

The Effect of Financial Leverage and Operational Efficiency on Profitability at PT Astra Agro Lestari Tbk for the 2015-2025 Period

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Abstract: *This research is motivated by changes in the financial condition of PT Astra Agro Lestari Tbk from 2015 to 2025 and differences in previous research findings regarding financial leverage, operational efficiency, and profitability. This study aims to analyze the relationship of Debt to Asset Ratio (DAR) and Total Asset Turnover (TATO) with Return on Assets (ROA), both partially and simultaneously. The study uses a quantitative approach with multiple linear regression. The population and sample consist of the annual financial statements of PT Astra Agro Lestari Tbk for the 2015–2025 period, comprising 11 observations. Data were analyzed using descriptive statistics, classical assumption tests, multiple linear regression, correlation analysis, coefficient of determination, t-tests, and F-tests. The results show that DAR is not significantly related to ROA (Sig. = 0.489), while TATO is also not significantly related to ROA (Sig. = 0.746). Simultaneously, DAR and TATO are not significantly related to ROA (Sig. = 0.746). The coefficient of determination (R^2) of 7.1% indicates that the model explains only a small proportion of the variation in ROA, while 92.9% is associated with factors outside the model. These findings suggest that DAR and TATO were not significant predictors of ROA within the observed period.*

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Introduction

The increasingly rapid development of the business world has increased competition between companies, including in the palm oil plantation sector. Companies need to manage finances and resources effectively to maintain business continuity and increase profitability. In this study, profitability is measured by Return on Assets (ROA), while financial leverage is measured using the Debt to Asset Ratio (DAR), and operational efficiency using Total Asset Turnover (TATO). According to Kasmir (2021), DAR indicates the proportion of assets financed by debt, while TATO indicates the efficiency of asset use in generating sales. According to Hutabarat (2021), ROA indicates a company's ability to generate net profit based on total assets.

The research phenomenon is seen in PT Astra Agro Lestari Tbk which experienced changes in financial conditions during 2015 to 2025. Total assets increased from IDR 21.51 trillion in 2015 to IDR 30.39 trillion in 2021, then decreased to IDR 27.05 trillion in 2025. Total debt also tended to decrease from IDR 9.81 trillion in 2015, while sales and net profit experienced fluctuations. During that period, the average assets reached IDR 26.98 trillion, debt IDR 7.06 trillion, net sales IDR 19.56 trillion, and net profit IDR 1.38 trillion.

The research problem relates to changes in debt levels, asset utilization, and company profitability. A high Debt to Asset Ratio (DAR) can increase financial risk and interest expense, while a high TATO indicates a company's ability to efficiently use assets to generate sales. However, the relationship between DAR and TATO and ROA is inconsistent, requiring analysis for PT Astra Agro Lestari Tbk from 2015 to 2025.

Differences in previous research results also indicate a research gap. Endang Puji Astutik and Ammelia Novita Anggraeny (2019), Luckieta et al. (2021), and Pangestika et al. (2021) showed that DAR influences ROA, while M. Basri Kamal (2016), Zuliana Zulkarnaen (2018), and Arum Utami (2024) stated that DAR has no significant effect. Regarding TATO, Pangestika et al. (2021), Darminto and Fuadati (2020), Arum Utami (2024), Hidayat (2024), and Siti Mardiana and Anum Nuryani (2022) found a positive and significant effect on ROA, while Lola Luthfi Aulia, Ruhadi, and Diharpi Herly Setyowati (2021) and Ninda Agustina and Aliah Pratiwi (2021) found that TATO had no significant effect on ROA.

Based on the phenomenon and research gap, this study aims to analyze the effect of DAR on ROA, TATO on ROA, and DAR and TATO simultaneously on ROA at PT Astra Agro Lestari Tbk for the period 2015 to 2025. This study is important to provide an overview of the relationship between financial leverage and operational efficiency with company profitability. The novelty of the study lies in the simultaneous testing of DAR and TATO on ROA at PT Astra Agro Lestari Tbk for the period 2015 to 2025.

Method

This study uses a quantitative approach with multiple linear regression methods to analyze the effect of Debt to Asset Ratio (DAR) and Total Asset Turnover (TATO) on Return on Assets (ROA) at PT Astra Agro Lestari Tbk for the period 2015 to 2025. Quantitative research emphasizes the use of numerical data to analyze phenomena systematically and structured (Sugiyono, 2017 in Efendi & Mustofa, 2024). The research data are in the form of annual financial reports of PT Astra Agro Lestari Tbk obtained from the Indonesia Stock Exchange and the company's official website.

The research instrument consisted of secondary data from the annual financial reports of PT Astra Agro Lestari Tbk for the period 2015 to 2025, specifically the balance sheet and income statement. DAR was used to measure the ratio of total debt to total assets, TATO to measure asset turnover in generating sales (Kasmir, 2019), and ROA to measure the ability of assets to generate net income (Hery, 2016:26 in Sitompul et al., 2023). Data analysis includes descriptive statistics, Kolmogorov-Smirnov normality test, multicollinearity with VIF, heteroscedasticity through scatterplot and Glejser test, autocorrelation with Durbin-Watson, multiple linear regression, correlation test, coefficient of determination, as well as t-test and F-test. The normality test uses a significance of 0.05 (Ghozali, 2018), VIF below 10 indicates no multicollinearity (Priyatno, 2022 in Suwadi et al., 2024), while the heteroscedasticity and autocorrelation tests refer to Ghozali (2013, 2018 in Panjaitan et al., 2022).

The research population is all annual financial reports of PT Astra Agro Lestari Tbk obtained from the Indonesia Stock Exchange for the period 2015 to 2025. According to Sugiyono (2019 in Mardhiyah et al., 2025), a population is a generalization area that has certain characteristics to be studied and conclusions drawn. The research sample is the financial reports of PT Astra Agro Lestari Tbk for the period 2015 to 2025 which have complete data in the form of balance sheets and income statements, so that 11 years of observation or 11 observations are obtained.

The research procedure was carried out by determining the object and research variables, collecting secondary data through documentation methods from the Indonesia Stock Exchange and the official website of PT Astra Agro Lestari Tbk, then calculating the DAR, TATO, and ROA values based on financial reports for the period 2015 to 2025. The data were then analyzed using descriptive statistics, classical assumption tests, multiple linear regression, correlation tests, coefficients of determination, as well as t-tests and F-tests. The t-test was used to determine the effect of DAR and TATO partially, while



the F-test was used to determine the effect of both simultaneously on ROA with a significance level of 0.05 (Ghozali, 2018 in Panjaitan et al., 2022; Ghozali, 2019 in Haris Hidayat & Susanti, 2024).

Results and Discussion

Data Analysis Results

Table 1 Debt to Asset Ratio (DAR) of PT Astra Agro Lestari Tbk for the 2015-2025 Period

LEVERAGE KEUANGAN			
TAHUN	TOTAL HUTANG	TOTAL ASET	Debt to Assets Ratio (%)
2015	9.813.584.000.000	21.512.371.000.000	45,62
2016	6.632.640.000.000	24.226.122.000.000	27,38
2017	6.407.132.000.000	25.119.609.000.000	25,51
2018	7.382.445.000.000	26.856.967.000.000	27,49
2019	7.995.597.000.000	26.974.124.000.000	29,64
2020	8.533.437.000.000	27.781.231.000.000	30,72
2021	9.228.733.000.000	30.399.906.000.000	30,36
2022	7.006.119.000.000	29.249.340.000.000	23,95
2023	6.280.237.000.000	28.846.243.000.000	21,77
2024	5.591.163.000.000	28.793.225.000.000	19,42
2025	2.889.470.000.000	27.047.104.000.000	10,68
Rata-Rata Debt to Asset Ratio (DAR)			26,59

Based on 2015–2025 data, PT Astra Agro Lestari Tbk's highest DAR was 45.62% in 2015 and its lowest was 10.68% in 2025, with an average of 26.59%. This means that 26.59% of the company's assets are financed by debt and 73.41% by equity. This average DAR is below the industry standard of 35% according to Kasmir (2019), indicating a relatively low level of debt dependence and a relatively manageable financial risk profile.

Table 2 Total Asset Turnover (TATO) of PT Astra Agro Lestari Tbk for the 2015-2025 Period

EFISIENSI OPERASIONAL			
TAHUN	PENJUALAN BERSIH	TOTAL ASET	Total Asset Turnover
2015	13.059.216.000.000	21.512.371.000.000	0,61
2016	14.121.374.000.000	24.226.122.000.000	0,58
2017	17.305.688.000.000	25.119.609.000.000	0,69
2018	19.084.387.000.000	26.856.967.000.000	0,71
2019	17.452.736.000.000	26.974.124.000.000	0,65
2020	18.807.043.000.000	27.781.231.000.000	0,68
2021	24.322.048.000.000	30.399.906.000.000	0,80
2022	21.828.591.000.000	29.249.340.000.000	0,75
2023	20.745.473.000.000	28.846.243.000.000	0,72
2024	21.815.035.000.000	28.793.225.000.000	0,76
2025	28.654.648.000.000	27.047.104.000.000	1,06
Rata-Rata Total Asset Turnover (TATO)			0,73

Based on 2015–2025 data, the highest TATO was 1.06 times in 2025 and the lowest was 0.58 times in 2016, with an average of 0.73 times. This value indicates that the company's assets average 0.73 times in generating sales each year. Based on the industry standard of 2 times according to Kasmir (2019), the average TATO is still below the standard, so the efficiency of the company's asset utilization still needs to be improved.

Table 3 Return on Assets (ROA) of PT Astra Agro Lestari Tbk for the period 2015-2025

PROFITABILITAS			
TAHUN	LABA BERSIH (Tahun Berjalan)	TOTAL ASET	Return on Assets (%)
2015	695.684.000.000	21.512.371.000.000	3,23
2016	2.114.299.000.000	24.226.122.000.000	8,73
2017	2.069.786.000.000	25.119.609.000.000	8,24
2018	1.520.723.000.000	26.856.967.000.000	5,66
2019	243.629.000.000	26.974.124.000.000	0,90
2020	893.779.000.000	27.781.231.000.000	3,22
2021	2.067.362.000.000	30.399.906.000.000	6,80
2022	1.792.050.000.000	29.249.340.000.000	6,13
2023	1.088.170.000.000	28.846.243.000.000	3,77
2024	1.186.783.000.000	28.793.225.000.000	4,12
2025	1.537.631.000.000	27.047.104.000.000	5,69
Rata-Rata Return on Asset (ROA)			5,14

ROA for the 2015–2025 period had an average of 5.14%, with the highest value of 8.73% in 2016 and the lowest of 0.90% in 2019. Based on the industry standard of 30% according to Kasmir (2019), the company's ROA is still relatively low so the ability of assets to generate profits needs to be increased.

Description of Research Results

Table 4 List of Research Samples

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
DAR	11	10.68	45.62	26.5945	8.60263
TATO	11	.58	1.06	.7282	.12766
ROA	11	.90	8.73	5.1355	2.34597
Valid N (listwise)	11				

Based on descriptive statistics, the study used 11 annual data. DAR has a minimum value of 10.68, a maximum of 45.62, a mean of 26.5945, and a standard deviation of 8.60263. TATO has a minimum value of 0.58, a maximum of 1.06, a mean of 0.7282, and a standard deviation of 0.12766. ROA has a maximum value of 8.73 and a minimum of 0.90.

Classical Assumption Test Results

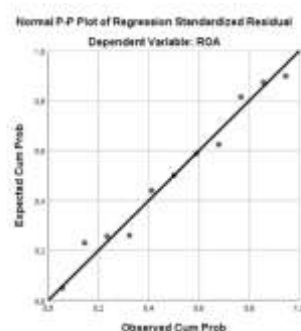


Figure 1 Results of the P-Plot Normality Test

The Normal PP Plot graph shows that the residual points are located around and follow the diagonal line. Thus, the residuals are normally distributed and the regression model meets the assumption of normality.

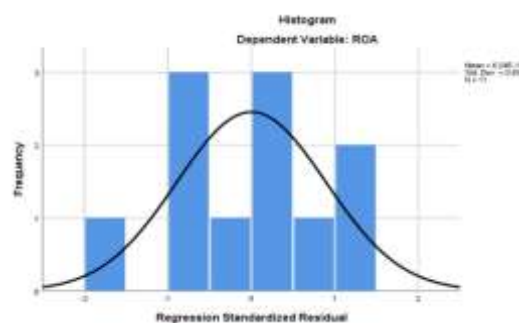


Figure 2 Histogram Normality Test Results

The histogram shows that the residuals form a pattern approaching a normal curve and tend to be symmetrical. Thus, visually, the assumption of normality has been met and is further confirmed by the One-Sample Kolmogorov-Smirnov test.

Table 5 Normality Test Results

One-Sample Kolmogorov-Smirnov Test		
		Unstandardized Residual
N		11
Normal Parameters ^{a,b}	Mean	.0000000
	Std. Deviation	2.26148809
Most Extreme Differences	Absolute	.128
	Positive	.128
	Negative	-.114
Test Statistic		.128
Asymp. Sig. (2-tailed)		.200 ^{c,d}
a. Test distribution is Normal.		
b. Calculated from data.		
c. Lilliefors Significance Correction.		
d. This is a lower bound of the true significance.		

The results of the One-Sample Kolmogorov-Smirnov Test show an Asymp. Sig. (2-tailed) value of 0.200 > 0.05. Thus, the residuals are normally distributed and the normality assumption in the regression model has been met.

Table 6 Multicollinearity Test Results

Coefficients ^a										
Model		Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.	Correlations			Collinearity Statistics Tolerance VIF
		B	Std. Error				Zero-order	Partial	Part	
1	(Constant)	10.815	8.693		1.244	.332				
	DAR	-.098	.136	-.365	-.728	.489	-.240	-.248	-.247	.465
	TATO	-1.087	8.188	-.168	-.135	.745	-.088	-.118	-.118	.215

a. Dependent Variable: ROA

From the table above, it can be seen that the tolerance values for Debt to Asset Ratio and Total Asset Turnover are 0.465; 0.215, which are greater than 0.1, respectively, and the VIF value is 2.151; 2.151, which is less than 10. Thus, it can be concluded that there are no symptoms of multicollinearity between the independent variables in the regression model.

Table 7 Heteroscedasticity Test Results

Coefficients ^a					
Model		Unstandardized Coefficients		Standardized Coefficients Beta	Sig.
		B	Std. Error		
1	(Constant)	10.857	4.335		.039
	DAR	-.063	.081	-.549	.211
	TATO	-9.184	4.108	-.904	.056

a. Dependent Variable: Abs_RES

The Glejser test results show a significance value of 0.211 for the DAR and 0.056 for the TATO, both greater than 0.05. Thus, there is no heteroscedasticity, and the regression model meets the classical assumptions.

Table 8 Autocorrelation Test Results

Model Summary ^b					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.266 ^a	.071	-.162	2.52842	1.457

a. Predictors: (Constant), TATO, DAR

b. Dependent Variable: ROA

The Durbin-Watson value of 1.457 lies between dL = 0.7580 and dU = 1.6044, so the autocorrelation test results cannot provide a definitive conclusion. Therefore, testing was continued using the Run Test as an alternative method.

Table 9 Autocorrelation Test Results (using Run Test)

Runs Test	
	Unstandardized Residual
Test Value ^a	.00378
Cases ≤ Test Value	5
Cases > Test Value	6
Total Cases	11
Number of Runs	6
Z	.000
Asymp. Sig. (2-tailed)	1.000

a. Median

From the test results using the Run Test method above, it can be seen that the significance value is $1,000 > 0.05$, which means that there are no symptoms of autocorrelation from this research test.

Table 10 Results of Multiple Linear Regression Analysis

Coefficients ^a					
Model		Unstandardized Coefficients	Standardized Coefficients	t	Sig.
		B	Std. Error	Beta	
1.	(Constant)	10.015	9.693		1.033
	DAR	-.099	.136	-.363	.726
	TATO	-3.087	9.186	-.168	.876

a. Dependent Variable: ROA

The regression equation obtained is $Y = 10.015 - 0.099X_1 - 3.087X_2$. The constant 10.015 indicates ROA of 10.015 if DAR and TATO are zero. The DAR coefficient of -0.099 indicates that every 1% increase in DAR will decrease ROA by 0.099 assuming other variables remain constant, while the TATO coefficient of -3.087 indicates that every 1% increase in TATO will decrease ROA by 3.087 assuming other variables remain constant.

Table 11 Correlation Coefficient Results

Model Summary ^b					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.266 ^a	.071	-.162	2.52842	1.457

a. Predictors: (Constant), TATO, DAR

b. Dependent Variable: ROA

The test results in the table above revealed a correlation coefficient of 0.266, within the 0.20–0.399 range. This indicates that the debt-to-asset ratio (DAR) and the multiple of total assets (TATO) have only a weak relationship with return on assets (ROA).

Table 12 Results of Determination Analysis

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.266 ^a	.071	-.162	2.52842

a. Predictors: (Constant), TATO, DAR

Table 12 shows that the R² value is 0.071. This means that 7.1% of Return on Assets is explained by the Debt to Asset Ratio and Total Asset Turnover, while 92.9% is explained by other factors not mentioned in this study.

Hypothesis Test Analysis

Table 13 T-Test Results

Coefficients ^a					
Model		Unstandardized Coefficients	Standardized Coefficients	t	Sig.
1	(Constant)	18.815		1.833	.332
	DAR	-.099	-.363	-.726	.489
	TATO	-3.087	-.188	-.336	.746

a. Dependent Variable: ROA

Based on the t-test with a t-table of 2.306, DAR has a calculated t of -0.726 and a significance of $0.489 > 0.05$, so it has no significant effect on ROA and H1 is not accepted. TATO has a calculated t of -0.336 and a significance of $0.746 > 0.05$, so it also has no significant effect on ROA and H2 is not accepted.

Table 14 F Test Results

ANOVA ^a					
Model		Sum of Squares	df	Mean Square	Sig.
1	Regression	3.893	2	1.946	.304
	Residual	51.143	8	6.393	
	Total	55.036	10		

a. Dependent Variable: ROA

b. Predictors: (Constant), TATO, DAR

The F test results show a calculated F of $0.304 < F$ table 4.46 with a significance value of $0.746 > 0.05$. Thus, H0 is accepted and Ha is rejected, so that DAR and TATO simultaneously have no significant effect on ROA.

Discussion

1. The Effect of Debt to Asset Ratio on Return on Assets at PT ASTRA AGRO LESTARI

Based on the results of the multiple linear regression analysis presented in Table 4.9 (Regression Coefficient), the regression coefficient for the Debt to Asset Ratio (DAR) variable is -0.099 . This indicates that every 1% increase in DAR will result in a 0.099 unit decrease in ROA, assuming other variables remain constant.

The t-test results show that the calculated t-value for DAR is -0.726 with a significance value (Sig.) of 0.489. The Sig. value is greater than the significance level used, namely 0.05 ($\alpha = 5\%$). In addition, the calculated t-value (0.726) is smaller than the t-table value of 2.306 ($df = 8$; $\alpha/2 = 0.025$). Therefore, it can be concluded that Debt to Asset Ratio (DAR) has a negative but insignificant effect on Return on Assets (ROA) at PT Astra Agro Lestari Tbk for the period 2015–2025. Thus, the first hypothesis (H1) in this study is rejected.

The results of this study align with research conducted by Zuliana Zulkarnaen in 2018, which stated that the debt-to-asset ratio does not significantly affect Return on Assets. However, these results differ from the research by Meita Pangestika et al. (2021), which found a significant negative impact.

2. The Effect of Total Asset Turnover on Return on Assets at PT ASTRA AGRO LESTARI

Based on the results of multiple linear regression analysis, the regression coefficient for the Total Asset Turnover (TATO) variable is -3.087 . This coefficient indicates that every 1 unit increase in TATO will cause a 3.087 unit decrease in ROA, assuming other variables remain constant.

The partial test results in the form of a t-test show a calculated t value of -0.336 and a significance value of 0.746. The significance value of 0.746 is greater than 0.05 and the calculated t of 0.336 is smaller than the t-table value of 2.306. So the conclusion is that Total Asset Turnover (TATO) has a negative but insignificant impact on Return on Assets (ROA) at PT Astra Agro Lestari Tbk during the period 2015–2025. Therefore, the second hypothesis (H2) in this study cannot be accepted.

This finding aligns with research by Lola Luthfi Aulia et al. (2021) and Ninda Agustina & Aliah Pratiwi (2021), which states that Total Asset Turnover has no significant effect on Return on Assets.

To support the explanation of TATO's lack of effect on ROA, researchers examined the movement patterns of both ratios over the 2015-2025 period. The data shows that TATO has a fairly consistent upward trend, from 0.58 times in 2016 to 1.06 times in 2025. If asset utilization efficiency were truly the primary determinant of profitability, ROA should also show a corresponding upward trend. However, in reality, ROA actually experienced a sharp decline in 2019 to just 0.90% and fluctuated in subsequent years, not following the upward pattern of TATO. This misalignment is a clear indication that increased asset turnover does not automatically translate into increased net income.

Another reason that supports the insignificant effect of TATO on ROA can be seen from the comparison of the variability of the two variables during the study period. The standard deviation value of TATO is only 0.12766 with an average of 0.7282 times, which indicates that the company's asset turnover is relatively stable and does not change much from year to year. In contrast, ROA has a much larger standard deviation, namely 2.34597 with an average of 5.1355%, which reflects a much higher level of fluctuation in profitability compared to fluctuations in asset efficiency. This imbalance in variability statistically explains why the relatively small and stable movement of TATO is not strong enough to explain the much more volatile movement of ROA, as reflected in the small t-value (-0.336) and the significance value far above 0.05. In addition, the company's average TATO of 0.73 times, which is far below the industry standard of 2 times, also reflects the characteristics of the palm oil plantation business which is intensive in fixed assets, such as land, productive plants, and processing plants, so that the low asset turnover rate does not merely reflect inefficiency, but rather the structural characteristics of the industry itself which are less relevant as the main determinant of the company's short-term profitability.

3. The Effect of Debt to Asset Ratio and Total Asset Turnover on Return on Assets at PT ASTRA AGRO LESTARI Tbk for the Period 2015-2025

To test the simultaneous influence, an F test (ANOVA test) was conducted, the results of which are presented in Table 4.7. Based on this table, the calculated F value was 0.304 with a significance value of 0.746.

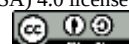
The F table value for $df_1 = 2$ ($k=2$) and $df_2 = 8$ ($nk-1$) at a significance level of 5% is 4.46. Since the calculated F value ($0.304 < F$ table (4.46) and the Sig. value ($0.746 > 0.05$), it can be concluded that Debt to Asset Ratio (DAR) and Total Asset Turnover (TATO) simultaneously have no significant effect on Return on Assets (ROA) at PT Astra Agro Lestari Tbk for the period 2015–2025. Thus, the third hypothesis (H3) in this study is rejected.

The results of this simultaneous test indicate that although financial leverage and operational efficiency theoretically influence profitability, in the case of PT Astra Agro Lestari Tbk during the study period, these two variables were unable to jointly explain the variation in ROA significantly. This is likely influenced by factors outside the research model, such as fluctuations in CPO prices, operational costs, and global palm oil market conditions.

Conclusion

Based on the research results, Debt to Asset Ratio (DAR) and Total Asset Turnover (TATO) do not have a significant effect on Return on Assets (ROA) at PT Astra Agro Lestari Tbk for the period 2015 to 2025, either partially or simultaneously. DAR has a regression coefficient of -0.099 with a significance value of 0.489, while TATO has a coefficient of -3.087 with a significance value of 0.746. Simultaneously, DAR and TATO produce a calculated F value of 0.304 with a significance of 0.746, so both have not been able to explain changes in ROA significantly. The coefficient of determination value of 0.071 indicates that DAR and TATO are only able to explain 7.1% of the variation in ROA, while 92.9% is influenced by other factors outside the model. This finding indicates that changes in debt levels and asset turnover have not been the main factors determining the company's profitability during the research period.

This study is limited by its relatively limited number of observations, namely 11 annual data sets, and its use of only DAR and TATO as independent variables, thus the model cannot explain most of the variation in ROA. Future research is recommended to use a longer observation period, add other



relevant variables, and consider factors related to operational conditions and the palm oil market. Practically, the research results can be used as a consideration for the management of PT Astra Agro Lestari Tbk to focus not only on debt management and asset turnover, but also on other factors that have a greater influence on profitability. For investors, the research results can provide additional information in assessing company performance by considering financial conditions more comprehensively.

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