



The Moderating Effect of Profitability and Leverage on The Influence of Eco-Efficiency on Firm Value

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Abstract. *This research was conducted because of the emergence of cases of environmental pollution due to excessive production activities and the lack of awareness of business actors towards environmental conservation. Since the emergence of COVID-19 in Indonesia, the demand for medicines and other consumer products has increased. Public demand for companies to continue to care about environmental sustainability to reduce the negative impact of company activities on the environment. One concept that can be applied by management to handle problems that occur between the environment and the company is the concept of eco-efficiency. The purpose of this study is to, first, test the effect of eco-efficiency on firm value, second, test the effect of eco-efficiency on firm value with profitability and leverage as moderating variables. The sample of this research is manufacturing companies in the consumer goods sector listed on the Indonesia Stock Exchange in 2020-2023 using purposive sampling method. This research analysis method uses simple regression analysis and moderating analysis regression (MRA). This study provides evidence that environmental management implemented by the company can significantly provide good company value, besides that the high level of profit earned by the company can moderate the relationship between eco-efficiency and company value with a positive effect but in this study leverage cannot moderate the eco-efficiency relationship.*

Keywords Eco-Efficiency, Profitability, Leverage, Firm Value, ISO 14001.

1. INTRODUCTION

The company's continuous operations use large resources, if these activities continue without being balanced with preservation and recovery, the surrounding community will lose their source of life due to damage to the environment. In 2020 in Indonesia there began to be the spread of the COVID-19 virus, the virus has a high rate of spread which causes adverse negative effects that cause death. The high spread of the virus has confirmed that 6,727,847 Indonesians have been exposed to the virus. This condition results in increased demand for medicines.

The high demand for medicines has led pharmaceutical manufacturers to increase their production to meet market demand. This excessive and continuous production activity has a negative impact on the environment. In 2022, there was a case of high paracetamol waste found in the Citarum river water, and other pharmaceutical waste was also found in the river (Ramdhani & Gabrillin, 2022). (Ministry of Environment, 2018) states that 20% of industrial companies contribute to pollution in the Citarum river and the other 50% comes from household waste.

Plastic bags and packaging are common types of household waste, with around one million plastic bags being used every minute, and they can take hundreds of years to

break down. The lack of environmental awareness among businesspeople is highlighted by 2021 data from the Ministry of Environment and Forestry, which indicates that hazardous and toxic (B3) waste is most significantly contributed by manufacturing companies. In 2021 Indonesia has approximately 60 million tons of hazardous waste, the waste is contributed by 2,897 industries in the manufacturing sector with the highest percentage compared to other sectors (Mutia, 2022).

Based on these conditions, it raises expectations from the community for business people to provide environmental responsibility in the form of minimizing the negative impact of production activities. Companies are required not only to pay attention to the profits generated, but also to pay attention to the condition of the surrounding environment. With the demands of the community, the company tries to fulfill its responsibilities towards the environment in accordance with the Law of the Republic of Indonesia No. 32 of 2009 concerning environmental protection and management in articles 67 and 68. The law states that in carrying out company activities, companies are required to maintain and maintain environmental sustainability.

Management can apply the concept of eco-efficiency to handle problems that arise between the environment and company activities. In line with research conducted by Han, et al., (2021) which shows that the government must encourage industrial improvement accompanied by prioritizing cooperation between the government and companies to encourage the adoption of the concept of eco-efficiency. Eco-efficiency is a concept that implements efficiency and includes aspects of natural resources and energy that minimize the use of raw materials, energy, water, and minimize waste per unit of product from the production process (Safitri et al., 2019).

The company's concern for the environment can be in the form of reducing negative environmental impacts, using efficient raw materials, and suppressing excess production costs by applying the concept of eco-efficiency. In its development, the international standardization organization (ISO) 14001 has been recognized on a global scale which is a standard for assessing the implementation and economic management systems and management of quality aspects. In Indonesia, the ISO 14001-2005 standard is a voluntary environmental standard on environmental management regulations (SNI, 2005). Ownership of ISO 14001-2005 certification shows that a company has fulfilled its obligations towards environmental preservation and is used as an indicator of external

recognition that the company has adopted environmental management, namely eco-efficiency (Hartini, 2018).

Basically, the purpose of establishing a company is to get as much profit or profit as possible (Kalbuana et al., 2021). The strategies implemented by management to enhance company value by benefiting owners and shareholders are reflected in the stock price (Brigham & Houston, 2018). Firm value represents the value per share that would be realized if the company's assets were sold at the current share price (Gitman, 2020). The company's value will increase because effective environmental management can produce good environmental sustainability so that it can create long-term value for all stakeholders. The existence of disclosure or more information on the company is an assessment for investors to invest in the company (Panggau & Septiyani, 2017).

Companies that implement eco-efficiency seek to emphasize production costs that will have a sustainable impact on company profits. The size of the profit generated by the company will affect the value of the company. With an increase in profitability, the company can be more concerned about environmental sustainability. According to Osazuwa & Che Ahmad (2016) high profitability can increase the influence of eco-efficiency on firm value. Apart from profitability, another factor that affects firm value is leverage. Leverage refers to the use of assets and fixed-cost financing sources to amplify potential profits for shareholders (Sartono, 2015). Khosyi & Handayani (2022) state that increased dependence on debt will ensure that companies increase environmental activities in order to meet creditor expectations on environmental issues, this shows that positive leverage can increase the influence of eco-efficiency on firm value.

Based on this description, the researcher is encouraged to conduct research with the title "**The Moderating Effects of Profitability and Leverage on the Influence of Eco- efficiency on Firm Value**".

2. LITERATURE REVIEW

Signal Theory

Company management has an obligation to provide good information to shareholders. The information provided by the company's management is a signal to convince shareholders of the condition of the company's value. Ross (1977) states that a signal that is said to be good is a signal that cannot be imitated by companies that have little value. The implementation of activities as the company's responsibility to

stakeholders is a good signal, because the company does not only seek profit for itself but also pays attention to stakeholders.

Stakeholder Theory

Stakeholder theory is a theory that states that a company is not an entity that only operates for the benefit of an entity but is also required to provide benefits to stakeholders (Ghozali & Ratmono, 2018). This makes management pay attention to company activities to fulfill their responsibilities to their stakeholders. One of the responsibilities that can be carried out by the company is to carry out effective environmental management. These activities will affect the company's image to be good and stakeholders have a positive view of the value of a company. A well-established relationship between the company and stakeholders will increase the company's value in the future.

Legitimacy Theory

Legitimacy theory is a company's social contract with the company's surrounding environment. Suchman (1995) in Rawi & Muchlish (2010) states that an entity will continuously try to ensure that they carry out activities in accordance with the limits and norms that apply to the environment in which their society is located. The way the company convinces the community can be by paying attention to its responsibility to the environment, efficient utilization of resources that follow ISO 14001 international environmental performance standards. These activities can lead the company to get a positive assessment and trust from the community in connection with the activities or activities that the company has carried out (Ghozali & Ratmono, 2018). With the trust gained from the community, it is hoped that the company can increase the company's value.

Research Hypothesis

1. The effect of *eco-efficiency* on firm value

Implementing the concept of *eco-efficiency* is a good signal from the company that the company has carried out activities to reduce negative impacts on the environment and resource use management. This can increase company value because shareholders believe the company has a good image with the community environment. D'Amato & Falivena (2020) in their research state that disclosure of corporate responsibility for a sustainable environment tends to have a higher stock

- price. Based on this description, this study formulates the hypothesis that *eco-efficiency* affects firm value.
2. Profitability moderates the relationship between *eco-efficiency* and firm value
The main purpose of establishing a company is to achieve maximum profit. Management decisions in making policies can provide a significant level of profit. Helmina et al., (2022) in their research shows that the level of profit owned by the company is able to moderate the relationship between *eco-efficiency* and firm value. Based on this description, this study formulates the hypothesis that profitability can moderate the relationship between *eco-efficiency* and firm value.
 3. Leverage moderates the relationship between *eco-efficiency* and firm value
Leverage is the ability of a company to fulfill all its obligations if the company is liquidated (Munawir, 2010). Research conducted by Dewi et al., (2021) shows the influence of the level of *leverage* on the relationship between corporate responsibility disclosure and firm value. Based on this description, this study formulates the hypothesis that *leverage* can moderate the relationship between *eco-efficiency* and firm value.

3. METHODS

Population and Sample

This study uses secondary data in the form of annual reports of consumer goods companies listed on the Indonesia Stock Exchange for 2020-2023. Data collection was conducted using purposive sampling techniques, selecting participants based on specific, predetermined criteria. 148 sample data were obtained which then required outliers to be 141 sample data companies used in this study.

Variable Measurement

1. Dependent Variable

Firm value is the company's performance which is reflected in the stock price, the higher the company value, the higher the prosperity of its stakeholders (Wahasusmiah & Arshintia, 2022). So that this research, the company value is measured by the natural logarithm of the stock price (Ln stock price).

2. Independent Variable

The *eco-efficiency* variable as an independent variable is measured using a dummy variable which is seen based on ownership of ISO 14001 certification. Companies

that have ISO 14001 certification are given a value of 1, while companies that do not have this certification are given a value of 0.

3. Moderating Variable

- a. Profitability is a value that reflects the profit generated by the company (Ali et al., 2021). In this study, profitability is measured using *Return on Equity* (ROE):

$$\text{ROE} = \frac{\text{Profit After Tax}}{\text{Total Equity}}$$

- b. Leverage is the size of the debt used to finance the company's assets (Kasmir, 2019). Leverage in this study was measured using the Debt to Equity Ratio (DER):

$$\text{DER} = \frac{\text{Total Liabilities}}{\text{Total Equity}}$$

Data Analysis Method

This research uses simple linear regression and *moderated regression analysis* methods which are processed using SPSS. The regression model in this study is as follows:

- 1. Simple linear regression

$$\text{LnNP} = \alpha + \beta_1 \text{ECO} + e$$

- 2. Moderated Regression Analysis

$$\text{LnNP} = \alpha + \beta_1 \text{ECO} + \beta_2 \text{ROE} + \beta \text{DER} + \beta_{34} \text{ECO_ROE} + \beta_5 \text{ECO_DER} + e$$

4. RESULTS

Multicollinearity Test Results

Tabel 1. First Equation Multicollinearity Test Results

First Equation Test Results		
Model	Collinearity Statistics	
	Tolerance	VIF
1 (Constant)		
ECO	1.000	1.000

a. Dependent Variable: LN_NP

Source: Data processed, 2024

Tabel 2. Second Equation Multicollinearity Test Results

Second Equation Test Results	
Model	Collinearity Statistics

		Tolerance	VIF
1	(Constant)		
	ECO	.640	1.562
	ROE	.830	1.205
	DER	.933	1.071
	ECO_ROE	.125	7.972
	ECO_DER	.129	7.773

a. Dependent Variable: LN_NP

Source: Data processed, 2024

Based on the test results that have been carried out in the simple linear regression model and MRA, there is no multicollinearity found because both regressions show the results of tolerance values > 0.10 and VIF values < 10.

Autocorrelation Test Results

Tabel 3. First Equation Autocorrelation Test Results

First Equation Test Results	
Model	Durbin-Watson
1	2.000

a. Predictors: (Constant), ECO

Dependent Variable: LN_NP

Source: Data processed, 2024

Tabel 4. Second Equation Autocorrelation Test Results

Second Equation Test Results	
Model	Durbin-Watson
1	1.835

a. Predictors: (Constant), ECO_DER, DER, ROE, ECO, ECO_ROE

Dependent Variable: LN_NP

Source: Data processed, 2024

The results of the autocorrelation test using the Durbin-Watson test show that the DW value for the first equation is 2.000, while the DW value for the second equation is 1.835. Both values are between -2 to + 2 so it can be interpreted that in the two regression models of this study there is no autocorrelation relationship.

Goodnes of Fit Test Results (F Test)

Tabel 5. First Equation F Test Results

First Equation Test Results		
Model	F	Sig.

1	Regression	9.144	.003 ^b
	Residuals		
	Total		

a. Dependent Variable: LN_NP

b. Predictors: (Constant), ECO

Source: Data processed, 2024

Tabel 6. Second Equation F Test Results

Second Equation Test Results			
Model		F	Sig.
1	Regression	4.296	.001 ^b
	Residuals		
	Total		

a. Dependent Variable: LN_NP

b. Predictors: (Constant), ECO_DER, DER, ROE, ECO, ECO_ROE

Source: Data processed, 2024

The test results indicate that both regressions have significance values less than 0.05, with the first regression showing a significance of 0.003 and the second regression showing a significance of 0.001. Based on this significance value, two regression models in this study are suitable for predicting the value of the variables and it is said that the regression model fits.

Regression Coefficient Test Results (R)²

Tabel 7. Second Regression Coefficient Test Results (R)²

Second Equation Test Results		
Model	R Square	Adjusted R Square
1	.728	.330

a. Predictors: (Constant), ECO_DER, DER, ROE, ECO, ECO_ROE

Dependent Variable: LN_NP

Source: Data processed, 2024

The results of the R² test in the simple linear regression indicate that the adjusted R² value is 0.105, meaning that the eco-efficiency variable accounts for 10.5% of the variation in stock prices, with the remaining 89.5% explained by factors not included in the study. In the multiple regression analysis (MRA), the adjusted R² value is 0.330, indicating that 33% of the changes in stock prices are influenced by eco-efficiency, profitability, and leverage, while the remaining 67% are due to variables outside the scope of this research.

Regression Analysis Results

Based on the tests that have been carried out in this study, the regression equation is as follows:

1. Simple linear regression

$$\text{LnNP} = 6.897 + 0.607 \text{ ECO} + e$$

2. Moderated Regression Analysis

$$\text{LnNP} = 6.972 + 1.235 \text{ ECO} + 2.365 \text{ ROE} + 0.004 \text{ DER} + 2.826 \text{ ECO_ROE} - 0.533 \text{ ECO_DER} + e$$

Hypothesis Test Results

Tabel 8. First Hypothesis Test Results

First Equation Test Results			
Model		t	Sig.
1	(Constant)	52.684	.000
	ECO	3.024	.003

a. Dependent Variable: LN_NP

Source: Data processed, 2024

The test results indicate that the significance value of the eco-efficiency variable is 0.003, which is less than 0.05. This suggests that the hypothesis in this study is accepted, confirming that eco-efficiency has a significant effect on firm value.

Tabel 9. Second Hypothesis Test Results

Second Equation Test Results			
Model	t	Sig.	Model
1	(Constant)	48.308	.000
	ECO	1.926	.003
	ROE	1.775	.001
	DER	.085	.932
	ECO_ROE	2.598	.010
	ECO_DER	-1.294	.198

a. Dependent Variable: LN_NP

Source: Data processed, 2024

Based on the test results that have been carried out on the ECO_ROE variable shows a significant value of $0.01 < 0.05$ so it can be stated that the research hypothesis is accepted profitability can moderate the relationship between eco-efficiency and firm value with a positive effect. The test results for the ECO_DER variable show a

significance value of $0.198 > 0.05$ so it can be stated that the hypothesis in this study is rejected leverage cannot moderate the relationship between eco-efficiency and firm value.

5. DISCUSSION

Eco-Efficiency Affects Company Value

In this study, the eco-efficiency variable has an effect on firm value. This is indicated by a significance value of $0.003 < 0.05$. The results of this study indicate that adopting the concept of environmental management by having ISO 14001 certification ownership can increase company value through an increase in stock price. The results of this study are in line and consistent with research conducted by Ashidqi (2020), Lesmana & Kesaulya (2022), Dianti & Puspitasari (2024), Anjarsari et al, (2023), which state that the adoption of the eco-efficiency concept has a major impact on increasing firm value.

Profitability Can Moderate the Relationship between Eco-Efficiency and Firm Value

In this study, the ECO_ROE variable shows a significant value of $0.01 < 0.05$ so that this study provides evidence that the level of profit earned by the company can strengthen the company to adopt the concept of eco-efficiency which will provide an increase in company value. The results of this study are in line with research conducted by Helmina et al., (2022), Hartini (2018), Guenster et al., (2011), Machmuddah et al., (2020) which shows that profitability can strengthen the relationship of eco-efficiency to firm value. The results of this study are not in line with the research of Anjarsari et al.,(2023), Wusono & Matusin (2019), which state that profitability cannot affect the eco-efficiency relationship.

Leverage Cannot Moderate the Relationship between Eco-efficiency and Firm Value

In this study, the ECO_DER variable shows a significance value of $0.198 > 0.05$ so that this study provides evidence that the high level of debt or leverage value owned by the company has no effect on strengthening or weakening the adoption of the eco-efficiency concept which will increase the company's value. The results of this study are in line with research conducted by Wusono & Matusin (2019) which states that the level of leverage cannot moderate the relationship between eco-efficiency and firm value. The results of this study are not in line with the results of research by Dewi et al (2021),

Santosa (2020), Jihadi et al.,(2021) which state that leverage can strengthen the relationship between eco-efficiency and firm value.

6. CONCLUSION

This study was conducted to examine the moderating effect of profitability and leverage on the relationship between eco-efficiency and firm value. This research was conducted with 141 sample data of manufacturing companies in the consumer goods sector listed on the IDX in 2020-2023. Based on the research that has been done, the results show that eco-efficiency affects firm value. This happens because companies always try to give good signals to stakeholders. Demands from the public and the government for companies to increase their concern for the environment. In addition, the level of profitability in this study shows the results can moderate by strengthening the relationship between eco-efficiency and firm value. The higher the level of profitability owned by the company, the company will continue to maintain the concept of environmental management by adopting eco-efficiency supported by ownership of ISO 14001 certification. As for leverage, it has no influence on the relationship between eco-efficiency and firm value. The higher the level of leverage, the company will continue to adopt the concept of eco-efficiency to fulfill its responsibility to the environment.

7. LIMITATION

This study has a research year limit and the sample only covers consumer goods sector companies so that it cannot interpret the conditions of all companies in Indonesia. Of the 141 research samples, less than 50% of companies have ISO 14001 certification so that further research needs to be carried out regarding the factors that influence the ownership of ISO 14001 certification.

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