05 so that the third hypothesis is rejected. Meanwhile, the effect between company size and environmental performance that cannot be moderated by profitability is 0.508 or 50.8% >0.05 so that the fourth hypothesis is rejected.

## DISCUSSION

### leverage significantly impacts environmental performance

These results indicate that companies with high debt focus on debt repayment, neglecting to manage and improve the environmental impact of their operations. Companies with low debt can allocate funds to manage and improve the environment through their operations. These findings significantly support previous research by (Nursalim, 2022). Based on signaling theory, a company with low leverage sends a positive signal to investors and other stakeholders. A company with low leverage indicates a small amount of debt to support its operations. With a small amount of debt, a company can focus its finances, including on environmental improvements resulting from its operational results. Some companies use debt to finance their operations. Debt carries interest, requiring significant expenditures to repay the debt. Companies in the raw materials sector impact the environment, including air pollution, environmental contamination, and other issues. Environmental sustainability must be maintained to prevent harm to all people and the surrounding environment for the sake of survival. However, companies with significant debt must spend money on interest payments and environmental preservation. Companies with low debt can focus more on environmental preservation and improvement.

### Company size significantly impacts environmental performance

These results indicate that large companies with significant operational volumes have negative environmental impacts, such as waste and air pollution. Small companies with less significant operational output do not have a negative environmental impact. Previous research supports Juliani & Parapat (2024) research. Legitimacy theory explains that companies need to build and maintain stakeholder trust. One way to achieve this trust is by consistently protecting and improving the environment. Companies, both large and small, maintain and preserve their respective environments as a result of their operations. Being environmentally responsible will increase stakeholder trust in the company. Companies, both large and small, each produce waste, garbage, and other things from their operations. Some companies, both large and small, operate to achieve their respective goals. Companies in the raw materials sub-sector, both large and small, in carrying out their operations, incur losses that damage the environment. Maintaining a healthy environment can ensure the company's survival and sustainability. Large companies have a responsibility to care for their environment because they produce more waste, garbage, and other operational results. However, small companies also need to pay attention to their environment to avoid damaging it and maintain environmental sustainability. debt, so that companies do not pay attention to their impact on the environment.

**Profitability does not moderate the relationship between leverage and environmental performance**

These results indicate that high or low profitability has no effect on environmental performance. Companies strive to maintain their operations by continuing to pay off debt, thus ignoring their environmental impact. According to stakeholder theory, companies need to disclose carbon emissions to increase stakeholder trust and maintain environmental sustainability. Some companies focus more on generating profits than on preserving the environment. Companies need to use their leverage to expand their business, one way being to protect the environment. Profitability can be used to partially repay debt and partially protect the environment. Some companies operate with debt, thus having other obligations to consider besides the environment for their continued existence. When companies operate, they generate waste, garbage, and other things that can pollute the surrounding environment. Some companies do not disclose carbon emissions because it is quite expensive. Companies that do achieve profitability do not use it to protect the environment but to repay debt or even for other purposes. Therefore, when a company has leverage to continue its business, it does not use its profitability to improve or protect the environment.

**Profitability does not moderate the relationship between company size and environmental performance**

These results indicate that the size of a company's profitability has no effect on its environmental performance. Companies are too focused on expanding their businesses using their existing funds to consider their environmental impact. According to legitimacy theory, some companies focus solely on profits. Companies that focus on profits will ignore the negative impacts that can harm the surrounding environment. Both large and small companies should pay attention to and improve the environment affected by their operations. Companies generate profits when they run their businesses well. By utilizing these profits, companies can improve their environmental performance. Each company wants to achieve substantial profits. Stakeholders believe large companies have a greater responsibility to care for their surroundings. Large companies maintain their reputations to maintain their businesses. Both small and large companies use their profits to expand their businesses. However, some large companies focus more on ways to expand their businesses than on preserving the environment. Small companies also generate profits from their operations. However, sometimes small companies have limited profits, so they prefer to use these profits to run their businesses rather than improve the environment. The cost of maintaining and improving the environment is quite expensive, so some companies do not disclose their environmental performance. Therefore, some large and small companies have poor environmental performance.

## CONCLUSION

The research concluded that leverage significantly impacts environmental performance. Companies that use debt to build their businesses effectively will improve their environmental performance because they utilize their debt effectively to manage their business and the environment. Company size significantly impacts environmental performance. Companies, both large and small, have an impact on environmental performance because they produce carbon emissions that can harm the environment. Profitability does not moderate the relationship between leverage and environmental performance. Companies' profits are not utilized effectively, resulting in debt and interest payments, which cannot be used to improve and preserve the environment. Furthermore, profitability does not moderate the relationship

between company size and environmental performance. Some companies focus solely on profit, neglecting environmental concerns, whether small or large. Environmental maintenance is expensive, making it a significant consideration for some companies.

This research contributes or benefits as knowledge to the community, government, employees, and others. By analyzing the influence of leverage and company size on environmental performance, moderated by profitability, it can be seen that there are significant and insignificant influences between variables. Companies with high leverage indicate that the company has a lot of debt, with a large amount of debt sometimes forcing the company to focus on paying interest and debt. However, the environment is an important thing to pay attention to, so companies also need to pay attention to operational results that can be detrimental to the environment. Companies, both large and small, produce carbon emissions that can be detrimental to the environment. This study can determine how large or small companies can influence their environmental performance, how they use existing funds to maintain or improve the surrounding environment.

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