

The Effect of Greenhouse Gas Emission Intensity and Liquidity on Profitability at PT Unilever Indonesia Tbk for the Period 2015-2024

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Abstract: Changes in environmental performance and liquidity conditions can affect the profitability of manufacturing companies. This study aims to analyze the effect of Greenhouse Gas Emission Intensity and Current Ratio on Return on Assets at PT Unilever Indonesia Tbk for the period 2015–2024. The study uses a quantitative descriptive associative approach. The population and sample are financial reports and sustainability reports of PT Unilever Indonesia Tbk for 2015–2024 with a purposive sampling technique, resulting in 10 observations. Secondary data were analyzed using descriptive statistics, classical assumption tests, multiple linear regression, correlation, coefficient of determination, t-test, and F-test. The results show that Greenhouse Gas Emission Intensity has a positive and significant effect on ROA ($t = 3.886$; $p = 0.006$), while Current Ratio also has a positive and significant effect ($t = 6.772$; $p < 0.001$). Simultaneously, both variables have a significant effect on ROA ($F = 64.254$; $p < 0.001$; $R^2 = 0.948$). In conclusion, variations in ROA can be strongly explained by emission intensity and liquidity.

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Introduction

In the modern business sector, companies are not only required to achieve financial performance but also to pay attention to sustainability, including environmental aspects. One issue of concern is greenhouse gas emission intensity related to climate change. This condition encourages companies to increase transparency through sustainability reporting (Athaya et al., 2025). According to Suyanto (2023:12), "One of the main factors causing climate change is human activity. The use of fossil fuels such as coal, petroleum, and natural gas for transportation, industry, and power generation produces greenhouse gas emission intensity (greenhouse gas emissions) such as carbon dioxide (CO₂), methane (CH₄), and nitrogen oxide (N₂O). These gases strengthen the Earth's natural greenhouse effect, which causes global temperatures to rise."

PT Unilever Indonesia Tbk is a manufacturing company that consistently discloses sustainability reports and emission intensity levels. Operational activities that use energy and resources

make emission management crucial for the company (Awanda & Bayangkara, 2025). Sustainability disclosure obligations are also strengthened through POJK Number 51/POJK.03/2017 and SEOJK Number 16/SEOJK.04/2021 (Amanda Oktariani, 2024; Susilawati, 2026). Furthermore, Indonesia has ratified Sustainability Disclosure Standards that adopt IFRS S1 and IFRS S2 (Indonesian Institute of Accountants, 2025), and strengthened emission control through Presidential Regulation Number 110 of 2025 (Republic of Indonesia, 2025).

The problem is seen from the decline in Greenhouse Gas Emission Intensity of PT Unilever Indonesia Tbk from 2015 to 2024. Emission intensity decreased from 119.76 kg CO₂e per ton of product in 2015 to 11.40 kg CO₂e per ton of product in 2024. However, this decrease is not always in line with profitability because ROA also decreased, from 46.66% in 2018 to 20.99% in 2024. This condition indicates a gap between the development of environmental performance and the company's financial performance.

Another issue is the company's liquidity, which remains below general standards. PT Unilever Indonesia Tbk's current ratio from 2015 to 2024 ranged from 0.45 to 0.75, or 44.63% to 74.76%. This value is still below the standard of 200%, or 2:1, which, according to Kasmir (2019), indicates a good current ratio. A decline in the current ratio to 0.45 by 2024 indicates a weakening of the company's ability to meet short-term obligations.

In addition to this phenomenon, previous research results show inconsistencies. Nabilah & Nugroho (2024) found that the Current Ratio significantly influences ROA, while Padilah & Janudin (2024) found that the Current Ratio has no effect on ROA. Oestreich & Tsiakas (2024) found a negative relationship between carbon emission intensity and ROA, while Vaicondam et al. (2025) found a positive relationship between GHG emissions and ROA. These conditions indicate a research gap that requires further study, especially because there are differences between stakeholder theory and legitimacy theory and the empirical conditions of companies (Freeman, 1984; Martusa & Meythi, 2025).

This study aims to determine the effect of Greenhouse Gas Emission Intensity and Liquidity (Current Ratio) on Profitability (Return on Assets) at PT Unilever Indonesia Tbk for the period 2015 to 2024. This study is important to provide an empirical picture of the relationship between environmental performance, liquidity, and company profitability. The novelty of the study lies in testing both independent variables together on ROA at PT Unilever Indonesia Tbk for the period 2015 to 2024.

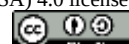
Research methods

This research uses a quantitative method with an associative descriptive approach. According to Sugiyono (2019), quantitative methods are used to test hypotheses through statistical data collection and analysis. This study analyzes the effect of Greenhouse Gas Emission Intensity (X1) and Current Ratio (X2) on Return on Assets (Y), both partially and simultaneously.

The research data consists of secondary data from the financial statements and sustainability reports of PT Unilever Indonesia Tbk for the period 2015 to 2024. Greenhouse Gas Emission Intensity data was obtained from the sustainability report, while Current Ratio and Return on Assets were obtained from the financial statements. Data analysis includes descriptive statistics, classical assumption tests, multiple linear regression, correlation, coefficient of determination, t-test, and F-test with a significance level of 5% (Ghozali, 2021; Sugiyono, 2019).

The research population comprised all financial statements and sustainability reports of PT Unilever Indonesia Tbk for the period 2015 to 2024. The sample consisted of financial position statements, income statements, and sustainability reports containing emission intensity data for the period. Purposive sampling was used, based on the availability and suitability of the research data.

The research was conducted through the stages of data collection, data processing, data analysis, and preparation of research results. Data were obtained through financial reports and sustainability reports of PT Unilever Indonesia Tbk, then processed using descriptive statistics, classical assumption tests, multiple linear regression, correlation analysis, coefficient of determination, as well as t-tests and F-tests. The research was conducted from September 2025 to July 2026 with research data from the period 2015 to 2024.



Results and Discussion

1. Ratio Calculation

Table 1 Greenhouse Gas Emission Intensity Data for the period 2015-2024

Year	GHG Emission Intensity(kg CO ₂ e/ton)
2015	119.76
2016	105.4
2017	103.05
2018	101.69
2019	60.25
2020	20.59
2021	12.95
2022	15.56
2023	14.50
2024	11.40

Based on Table 1, the Greenhouse Gas Emission Intensity of PT Unilever Indonesia Tbk during 2015–2024 experienced a consistent decline, from 119.42 kgCO₂e/ton of product in 2015 to 11.40 kgCO₂e/ton in 2024. The decline of more than 90% shows the company's success in implementing eco-efficiency through the use of more efficient energy, renewable energy, and increasing the efficiency of production machines.

The formula used to calculate the Current Ratio is as follows:

$$\text{Current Ratio} = \frac{\text{aktiva lancar (current assets)}}{\text{utang lancar (current assets)}} \times 100\%$$

Source: according to kasmir (2019)

Table 2 Results of Current Ratio Calculation for 2015-2024

Year	Current assets (In Millions of Rupiah)	Current Liabilities (In Millions of Rupiah)	CR	%
2015	6,623,114	10,127,542	0.65	65.40
2016	6,588,109	10,878,074	0.61	60.56
2017	7,941,635	12,532,304	0.63	63.36
2018	8,325,029	11,134,786	0.75	74.76
2019	8,530,334	13,065,308	0.65	65.29
2020	8,828,360	13,357,536	0.66	66.09
2021	7,642,208	12,445,152	0.61	61.40
2022	7,567,768	12,442,223	0.61	60.82
2023	6,191,839	11,223,968	0.55	55.16
2024	5,280,548	11,830,201	0.45	44.63

Based on Table 2, PT Unilever Indonesia Tbk's Current Ratio during 2015–2024 was below the general standard of 200% and decreased from 0.65 in 2015 to 0.45 in 2024. This condition indicates that current assets have not been fully able to cover short-term debt. The decline was influenced by the reduction in current assets and high current liabilities, so although this condition can occur in consumer goods companies with fast cash turnover, the decline in the ratio in 2024 still needs to be a concern for management.

Formula:

$$\text{Return On Assets} = \frac{\text{Laba Bersih Setelah Pajak}}{\text{Total Aset}} \times 100\%$$

Source: Kasmir (2019)

Table 3 Results of Return on Assets Calculation for 2015-2024

Year	Net profit (In Millions of Rupiah)	Total Assets (In Millions of Rupiah)	ROA	ROA (%)
2015	5,851,805	15,729,945	0.3720	37.20
2016	6,390,672	16,745,695	0.3816	38.16
2017	7,004,562	18,906,413	0.3705	37.05
2018	9,109,445	19,522,970	0.4666	46.66
2019	7,392,837	20,649,371	0.3580	35.80
2020	7,163,536	20,534,632	0.3488	34.88
2021	5,758,148	19,068,532	0.3020	30.19
2022	5,364,761	18,318,114	0.2929	29.28
2023	4,800,940	16,664,086	0.2881	28.81
2024	3,368,693	16,046,195	0.2099	20.99

Based on Table 4, PT Unilever Indonesia Tbk's Return on Assets (ROA) fluctuated with a downward trend from 2015 to 2024. The highest ROA occurred in 2018 at 46.66%, while the lowest was in 2024 at 20.99%. Despite the decline since 2019, ROA still demonstrates the company's ability to utilize assets to generate profits. However, this condition requires careful attention to maintain asset management and profitability.

Descriptive Statistical Test

Table 4 Results of Descriptive Statistical Tests

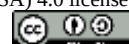
<i>Descriptive Statistics</i>					
	N	Minimum	Maximum	Mean	Standard Deviation
Greenhouse gas emission intensity	10	11.40	119.76	56.5150	46.27978
Current ratio	10	44.63	74.76	61.7470	7.85612
Return on assets	10	20.99	46.66	33.9020	6.94448
Valid N (listwise)	10				

Based on the results of descriptive statistical tests, Greenhouse Gas Emission Intensity (X1) has a minimum value of 11.40, a maximum of 119.76, an average of 56.5150, and a standard deviation of 46.27978. Current Ratio (X2) has a minimum value of 44.63, a maximum of 74.76, an average of 61.7470, and a standard deviation of 8.85612. Meanwhile, Return on Assets (Y) has a minimum value of 20.99, a maximum of 46.66, an average of 33.9020, and a standard deviation of 6.94448.

Classical Assumption Test

Table 5 Normality Test Results

One-Sample Kolmogorov-Smirnov Test		
Unstandardized Residual		
N		10
Normal Parameters ^{a,b}	Mean	.0000000
	Standard Deviation	1.57835831
Most Extreme Differences	Absolute	.125
	Positive	.125
	Negative	-.125
Kolmogorov-Smirnov Z		.397
Asymp. Sig. (2-tailed)		.998
a. Test distribution is Normal.		
b. Calculated from data.		



From table 5 it can be seen that the significant value obtained is 0.998 which is greater than > 0.050 .

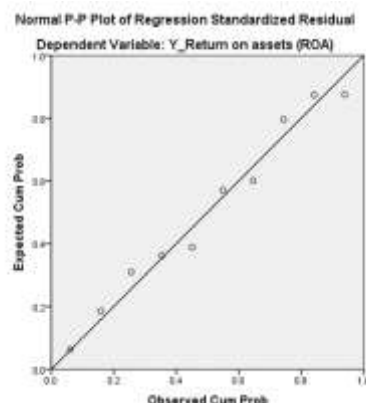


Figure 1 Normality Test Results

Judging from Figure 1, the normal probability graph shows a normal pattern. This is evident from the points being distributed around the diagonal, and their distribution along the diagonal. Therefore, it can be concluded that the regression model meets the assumption of normality.

Table 6 Multicollinearity Test Results

Coefficientsa			
model		Collinearity Statistics	
		Tolerance	VIF
1	Greenhouse gas emission intensity	.699	1,431
	Current ratio	.699	1,431

Based on Table 6, the Tolerance values for Greenhouse Gas Emission Intensity and Current Ratio are each 0.699, while the VIF values are each 1.431. Since the Tolerance value is < 1 and $VIF < 10$, it can be concluded that the regression model does not experience multicollinearity.

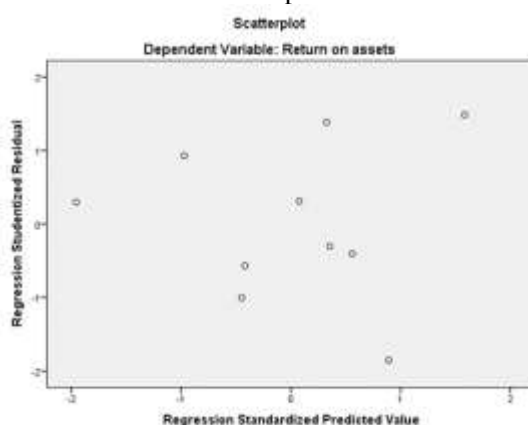


Figure 2 Heteroscedasticity Test Results

Based on Figure 2, it can be concluded that the Heteroscedasticity test on the scatterplot graph shows that the points are spread randomly above and below the number 0 on the Y axis (Studentized Residual regression), this shows that there are no symptoms of Heteroscedasticity in the regression model.

Table 7 Durbin Watson Autocorrelation Test (DW Test)

Model Summary					
Model	R	R Square	Adjusted R Square	Standard Error of the Estimate	Durbin-Watson
1	.974a	.948	.934	1.78969	2.587
a. Predictors: (Constant), Current ratio (CR), Greenhouse gas emission intensity					
b. Dependent Variable: Return on assets (ROA)					

Based on Table 7, the Durbin-Watson value is 2.587, while the dL value is 0.6972 and dU is 1.6413. The calculation results show $2.3587 < 2.587 < 3.3028$, so the Durbin-Watson value is in the doubtful or inconclusive area. Therefore, additional testing is carried out using the Runs Test to confirm the presence or absence of autocorrelation symptoms in the regression model.

Table 8 Runs Test Results

Runs Test	
Unstandardized Residual	
Test Value ^a	-.09312
Cases < Test Value	5
Cases ≥ Test Value	5
Total Cases	10
Number of Runs	8
Z	1.006
Asymp. Sig. (2-tailed)	.314

a. Median

Source: SPSS 20 output

Based on the Runs Test results above, the significance value is 0.314, where $0.314 > 0.05$. It can be concluded that this regression model does not exhibit autocorrelation. Therefore, the autocorrelation issue, which could not be confirmed through the Durbin-Watson test, can be confirmed by the Runs Test results, thus confirming the feasibility of the regression model and allowing for further regression analysis.

Multiple Linear Regression Analysis

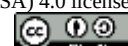
Table 9 Results of Multiple Linear Regression Analysis Test

Table 5: Results of Multiple Linear Regression Analysis (continued)							
Coefficients ^a							
		Unstandardized		Standardized		Collinearity Statistics	
		Coefficients		Coefficients			
Model		B	Std. Error	Beta	T	Sig.	
1	(Constant)	-7,461	5,212		-1,431	.195	
	Greenhouse gas emission intensity	.060	.015	.399	3,886	.006	.699
	Current ratio (CR)	.615	.091	.696	6,772	.000	.699

a. Dependent Variable: Y_Return on assets (ROA)

Source: SPSS 20 output

Based on Table 9, the multiple regression equation is $Y = -7.461 + 0.060(X_1) + 0.615(X_2)$. The constant of -7.461 indicates that if the Greenhouse Gas Emission Intensity and Current Ratio are 0, then the Return on Assets is -7.461. The X1 coefficient of 0.060 indicates that every one-unit increase in Greenhouse Gas Emission Intensity increases the Return on Assets by 0.060 with other variables



constant. Meanwhile, the X2 coefficient of 0.615 indicates that every one-unit increase in the Current Ratio increases the Return on Assets by 0.615.

Correlation Coefficient Analysis

Table 10 Results of Correlation Coefficient Test

		<i>Correlations</i>		
		<i>Greenhouse gas emission intensity</i>	<i>Current ratio</i>	<i>Return on assets</i>
<i>Greenhouse gas emission intensity</i>	Pearson Correlation Sig. (2-tailed)	1	.549	.781**
			.101	.008
	N	10	10	10
<i>Current ratio</i>	Pearson Correlation Sig. (2-tailed)	.549	1	.915**
		.101		.000
	N	10	10	10
<i>Return on assets</i>	Pearson Correlation Sig. (2-tailed)	.781**	.915**	1
		.008	.000	
	N	10	10	10

**. Correlation is significant at the 0.01 level (2-tailed).

Based on Table 10, Greenhouse Gas Emission Intensity has a strong positive correlation with Return on Assets of 0.781 with a significance level of $0.008 < 0.05$, so the relationship between the two is significant. Meanwhile, the Current Ratio has a very strong positive correlation with Return on Assets of 0.915 with a significance level of $0.000 < 0.05$, indicating that the better the company's liquidity, the higher the tendency for Return on Assets.

Analysis of the Coefficient of Determination (R²)

Table 11 Results of simultaneous determination coefficient tests of Greenhouse gas emission intensity (X1) and Current ratio (X2) on Return on assets (Y)

<i>Model Summary</i>				
Model	R	R Square	Adjusted R Square	Standard Error of the Estimate
1	.974a	.948	.934	1.78969

a. Predictors: (Constant), X2_Current ratio, X1_Greenhouse gas emission intensity

b. Dependent Variable: Y_Return on assets

Table 11 above shows an R Square value of 0.948. This means that the independent variables Greenhouse Gas Emission Intensity and Current Ratio can explain 94.8% of the variation in Return on Assets. The remaining 5.2% is influenced by factors outside the research model. The Adjusted R Square value obtained is 0.934. After adjusting for the number of independent variables and sample size, the model is still able to explain 93.4% of the Return on Assets variable. This explains that the research model has a good ability to explain the relationship between the independent and dependent variables.

Hypothesis Testing

Table 12 Results of the T-Test Hypothesis Test (Partial)

<i>Coefficientsa</i>					
Model	<i>Unstandardized Coefficients</i>		<i>Standardized Coefficients</i>	t	Sig.
	B	Std. Error	Beta		
(Constant)	-7,461	5,212		-1,431	.195
1 <i>Greenhouse gas emission intensity</i>	.060	.015	.399	3,886	.006
<i>Current ratio</i>	.615	.091	.696	6,772	.000

a. Dependent Variable: Return on assets

Based on Table 12, Greenhouse Gas Emission Intensity has a t-count value of 3.886 > t-table 2.36462 with a significance of 0.006 < 0.05, so it has a positive and significant effect on Return on Assets. Meanwhile, Current Ratio has a t-count value of 6.772 > t-table 2.36462 with a significance of 0.000 < 0.05, so it also has a positive and significant effect on Return on Assets at PT Unilever Indonesia Tbk for the period 2015–2024.

Table 13 F-Test Results (Simultaneous)

<i>ANOVA</i>					
Model	<i>Sum of Squares</i>	<i>df</i>	<i>Mean Square</i>	F	Sig.
<i>Regression</i>	411,612	2	205,806	64,254	.000b
1 <i>Residual</i>	22,421	7	3,203		
<i>Total</i>	434,033	9			

a. Dependent Variable: Return on assets

b. Predictors: (Constant), Current ratio, Greenhouse gas emission intensity

Based on Table 13, the F test results show that the Greenhouse gas emission intensity and Current ratio variables simultaneously have a significant effect on Return on Assets. This is evidenced by the calculated F value of 64.254 > Ftable 4.74, with Df1 = 3 – 1 = 2 and Df2 = 10 – 3 = 7 and a significance value of 0.000 < 0.05. It can be concluded that Ho is rejected and Ha is accepted, meaning that the independent variables jointly influence the dependent variable at PT Unilever Indonesia Tbk for the period 2015–2024.

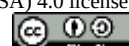
Discussion

This section discusses the results of the influence of Greenhouse Gas Emission Intensity and Current Ratio on Return on Assets at PT Unilever Indonesia Tbk for the 2015–2024 period. Based on data management and previous tests, the following points can be explained and concluded from this study:

1. The Effect of Greenhouse Gas Emission Intensity on Return on Assets

The results of the t-test (partial) show a significant number of the influence of Greenhouse Gas Emission Intensity on Return On Assets of 0.006 < 0.05. on the other hand, the calculated t value is 3.886 > ttable 2.36462. With this, Ho is rejected and Ha is accepted, indicating that Greenhouse Gas Emission Intensity has a positive and significant effect on Return On Assets at PT Unilever Indonesia Tbk for the 2015–2024 period.

This research is in line with research conducted by Vaicondam et al (2025) in the International Journal of Energy Economics and Policy. The results of the study stated that increasing GHG emissions are positively correlated with profitability (ROA) and Tobin's Q. This positive relationship explains that if a company is not actively reducing emissions, it will actually gain short-term financial benefits.



2. The Effect of Current Ratio on Return on Assets

The results of the t-test (partial) show that the Current Ratio's influence on Return On Assets is $0.000 < 0.05$. On the other hand, the t-value is $6.772 > t\text{-table } 2.36462$. Thus, H_0 is rejected and H_a is accepted, this indicates that the Current Ratio has a positive and significant effect on Return On Assets at PT Unilever Indonesia Tbk for the 2015-2024 period.

This research aligns with previous research conducted by Zerlinda Nabilah & Riski Dwi Nugroho (2025), Journal of Management Synergy. The research findings indicate that the current ratio significantly influences Return on Assets.

3. The Simultaneous Effect of Greenhouse Gas Emission Intensity and Current Ratio on Return on Assets

The results of the F test (Simultaneous) show that the Effect of Greenhouse Gas Emission Intensity and Current Ratio on Return On Assets has a significance figure of $0.000 < 0.05$. In addition, the F count value of $64.254 > F\text{ table } 4.74$. With $Df_1 = 3 - 1 = 2$ and $Df_2 = 10 - 3 = 7$, the conclusion is that H_0 is rejected and H_a is accepted, which means that Greenhouse Gas Emission Intensity and Current Ratio simultaneously have a significant influence on Return On Assets at PT Unilever Indonesia Tbk during the period 2015 to 2024.

This study demonstrates concrete results, although no previous studies have simultaneously tested the combination of Greenhouse Gas Emission Intensity and Current Ratio on Return on Assets. The results obtained can strengthen stakeholder theory and general finance theory. These results indicate that the profitability of PT Unilever Indonesia Tbk is not only influenced by the company's ability to manage liquidity, but also by the company's efforts to address and reduce greenhouse gas emissions. Good environmental management can improve a company's reputation and provide added value to consumers and investors, which can help increase the company's profits in the long term.

Conclusion

Based on the research results, Greenhouse Gas Emission Intensity and Liquidity, measured using the Current Ratio, were found to have positive and statistically significant relationships with Profitability, measured using Return on Assets, within the research model at PT Unilever Indonesia Tbk for the period 2015–2024. Partially, Greenhouse Gas Emission Intensity showed a significant relationship with ROA ($p = 0.006$), while Current Ratio also showed a significant relationship with ROA ($p < 0.001$). Simultaneously, both variables were significantly associated with ROA ($F = 64.254$; $R^2 = 0.948$). These statistical findings describe the relationships observed in the research model and should not be interpreted as evidence that increasing greenhouse gas emissions improves profitability. Practically, the findings indicate the importance of considering emission management and liquidity management in evaluating the company's financial performance. However, the interpretation should be considered cautiously because the study used only 10 observations from one company. Further research is recommended to involve more companies, longer observation periods, and additional financial and sustainability variables.

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