

The Role of Profitability in Moderating the Effects of Leverage and Liquidity on Financial Distress in the Automotive Sector Listed on the IDX for the 2021–2025 Period

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Abstract

Financial distress remains an important concern for automotive companies because economic uncertainty, market fluctuations, rising production costs, and debt obligations can weaken corporate financial stability. This study examines the effects of leverage and liquidity on financial distress and evaluates the moderating role of profitability in automotive sector companies listed on the Indonesia Stock Exchange during 2021–2025. A quantitative explanatory approach was employed using secondary data from annual financial statements. The sample consisted of 13 automotive companies observed over five years, producing 65 panel-data observations. Data were analyzed with Stata 18 using descriptive statistics, classical assumption tests, panel-data model selection, fixed-effects regression, and moderation regression analysis with cluster-robust standard errors. The results show that leverage, proxied by the Debt to Asset Ratio, has no significant effect on financial distress. Liquidity, measured by the Current Ratio, has a positive and significant effect on the Altman Modified Z-Score, indicating that stronger liquidity reduces financial distress risk. Profitability, measured by Return on Assets, significantly moderates the effect of leverage on financial distress but does not moderate the effect of liquidity. In conclusion, liquidity is a key determinant of financial health, while profitability conditions the impact of leverage on financial distress in the automotive industry.

INTRODUCTION

The automotive industry is one of the strategic sectors that has an important role in encouraging national economic growth (Negara & Hidayat, 2021; Prabowo, 2024). In Indonesia, this sector contributes greatly to the Gross Domestic Product (GDP) of the non-oil and gas industry, job creation, and increased investment and exports (Harahap et al., 2026; Badra & Setyari, 2020). The development of the automotive industry also shows an increasing trend as the public's need for vehicles as a means of mobility increases (Arifin et al., 2024). Vehicles are no longer seen as luxury items, but have become a primary necessity and even part of the lifestyle of modern society (Faturrochman & Yaasiin, 2024). This condition shows that the automotive industry has a vital position in maintaining national economic stability and growth.

Indonesia's automotive industry faces various challenges throughout the 2021–2024 period due to the impact of the COVID-19 pandemic, global economic instability, geopolitical

conflicts, inflation, interest rate increases, exchange rate fluctuations, and supply chain disruptions that affect company performance (Munikhah & Ramdhani, 2022; Maharani et al., 2025). This condition is reflected in national vehicle sales which had increased by 18.1% in 2022, but then decreased by 4.0% in 2023 and fell again by 13.9% in 2024. A decline in market demand, rising production costs, and pressure on cash flow have caused some companies to face the risk of financial distress, which is a condition when companies have difficulty meeting their financial obligations (Fitrianti, 2022; Hidayat & Yuniati, 2024). This phenomenon can be seen in several automotive companies listed on the Indonesia Stock Exchange, such as Indomobil Sukses Internasional Tbk and Gajah Tunggal Tbk which show high levels of leverage, low liquidity, and negative profitability so that it is indicated to be experiencing financial distress, while Astra Otoparts Tbk is still able to maintain healthy financial conditions (Palahiah & Nurabiah, 2025; MY & Syahdewa, 2025).

In addition, the transition to electric vehicles (EVs) requires large investments in technology development and production capacity, further increasing the company's financial pressure in the short term. Based on these conditions, this study was conducted to analyze the role of profitability in moderating the influence of leverage and liquidity on financial distress in automotive sector companies listed on the Indonesia Stock Exchange for the 2021–2025 period, so that it is expected to contribute to the development of financial management science as well as become a consideration for management, investors, and stakeholders in making more appropriate decisions.

The main problem that occurs in automotive companies today is the high use of debt which is not always balanced with the company's ability to generate profits and maintain liquidity. Many companies tend to increase leverage to finance business expansion and technology investments, but these conditions actually increase interest costs and debt repayment obligations. When sales decline or an economic slowdown occurs, the company will experience liquidity pressures because operating cash flow is insufficient to meet its financial obligations. This condition shows that there is an imbalance between the company's capital structure and the company's financial ability to maintain its operational stability (Filatova et al., 2024; Muchsidin et al., 2025; Muigai, 2016; Nagy, 2025; Vätavu, 2015).

The first factor that predicts financial distress is leverage, this ratio plays a role in describing and measuring companies that are faced with financial difficulties, leverage is the ability of a company to pay off its obligations. Leverage arises due to the use of costs derived from liabilities. Increased use of debt by companies can increase the risk of financial distress in the future because the value of the company's assets becomes lower compared to liabilities. Several previous studies have shown different results regarding the influence of leverage on financial distress, research by Lyana Nurul et al (2025), Refina Azari et al (2024) in line with the results of Nasution & Dinarjito, (2023), and (K. Sari & Subarjo, 2022), which stated that leverage has a significant positive influence on financial distress. However, a different view is put forward by Muhammad Daffa et al (2025), Wahyuningtyas & Fatmawati, 2021) and (Susanto Salim, 2020), who state that leverage actually has a negative impact on financial distress.

The second factor of financial distress of a company is liquidity which describes the company's ability to pay its current liabilities using current assets. In general, the risk of financial distress is lower for businesses with higher liquidity. (Yuriani et al., 2020). According

to Archanskaia et al (2023), good liquidity allows management to easily use existing assets to finance planned or unexpected company expenses. Several previous studies have shown different results regarding the effect of liquidity on financial distress. Research by Muhammad Daffa et al (2025), Nirawati (2022) and Rosid (2022) states that liquidity has a positive effect on financial distress. However, a different view is put forward by Grestika Febrianti et al (2023), Wiwi Idawati et al (2021) and Leonardo & Soetardjo (2024) stating that liquidity has a negative effect on financial distress.

Both factors are tested with profitability as a moderation variable, profitability is a ratio that shows how the company's profit can use all its available resources. Profitability in this study aims to determine the efficiency of the company when it makes a profit within a certain period of time for performance optimization and in debt repayment. A high level of profitability can usually help companies overcome the problem of using third-party funds and repaying their short-term obligations so that the potential for financial distress can be reduced. Several previous studies have shown different results related to the role of profitability in moderating the influence of leverage and liquidity on financial distress. Research by Wiwi Idawati (2021), Hayati & Sholicha (2022) and Sandika et al (2023) states that profitability strengthens the influence of leverage and liquidity on Financial Distress, but it is different from the research results of Aditya Kusuma Wardhana (2021), Refina Azari et al (2024) which states that profitability weakens the influence of leverage and liquidity on financial Distress.

A lot of research has been done on financial distress, most of the previous research has focused more on the manufacturing sector in general. Research that specifically examines the automotive sector in Indonesia is still relatively limited, especially those that associate leverage and liquidity with profitability as moderation variables in the post-pandemic period. In addition, the results of previous research also show inconsistencies regarding the influence of leverage and liquidity on financial distress. Some studies have found that leverage has a positive effect on financial distress, while others show different results. The research gap shows that further research is still needed to gain a more comprehensive understanding of the factors that affect financial distress in the automotive sector in Indonesia.

This research is important to be carried out because global economic uncertainty is still ongoing and can affect the financial stability of automotive companies in Indonesia. In addition, this study is expected to be able to provide an overview of the financial health condition of automotive companies and become an early detection tool for the potential for financial distress. The results of the research can also be considered for company management in determining debt management strategies, maintaining liquidity, and increasing the company's profitability in order to survive in the midst of increasingly fierce industry competition.

Based on this description, this study aims to analyze the role of profitability in moderating the influence of leverage and liquidity on financial distress in automotive sector companies listed on the Indonesia Stock Exchange (IDX) for the 2021–2025 period. This research focuses on four problem formulations, namely the effect of leverage on financial distress, the effect of liquidity on financial distress, the role of profitability in moderating the effect of leverage on financial distress, and the role of profitability in moderating the effect of liquidity on financial distress. In line with the formulation of the problem, the purpose of the study is to find out and analyze the influence of each variable and test the effectiveness of

profitability as a moderation variable. This research is expected to provide theoretical benefits by enriching the study of financial management science, especially regarding financial distress predictions, as well as being a reference for future research. From a practical perspective, the results of the research are expected to be considered for company management in developing financial management strategies, as well as assisting investors, creditors, and other related parties in making investment and financing decisions more appropriately based on the company's leverage, liquidity, and profitability conditions.

METHOD

This study used a quantitative approach with an associative type of research (explanatory research). The associative research aims to examine the relationship and influence between variables, namely leverage and liquidity as independent variables against financial distress as dependent variables, with profitability as a moderation variable. The data used is in the form of secondary data obtained from the annual financial statements of automotive sector companies listed on the Indonesia Stock Exchange (IDX) for the 2021–2025 period. The analysis was carried out using panel data regression to test the hypothesis and explain the relationship between variables empirically.

This study utilizes panel data, which is a combination of cross section data (13 automotive sector companies) and time series (2021–2025 period) resulting in 65 observations. Data processing was carried out using the Stata 18 application through the stages of descriptive statistical analysis, model assumption testing, panel data regression model selection (Pooled OLS, Fixed Effect Model, and Random Effect Model), and hypothesis testing. Based on the results of the model selection test, this study uses a Fixed Effect Model (FEM) with cluster-robust standard errors, so that the estimation results are more consistent and able to accommodate the specific characteristics of each company.

RESULTS AND DISCUSSION

Classic Assumption Test

Classical assumption testing is carried out as a prerequisite to ensure the validity of the statistical inference of the regression model. The four tests carried out were the residual normality test, the multicollinearity test, the heteroscedasticity test, and the autocorrelation test. All tests were conducted using Stata 18 software.

Normality Test

The normality test aims to detect whether the residual regression model is normally distributed. The test was performed using the Shapiro-Wilk test on residual models, which is more appropriate for small to medium sample sizes ($n < 2,000$) than the Kolmogorov-Smirnov test.

Table 1 Shapiro-Wilk Normality Test Results in Residual Models

Variable	Obs	W	V	z	Prob > z
Residual (Pooled OLS)	65	0,87223	7,407	4,336	0,00001

Source: Processed Research, 2026

Based on Table 1, the results of the Shapiro-Wilk test show a statistical value of $W = 0.87223$ with a probability of $p = 0.00001 < 0.05$ means that the null hypothesis (H_0) which

states that the normally distributed residual is rejected. Thus, it can be concluded that the residual model does not meet the assumption of normality.

Violations of the assumption of normality in residual models need to be interpreted carefully. According to Ghazali (2021), the normality test in regression analysis basically aims to test whether the disruptive or residual variables in the regression model have a normal distribution. The assumption of normality is mainly related to the reliability of parametric statistical testing, particularly *the t-test* and the F-test, especially in studies with relatively small sample counts. Therefore, the results of the Shapiro–Wilk test, which showed a probability value of $0.00001 < 0.05$, indicate that the residual model has not been perfectly distributed normally.

The residual abnormalities in this study do not necessarily cause the regression estimation results to be unusable. First, the number of research observations of 65 observations has exceeded the minimum number of samples that are generally considered adequate to support the *Central Limit Theorem approach*. The theorem explains that the sampling distribution from regression estimators tends to be close to the normal distribution when the number of observations increases, so that testing the significance of the regression coefficient can still be performed more reliably even if the residual is not completely normal (Wooldridge et al, 2023)

Second, the use of *cluster-robust standard errors* at the enterprise level in the regression of panel data provides consistent estimates without requiring residual normality, and remains robust to heteroscedasticity and intra-cluster correlation (MacKinnon et al., 2023). Thus, the violation of the assumption of normality does not affect the validity of statistical inference in this study, as long as the estimation is carried out with an appropriate robust approach

Multicollinearity Test

The multicollinearity test aims to find out whether there is a strong correlation between independent variables in the regression model so that it can cause the estimated coefficient to be unstable. Detection was carried out using *the Variance Inflation Factor (VIF)*, with the VIF criterion > 10 as an indication of multicollinearity.

Table 2 Multicollinearity Test Results (Variance Inflation Factor)

Variable	VIVID	1/VIF (Tolerance)	Remarks
DAR (Leverage)	1,87	0,5335	No problem
CR (Liquidity)	1,79	0,5595	No problem
ROA (Profitability)	1,10	0,9101	No problem
Mean VIF	1,59	–	No problem

Source: Processed Researcher, 2026

Based on table 2, all independent variables have VIF values well below the critical threshold of 10, with the highest VIF at *leverage* of 1.87 and the average VIF of only 1.59. The *tolerance* value of 1/VIF is entirely above 0.10, confirming that there is no problematic linear relationship between the predictors. Thus, the independent assumption of multicollinearity is met, and the estimated coefficient is not distorted by the collinearity between independent variables

Heteroscedasticity Test

Heteroscedasticity refers to a condition in which residual variance is not constant throughout observations, which can result in biased standard errors and invalid t/F inferences. The test was performed with the *Breusch-Pagan/Cook-Weisberg Test* which tests H_0 : residual variance is constant.

Table 3 Heteroscedasticity Test Results (*Breusch-Pagan/Cook-Weisberg*)

Test	chi2(1)	Prob > chi2
Breusch-Pagan/Cook-Weisberg	9,94	0,0016

Source: Processed Research, 2026

Based on table 3, the value of $\chi^2(1) = 9.94$ with a p-value of $0.0016 < 0.05$ indicates that H_0 is rejected, there is a heteroscedasticity problem in the data. This finding is because the sample includes companies of very varied sizes, ranging from large-cap companies such as PT Astra Internasional Tbk to medium-scale companies such as PT Multi Prima Sejahtera Tbk and PT Harapan Duta Pertiwi. To overcome heteroscedasticity, all panel regression model estimates use *cluster-robust standard errors* grouped at the company level. This method also simultaneously corrects the serial autocorrelation, so that the statistical inference remains valid.

Autocorrelation Test

The autocorrelation test aims to find out whether in the regression model there is a correlation between the residual in the current observation period and the residual in the previous period.

Table 4 Autocorrelation Test Results

Variable	Coefficient	Std. Error	t-stat	P > t
L1. resid_auto	0,8277	0,0945	8,76	0,000
Constanta (_cons)	0,3042	0,5767	0,53	0,600

Source: Processed Research, 2026

Based on table 4, a residual lag coefficient of 0.8277 and a very significant ($p = 0.000 < 0.01$) indicates a strong positive autocorrelation. A coefficient value close to 1 indicates high residual persistence between periods, which is a common phenomenon in panel data with a short time dimension and contains a strong component of individual effects ($\rho = 0.889$, meaning that 88.9% of the total variation is dominated by interfirm effects). This autocorrelation problem is systematically addressed through the use of *cluster-robust standard errors in fixed effect model estimation*, which theoretically provides valid inference even under the conditions of serial autocorrelation and heteroscedasticity.

Panel Data Regression Model Selection

The selection of the best panel regression model between *pooled OLS*, *fixed effect model* (FEM), and *Random Effect Model* (REM) was conducted through a standard hierarchical testing procedure, using three formal statistical tests: the chow test (F-test), the hausman test, and the breusch-pagan lagrange multiplier (LM) test.

Table 5 Results of a series of Panel Data Regression Model Selection Tests

Test	Hypothesis Nol (H0)	Statistics	df	p-value	Verdict
Uji Chow (F-test)	Pooled OLS = FE (no fixed effect)	F = 18,62	(12, 49)	0,0000	Subtract H0 → FE
Hausman Test	RE is consistent (not systematically different from FE)	chi2 = 14.01	(3)	0,0029	Subtract H0 → FE
Uji LM Breusch-Pagan	Var(u) = 0 (no individual effects)	chibar2 = 55,86	(01)	0,0000	Subtract H0 → RE

Source: Processed Research, 2026

The chow test yielded $F(12, 49) = 18.62$ with a p-value of 0.0000. These results indicate that the null (H0) hypothesis is rejected, which means that the *Pooled OLS model* is not able to adequately explain the variation in the data. This rejection shows that there are significant differences in characteristics between firms that cannot be ignored in the model. Thus, the existence of individual effects in each company is proven to be significant, so the *fixed effect model* approach is more suitable than *Pooled OLS*.

The thurst test showed a chi-square value of 14.0 with a p-value of $0.0029 < 0.05$. This result shows that the zero (H0) hypothesis is rejected, which means that there is no match between the random *effect model* estimator and *the fixed effect model*. In other words, there is a correlation between individual effects and independent variables in the model, so the *random effect estimator model* is inconsistent. This condition reinforces that the more appropriate model to use is the *fixed effect model*, because it is able to control heterogeneity that is not observed between companies.

The lagrange multiplier test Breusch-Pagan has a chi-square value of 55.86 with a p-value of $0.0000 < 0.05$. These results indicate that the null hypothesis is rejected, which means that there is a significant individual effect in the panel data. Thus, *the OLS pooled model* is inefficient because it ignores the existence of variations between companies that are indeed real in the research data. Overall, these three tests consistently confirm that the *fixed effect model* (FEM) with *Cluster-Robust Standard Errors* is the most appropriate estimation approach for this study data, qualifying the necessary consistency and inference correction.

Panel Data Regression Analysis

Regression analysis was carried out in two systematic stages. The first stage of the Main Model uses a *fixed effect model* without moderation interaction to answer Problem Formulations 1 and 2 regarding the direct influence of leverage and liquidity on *financial distress*. The second stage of the MRA model includes the interaction variables of $DAR \times ROA$ and $CR \times ROA$ to answer Problem Formulations 3 and 4 regarding the role of profitability moderation. The comparison of these two models also aims to see if the addition of a moderation variable is able to improve the model's explanatory ability, which is shown by the R^2 Within value.

Table 6 Fixed Effect Panel Data Regression Results with *Cluster-Robust Standard Errors*

Variable	Main Model (Without Moderation)	p-value	MRA model (With Moderation)	p-value
DAR (b1)	-11,4071	0,566	-10,8988	0,518
CR (b2)	1,5720***	0,007	2,3767*	0,075
ROA (b3)	13,8564	0,295	8,0658	0,744
DAR × ROA (β4)	–	–	55,6347**	0,050
CR × ROA (β5)	–	–	-7,1056	0,393
Constant (β0)	7,8183	0,402	6,4066	0,440
R ² Within	0,2490		0,3217	
F-statistics	F(3,12) = 5,83	0,0108	F(5,12) = 23,21	0,0000
N Observation	65		65	

Source: Processed Research, 2026

The regression equation for the main model can be written as follows:

$$Z''_{it} = 7.8183 - 11.4071 \text{ DAR}_{it} + 1.5720 \text{ CR}_{it} + 13.8564 \text{ ROA}_{it} + \mu_i + \varepsilon_{it}$$

While the regression equation of the MRA model (with moderation) is:

$$Z''_{it} = 6.4066 - 10.8988 \text{ DAR}_{it} + 2.3767 \text{ CR}_{it} + 8.0658 \text{ ROA}_{it} + 55.6347 (\text{DAR}_{it} \times \text{ROA}_{it}) - 7.1056 (\text{CR}_{it} \times \text{ROA}_{it}) + \mu_i + \varepsilon_{it}$$

where μ_i is a fixed *individual effect*, and ε_{it} (error term) is an idiosyncratic residual component.

Coefficient of Determination

In the context of the *Fixed Effect* model, the most relevant R² measure is R² Within, which measures the proportion of *within-group dependent variation* (the variation between time within the same company) that can be explained by an independent variable. R² Between and R² Overall are less relevant because the *Fixed Effect* model is not designed to explain variation between firms.

Table 7 Comparison of Coefficient of Determination (R²) Panel Regression Model

Size R ²	Main Models	Model MRA	Interpretation
R ² Within	0,2490 (24,90%)	0,3217 (32,17%)	Proportion of within-company variation described
R ² Between	0,0079 (0,79%)	0,0050 (0,50%)	Proportion of variation between-company (irrelevant to FE)
R ² Overall	0,0179 (1,79%)	0,0183 (1,83%)	Overall proportions of variation
ΔR ² Within	–	+7,27%	Increased clarity of MRA vs Main Model models

Source: Processed Research, 2026

As shown in table 7, the R² *Within* the Main Model value of 0.2490 indicates that DAR, CR, and ROA together account for 24.90% variation in changes in the Z-Score *within-company* during the period 2021–2025. The addition of the moderation interaction variable to the MRA Model increased the R² Within to 0.3217 an increase of 7.27 percentage points, confirming the significant incremental contribution of the moderation variable. The MRA Model's very large F-statistical value (F(5.12) = 23.21; p = 0.0000) indicates that overall, the MRA Model is

statistically significant.

The very low R^2 *between* values of 0.0079 and 0.0050 is an understandable consequence of the use of this *fixed effect* model of 'absorbing' all inter-firm variations into individual constants (μ_i), so that there is no inter-firm variation left to be explained by independent variables. This is not a lack of a model, but rather a feature that allows estimates that are free from individual heterogeneity biases

Hypothesis Testing Results

Table 8 Summary of Research Hypothesis Testing Results

H	Hypothesis	Coefficient	p-value	Sig.	Results
H1	Leverage (DAR) has a significant positive effect on <i>Financial Distress</i>	-11,407	0,566	–	REJECTED
H2	Liquidity (CR) has a significant negative effect on <i>Financial Distress</i>	1,572	0,007	***	ACCEPTED
H3	ROA moderates the influence of <i>Leverage</i> on <i>Financial Distress</i>	55,635	0,050	**	ACCEPTED
H4	ROA moderates the effect of Liquidity on <i>Financial Distress</i>	-7,106	0,393	–	REJECTED

Source: Processed Research, 2026

This section of the discussion outlines the empirical significance of the results of hypothesis testing that has been carried out in research on the role of profitability in moderating the influence of leverage and liquidity on financial distress in automotive sector companies listed on the Indonesia Stock Exchange for the 2021–2025 period. The discussion not only explains the direction and significance of the relationship between variables, but also relates it to financial theory, managerial concepts, and previous research findings so that a more comprehensive understanding is obtained.

The Effect of Leverage on Financial Distress

The first hypothesis states that leverage has a positive effect on financial distress in automotive sector companies listed on the Indonesia Stock Exchange for the 2021-2025 period. The test results showed that the leverage proxied with the Debt to Asset Ratio (DAR) had a negative coefficient of -11.4071, $t = -0.59$, and $p\text{-value} = 0.566 > 0.05$. So the first hypothesis was rejected. Statistically, this shows that leverage did not have a significant effect on financial distress in automotive companies during the study period.

Although high leverage increases the burden of debt and interest obligations, variations in leverage within a company do not directly affect the risk of financial distress. This is in line with the trade-off theory, which asserts that capital-intensive industrial companies such as automotive usually have a relatively stable optimal level of leverage, so marginal changes do not directly drive the risk of financial distress.

These findings are in line with the research of Muhammad Daffa et al. (2025), Febrian et al. (2024) and Wahyuningtyas and Fatmawati (2021) which show that leverage does not always have a positive effect on financial distress. Thus, leverage in this study is not the main determinant of financial distress, but rather depends on the company's ability to manage its capital structure effectively

The Effect of Liquidity on Financial Distress

The second hypothesis states that liquidity has a negative effect on financial distress in automotive sector companies listed on the Indonesia Stock Exchange for the 2021-2025 period. The test results showed that the liquidity proxied by the current ratio (CR) had a coefficient of 1.5720, $t = 3.23$, and $p\text{-value} = 0.007 > 0.01$. So that the second hypothesis is accepted. Statistically, this shows that increased liquidity significantly reduces the risk of financial distress.

The positive coefficient of $\beta = 1.5720$ means that every increase in the current ratio by 1 unit will increase the Z"-Score by 1.5720 points in the same company over time. In other words, the higher the liquidity, the healthier the company's financial condition, the farther away from the financial distress zone. These results are intuitive and have a strong theoretical foundation from two perspectives:

From the perspective of signaling theory, a high CR is a positive signal to creditors, suppliers, and investors that the company has adequate short-term capacity. This signal reduces the cost of adverse selection and increases stakeholder confidence, allowing companies to maintain access to financing even in tight market conditions.

From a direct mechanism perspective, a high CR reflects positive working capital, i.e. current assets outweigh short-term liabilities. The X1 component in the Altman Z-Score formula is WC/TA (Working Capital/Total Assets), so a high CR mechanically contributes positively to the Z-Score through X1. This explains why CR's influence on Z-Score remains strong and significant even after controlling for the company's fixed effects.

These findings are in line with the research of Arifuddin et al., (2023), Idawati, (2020), and Arifin et al, (2021) who found that liquidity has a significant effect on preventing financial distress. Practically, the case of IMAS that consistently had a $CR < 1$ and a Z-Score in the distress zone, as well as the case of a HOPE whose Z-Score fell into the distress zone at the same time as the decrease in CR, provide strong empirical confirmation of this causal relationship.

The Effect of Leverage on Financial Distress Moderated Profitability

The third hypothesis states that profitability is able to moderate the influence of leverage on financial distress in automotive sector companies listed on the Indonesia Stock Exchange for the 2021–2025 period. The regression results showed that the interaction coefficient of $DAR \times ROA = 55.6347$, $t = 2.18$, $p\text{-value} = 0.050$, so that the third hypothesis was accepted, indicating that profitability significantly moderated the leverage relationship with financial distress.

The positive and significant interaction coefficient $\beta_4 = 55.6347$ shows that ROA functions as a quasi-moderator that enhances the influence of leverage on Z-Score. Mathematically, the effect of total leverage on the Z-Score in the MRA model is:

Based on the results of the analysis, it shows that there is a significant role of profitability moderation (ROA) in the relationship between leverage (DAR) and financial distress as measured using Z-Score. In conditions when the ROA is zero, the company does not generate profit, so the increase in leverage will have a negative impact on the financial condition, which lowers the Z-Score by 10.8988. This indicates that in companies that are unable to generate

profits, increased debt tends to exacerbate the risk of financial distress.

Gradual increase in ROA is able to reduce these negative impacts. In fact, to a certain extent, the influence of leverage on Z-Score is no longer detrimental, but rather positive. Based on the estimated results, the turning point occurred at the ROA value of 0.1959 or 19.59%. This condition shows that when the company's profitability is above the threshold, the increase in leverage actually contributes to the improvement of the Z-Score, which reflects the increasingly healthy financial condition.

These findings indicate that profitability not only serves as a risk buffer, but also as a factor that changes the direction of the influence of the capital structure on the financial stability of the company. In the context of the research sample, companies such as DRMA with a 2025 ROA of 0.4686 and SMSM with an average ROA of 0.2180 are above this critical point, thus empirically supporting the results of the analysis that leverage can have a positive impact on financial distress in companies with a high level of profitability.

This finding has a strong theoretical foundation from the perspective of Agency Theory. In high-profitability companies, the use of debt creates a disciplining effect where the obligation to pay interest encourages management to allocate resources more efficiently and avoid unproductive investments. In addition, from the perspective of Pecking Order Theory, companies with high profitability that are able to use debt productively have a greater ability to pay liabilities from operating cash flow, so high leverage does not increase the risk of financial distress.

These results are in line with the research of Idawati (2020) which found the role of significant moderation of profitability in the relationship between leverage and financial distress. These findings also contribute to the literature by confirming that the profitability context is a critical factor in determining whether leverage has a positive or negative impact on a company's financial resilience.

The Effect of Liquidity on Financial Distress Moderated Profitability

The fourth hypothesis states that profitability is able to moderate the influence of liquidity on financial distress in automotive sector companies listed on the Indonesia Stock Exchange for the 2021–2025 period. The regression results showed that the interaction coefficient of $CR \times ROA = 7.1056$, $t = -0.89$, $p\text{-value} = 0.393 > 0.05$, so that the fourth hypothesis was rejected, indicating that profitability did not significantly moderate the relationship between liquidity and financial distress.

The rejection of the fourth hypothesis has important analytical implications. These results show that the effect of liquidity on financial distress conditions is direct, autonomous, and does not depend on the level of profitability. This means that in both profitable and non-profitable companies, the increase in the current ratio consistently increases the Z-Score by a magnitude that does not differ significantly.

This explanation can be understood through the fundamental difference between liquidity and profitability as financial concepts. Liquidity is a short-term condition and stock (reflecting the position of assets and liabilities at a given point in time), while profitability is a measure of flow that reflects financial performance over a period. Even highly profitable companies can experience a liquidity crisis if they do not manage the conversion of profits to cash effectively, a phenomenon known as profitable but illiquid. Thus, when a company faces a $CR < 1$ liquidity

crisis, it is enough to trigger financial distress regardless of the level of profitability, because short-term liabilities must be met from current assets, not from accrued profits.

Moreover, mathematically in the Altman Z-Score formula, the relationship between CR and Z-Score is mediated directly through the X1 component (WC/TA) without the intervention of profitability (X3). Thus, the ROA moderation effect does not have a strong enough mechanistic pathway to significantly change the relationship between CR and Z-score. These results are consistent with the findings of Rejeki et al. (2023) who also did not find the effect of profitability moderation on the relationship between liquidity and financial distress.

Implications of Research Results

The results of this study provide important implications for the company's financial management practices, especially in the context of financial distress risk management in the automotive industry which has capital-intensive, highly competitive, and sensitive characteristics to changes in macroeconomic conditions. Empirical findings show that not all financial variables have the same direct influence on financial distress conditions, so managerial strategies need to be formulated in a more directed manner, based on empirical evidence, and not just relying on financial intuition alone.

First, liquidity management should be a top priority in a company's financial management policy. The results of the study confirm that an increase in the current ratio significantly increases the z-score, which means that it strengthens the company's financial health. Thus, management needs to ensure smooth asset adequacy through optimizing working capital, controlling the cash cycle, and accelerating receivables collection so that the company is not in a liquidity-prone condition that can trigger financial distress.

Second, debt-based funding decisions cannot be treated as a single risk indicator, but must consider the context of the company's profitability. The moderation results show that leverage only has a negative impact on financial conditions when profitability is low, while in companies with high ROA levels, debt can actually be used productively. As such, management needs to integrate profitability analysis in every capital structure decision to ensure that the use of debt is at an optimal and sustainable level.

Third, companies need to implement an early warning system based on altman's z-score periodically. The results of the study show that there are variations in financial distress conditions between companies, including a rapid shift from healthy to risk zones in several companies. The implementation of periodic financial ratio-based monitoring allows management to take corrective actions more quickly before a more serious decline in financial performance occurs.

Fourth, for corporate risk management, the combination of high DAR, low CR, and unstable ROA indicators should be treated as a critical signal against potential financial distress. This condition has been empirically proven to increase the probability of a Z-Score decrease. Therefore, management needs to set an internal threshold for each financial ratio to maintain the stability of the company's financial structure.

Fifth, the results of this study indicate the importance of a panel data-based approach in corporate financial decision-making. Variations between companies (heterogeneity) have proven to be significant, so financial policies cannot be standardized between entities in the same industry. Every company needs to conduct a financial evaluation based on internal

characteristics (firm-specific analysis) so that the strategies applied are more accurate and in accordance with the company's real conditions.

Overall, the managerial implications of this study confirm that the financial stability of automotive sector companies is not only determined by the level of debt, but rather on the company's ability to maintain liquidity, manage profitability efficiently, and integrate financial risk monitoring systems in a sustainable manner. A holistic and indicator-based approach has proven to be the main key in preventing financial distress in the future

CONCLUSION

This study aims to analyze the influence of leverage and liquidity on financial distress proxied using the Altman Modified Z-Score and test the role of profitability as a moderation variable in automotive sector companies listed on the Indonesia Stock Exchange (IDX) for the 2021–2025 period. The results showed that leverage did not have a significant effect on financial distress, while liquidity had a positive and significant effect on the Z-Score value, which indicates that the higher the level of liquidity, the better the company's financial health and the lower the risk of financial distress. In addition, profitability has been proven to be able to moderate the influence of leverage on financial distress, so that companies with a high level of profitability can utilize debt more effectively and reduce the risk of financial difficulties. On the other hand, profitability is not able to moderate the effect of liquidity on financial distress, so the effect of liquidity is direct and consistent. This study has limitations because it only focuses on companies in the automotive sector, using leverage, liquidity, and profitability variables, and measures financial distress through the Altman Z-Score. Therefore, further research is recommended to expand the object of research, add other variables such as operational cash flow, company size, corporate governance, and macroeconomic factors, and consider the use of more comprehensive analysis methods. From a practical perspective, the company's management needs to prioritize liquidity management and adjust the use of debt to the company's level of profitability, while investors and creditors are advised to evaluate the company's financial condition thoroughly by paying attention to leverage, liquidity, profitability, and financial distress indicators before making investment or credit decisions.

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