

## **The Role of Firm Size in Moderating The Influence of Financial Ratios and Good Corporate Governance on Financial Distress in Manufacturing Companies for The Period 2019-2023**

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### **Abstract**

The manufacturing sector, a cornerstone of Indonesia's economy, faces increasing vulnerability to financial distress due to global shocks such as the COVID-19 pandemic and trade disruptions. This study investigates the influence of financial ratios—specifically liquidity and profitability—and corporate governance (institutional ownership and board independence) on financial distress in manufacturing firms, while examining the moderating role of firm size. A quantitative method employing panel data regression was applied to 205 manufacturing companies listed on the Indonesia Stock Exchange over the period 2019–2023. The Altman Z-Score served as the financial distress indicator. Results reveal that profitability significantly reduces financial distress, whereas liquidity becomes significant only when moderated by firm size. In contrast, institutional ownership and board independence do not exhibit significant effects. Notably, firm size demonstrates a dual role—both as a direct influence on financial distress and as a moderator, enhancing or diminishing the effect of financial indicators. These findings contribute to financial management literature by highlighting that firm-specific characteristics such as size alter the effectiveness of financial health indicators. The implications suggest that management and investors should consider both scale and financial performance in distress prediction models. Future studies are recommended to include qualitative dimensions of governance and assess industry-specific or macroeconomic moderating variables.

**Keywords:** Financial distress, Financial Ratios, Corporate Governance, Firm size, Panel Data Regression

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### **INTRODUCTION**

The long-term vision of a company, as articulated by Sukamulja (2021), extends beyond the pursuit of profit for its owners to include broader benefits for all stakeholders involved. However, achieving this vision is often hindered by internal and external challenges, including management policies and macroeconomic conditions. Indonesia's own experience with industrialization, particularly during the 1980s to 1990s, reflects this complexity (A. Hossain, 2006; A. A. Hossain, 2013; Woo et al., 1994). The rapid growth during that time—marked by a 17% average growth in manufacturing between 1990 and 1997—was abruptly interrupted by the 1997–1998 Asian financial crisis, which hampered the nation's path to sustained industrial development (Asian Development Bank & Bappenas, 2019).

The subsequent period from 2019 to 2023 brought further global disruptions. The COVID-19 pandemic significantly impacted economic activities in Indonesia, as reflected by a GDP contraction of -2.07% in 2020, compared to a growth rate of 5.02% in 2019 (Akhmad, 2022; Tampubolon, 2023). This downturn was exacerbated by the U.S.-China trade war and is evident in the decline of Indonesia's manufacturing PMI, with a production drop of up to 50% in 2020,

except in the medical sector (Guo et al., 2020; Kam, 2024; Markit Ekonomi, 2024). The contraction continued into 2024, with PMI scores of 49.3 in July and 48.9 in August—both below the neutral threshold of 50, signaling continued decline (Bureau For Economic Research, 2024; Fitri, 2024). Additionally, the Financial Services Authority (OJK) reported eight bankrupt issuers in September 2024—seven of which were manufacturing companies—further underlining the vulnerability of the sector (Puspadini, 2024).

These economic conditions prompt further investigation into the factors contributing to financial distress, particularly in the manufacturing sector due to its substantial contribution to Indonesia's GDP. The research aims to examine the roles of financial ratios and corporate governance, moderated by company size, in predicting financial distress. Sukamulja (2021) and Yuang et al. (2019) provide conceptual frameworks, defining financial distress through conditions like business failure, insolvency, and bankruptcy. Accurate financial analysis through ratios such as liquidity and profitability is critical to identifying early signs of distress. Liquidity gauges a firm's ability to meet short-term obligations, while profitability measures its efficiency in generating returns—both of which are crucial for assessing financial health.

Corporate governance is another key factor, as good governance practices enhance transparency and accountability. Institutional ownership and board independence are especially significant, with research by Ainnun & Purwandoko (2020) and Eka, Imam, and Hersugodo (Handriania et al., 2020) indicating that high institutional ownership and independent boards reduce the risk of financial distress by improving oversight and discouraging excessive debt use. Company size also serves as a moderating factor, with larger companies typically demonstrating greater resilience in facing financial pressures. The Altman-Z-Score model is a common analytical tool used to measure financial distress, based on financial ratio indicators including liquidity and profitability.

Supporting literature across various countries reaffirms these findings. For instance, research in Ethiopia highlights how profitability, company age, and size reduce distress risk, while high leverage increases it. In Vietnam, better corporate governance correlates with higher Altman-Z scores, signaling greater financial stability. Similar trends are noted in Indonesia, Malaysia, Pakistan, Sweden, and across Europe, where variables like profitability, liquidity, leverage, and governance structures consistently affect financial distress. In Indonesia, particularly among SOEs and family-owned firms, liquidity and profitability are vital in reducing financial vulnerability. Moreover, recent studies in telecommunications and basic industries further underscore the moderating role of company size and the importance of sound governance and strategic business planning in mitigating bankruptcy risks (Ahmad, 2024; Dai & Fang, 2023; Ullah et al., 2023).

Through this study, it is expected to provide important insights for investors and companies in dealing with potential financial distress. The novelty of this study lies in its integrative model that examines both financial ratios (liquidity and profitability) and corporate governance indicators (institutional ownership and board independence) in predicting financial distress, while introducing *firm size as a moderating variable*—a dimension rarely combined comprehensively in earlier studies. Previous research (Handriania et al., 2020) explored corporate governance elements individually, and others (Masita & Purwohandoko, 2020; Truong, 2022) focused on financial indicators or governance without moderation. This study advances the literature by testing how firm size interacts with these predictors using panel regression across 205 manufacturing firms over five years, revealing nuanced moderating effects, particularly that *firm size strengthens or weakens the impact of liquidity and profitability on financial distress*, depending on context.

## RESEARCH METHOD

This type of research uses a quantitative approach in the process of data collection and analysis, based on the philosophy of positivism that allows researchers to examine specific populations or samples. This study is associative causality, aiming to identify the cause-and-effect relationship between independent variables—liquidity, profitability, institutional ownership, and board independence—and dependent variables, i.e., financial distress, which is moderated by company size. Using cross section and time series data, this study combined data from various objects over a period of time. The panel data regression method was applied to analyze the influence of these indicators on manufacturing companies listed on the Indonesia Stock Exchange during 2019–2023. This research is also associative descriptive, with a deductive approach that tests theories through empirical data, without researcher intervention. An analysis unit is a manufacturing company selected through purposive sampling to ensure the relevance of the data. Data collection is carried out through financial statements and other reliable sources, which are then statistically analyzed. The process of operationalizing variables is important to define and measure abstract concepts well, where financial distress is proxied using the Altman-Z Score model. The data analysis includes classical assumption tests and regressions to measure the impact of independent variables on financial distress, it is hoped that this study can make a relevant empirical contribution in understanding the factors that affect financial distress in manufacturing companies in Indonesia.

## RESULT AND DISCUSSION

This study aims to determine the role of company size in moderating the influence of financial ratios and good corporate governance on financial distress in manufacturing companies for the 2019-2023 period. Where the independent variables in this study are X1 (current ratio), X2 (return on assets), X3 (institutional ownership), X4 (board's independence), while the dependent variable is Y (financial distress). Meanwhile, the moderation variable is Z (firm size). The analysis was carried out on 205 companies over a period of 5 years (2019-2023) using the panel data regression method. The following is a description of the results of the research:

### Classic Assumption Test

According to Supendi (2022) in the regression analysis of panel data, the Fixed Effect Model (FEM) approach is used to control for differences in individual characteristics that are fixed during the observation period, but cannot be measured directly. This model assumes that each entity (individuals, companies, countries, and others) has a unique but constant intercept, thus being able to capture unobserved heterogeneity. Parameter estimation in FEM is carried out using the Ordinary Least Squares (OLS) method with the addition of dummy variables or through transformation in the form of fixed effect transformation.

Although OLS theoretically requires the fulfillment of classical assumptions such as linearity, normality, autocorrelation, heteroscedasticity, and multicollinearity, in practice in panel regression with the FEM approach, not all of these assumptions should be tested.

This is in line with Ajija et al. (2011:42) who stated that panel data regression has its own characteristics that make testing classical assumptions as a whole unnecessary. In the context of FEM, all that needs to be considered is the potential for multicollinearity and heteroscedasticity, which can affect the accuracy of the estimate.

### Multicollinearity Test

This test is carried out to see whether there is a linear relationship/correlation between variables in a regression model. A model is declared to have an indication of multicollinearity if the test coefficient between variables is greater than 0.8. The results of the multicollinearity test from this study can be seen in table 1 as follows:

**Table 1. Multicollinearity Test Results**

	X1	X2	X3	X4	With
X1	1.000000	-0.009093	0.025730	0.000335	-0.129175
X2	-0.009093	1.000000	0.020296	0.122530	0.288951
X3	0.025730	0.020296	1.000000	0.027333	0.111447
X4	0.000335	0.122530	0.027333	1.000000	0.084904
With	-0.129175	0.288951	0.111447	0.084904	1.000000

Source : Prepared by the author (2025)

From table 2, it can be seen that the entire value of the coefficient between the variables is less than 0.8. This shows that there are no symptoms of multicollinearity in all dependent and moderation variables involved in this study.

### Heterokedasticity Test

This test is done to see if the residual variant of a model is constant or not. The heterokedasity test value shows variations in each observation. A model is declared to have symptoms of heterokedasticity if the probability value is less than 0.05. In this context, the test was carried out using the Panel Least Squares method with a dependent variable in the form of the residual absolute value of ABS (RESID).

The model tests the influence of the variables X1 to X4 and Z and their interactions (X1Z to X4Z) on the residual absolute values. The test is carried out by looking at the probability value (Prob.) of each coefficient, specifically to assess whether there are statistically significant variables to error. The results of the heterokedasticity test from this study can be seen in table 2 as follows:

**Table 2. Heterokedasticity Test Results**

Dependent Variabel: ABS(RESID)

Method: Panel Least Squares

Date: 04/28/25 Time: 14:26

Sample: 2019 2023

Periods included: 5

Cross-sections included: 205

Total panel (balanced) observations: 1025

Variabel	Coefficient	Std. Error	t-Statistic	Prob.
C	-9.565475	4.201928	-2.276449	0.0231
X1	-0.164747	0.085192	-1.933839	0.0535
X2	1.043632	8.250795	0.126489	0.8994
X3	-0.076233	0.138624	-0.549929	0.5825
X4	7.105213	5.626119	1.262898	0.2070
With	0.691098	0.283451	2.438158	0.0150
X1Z	0.013436	0.006938	1.936726	0.0531
X2Z	0.035577	0.535449	0.066443	0.9470
X3Z	0.005416	0.009373	0.577792	0.5636
X4Z	-0.490600	0.379613	-1.292367	0.1966
Effects Specification				
Cross-section fixed (dummy variabels)				
R-squared	0.617712	Mean dependent var	0.869361	
Adjusted R-squared	0.517308	S.D. dependent var	1.849962	
S.E. of regression	1.285280	Akaike info criterion	3.523211	

Sum squared resid	1339.727	Schwarz criterion	4.553010
Log likelihood	-1591.646	Hannan-Quinn criter.	3.914137
F-statistic	6.152288	Durbin-Watson stat	1.875617
Prob(F-statistic)	0.000000		

Source : Prepared by the author (2025)

Based on the results of the heteroscedasticity test, the entire probability value (Prob.) of each variable shows a number above 0.05. For example, the probability for the variable X1 is 0.0535; X2 of 0.8994; X3 of 0.5825; and X4 by 0.2070. The same is true for interaction variables such as X1Z (0.0531), X2Z (0.9470), X3Z (0.5636), and X4Z (0.7174). This probability value indicates that there is no variable that has a significant effect on the residual absolute value. In other words, no statistical evidence was found to show the existence of heteroscedasticity in this model.

Thus, the coefficients of the entire variable do not show a specific pattern, which indicates that the residual is spread randomly without a particular bias. This reinforces the indication that errors have a constant variance. Thus, the model has met the classical assumptions regarding homogeneity, which means that the results of the estimates are efficient and feasible to draw conclusions.

### Panel Data Regression Model Selection

The data regression panel has 3 models that are often used, namely, Common Effect Model, Fixed Effect Model and Random Effect Model. To determine which model is suitable for the study, a comparison test between models is needed which can be carried out through the Chow, Hausman and Langrange Multiplier tests.

### Chow Test

The Chow test is a test to determine which model is more fixed between the fixed effect model and the common effect model in the regression of panel data. The determination of which model is better is determined by the test probability value. If the chi-square probability value is less than 0.05, then the more appropriate model is the fixed effect model. The test results can be seen in table 3 as follows:

**Table 3. Chow Test Results**

Redundant Fixed Effects Tests  
Equation: Untitled  
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	8.505454	(204,811)	0.0000
Cross-section Chi-square	1172.656366	204	0.0000

Source : Prepared by the author (2025)

Based on the results of the Chow test, a statistical value of F was obtained of 8.505454 with a significance level (p-value) of 0.0000, which is below the significance threshold of 5%. In addition, the results of the Chi-square test also showed a value of 1172.66 with the same p-value. These findings indicate that the Fixed Effect model is more appropriate to use than the Common Effect model, as it is able to explain data variations more significantly. Therefore, the model used in the next analysis is the Fixed Effect Model (FEM). To further ensure the accuracy of the model, it is necessary to perform the Hausman test to choose between FEM and Random Effect Model (REM).

### Hausman Test

The Hausman test is a test method to choose a model that is better between a fixed effect model and a random effect model. Which model is selected is determined from the random cross section probability value. If the probability value is below 0.05, then the fixed effect model is selected. On the other hand, if the probability value is greater than 0.05, then the random effect model is selected. The test results can be seen from table 4 as follows

**Table 4. Hausman Test Results**

Correlated Random Effects - Hausman Test  
Equation: Untitled  
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	89.443777	9	0.0000

Source : Prepared by the author (2025)

Based on the results of the Hausman test, a probability value of 0.0000 was obtained, where the value was below 0.05, so the more appropriate model used in this study was the fixed effect model.

### Uji Langrange Multiplier

The Langrange Multiplier (LM) test is a test used to compare common effect models and random effect models. In this study, the LM test was not carried out because the chow and hausman tests gave the same results where the best model chosen was the fixed effect model, exceeding the common effect model and random effect model.

### Panel Data Regression Analysis and Results

This panel regression model with a moderation approach is designed to analyze the influence of independent variables (X1, X2, X3, X4) on dependent variables (Y) in strengthening or weakening the relationship. The estimation was carried out using the Panel Least Squares method on panel data covering 205 entities over a 5-year period (2019–2023), resulting in 1,025 observations. By including interaction variables, this model is able to capture the complexity of the relationship dynamics between variables X and Y. Here is table 4.6 which contains the results of the regression of the panel data:

**Table 5. Regression Data Panel**

Dependent variable: Y  
Method: Panel Least Squares  
Date: 04/28/25 Time: 19:04  
Sample: 2019 2023  
Periods included: 5  
Cross-sections included: 205  
Total panel (balanced) observations: 1025

Variabel	Coefficient	Std. Error	t-Statistic	Prob.
C	2.209995	0.484634	4.560131	0.0000
X1	-0.000612	0.010300	-0.059413	0.9526
X2	12.47417	1.736790	7.182312	0.0000
X3	0.038348	0.026170	1.465366	0.1432
X4	0.773719	1.127644	0.686138	0.4928

Effects Specification			
Cross-section fixed (dummy variabls)			
R-squared	0.783834	Mean dependent var	3.215713
Adjusted R-squared	0.728733	S.D. dependent var	4.439221
S.E. of regression	2.312095	Akaike info criterion	4.693956
Sum squared resid	4362.157	Schwarz criterion	5.699694
Log likelihood	-2196.652	Hannan-Quinn criter.	5.075748
F-statistic	14.22535	Durbin-Watson stat	1.382333
Prob(F-statistic)	0.000000		

Source : Prepared by the author (2025)

$$Y_{it} = 2,209995 - 0,000612X_{1it} + 12,47417X_{2it} + 0,038348X_{3it} + 0,773719X_{4it} + \epsilon_{it}$$

Information:

And : Financial distress

X1 : Liquidity

X2 : Profitability

X3 : Institutional Ownership

X4 : Independence of the Council

E : error term

it : Individual Observations I in Time Period t

The variable X1 has a negative regression coefficient of -0.000612, which indicates that any one-unit increase in X1 tends to decrease the value of Y, assuming the other variable is constant. This indicates that X1 has a negative effect on Y, so the increase in X1 has the potential to inhibit the growth of dependent variables.

The variable X2 shows a positive and significant coefficient of 12.47417, which means that every one unit increase in X2 will increase Y by that value. The magnitude of this coefficient indicates that X2 is a major contributor to driving the increase in Y, and is likely to reflect a strategic or productive variable in the context of this model.

The variable X3 has a positive coefficient of 0.038348, indicating that the increase in X3 will increase Y by a small amount. Although its influence is relatively small compared to other variables, X3 still acts as a driver of Y's growth, albeit with a more limited contribution.

The X4 variable also showed a positive influence on Y, with a coefficient of 0.773719. This suggests that the X4 upgrade has the potential to be significant in improving Y, and can be attributed to structural elements or internal efficiency of the company.

### **Panel Data Regression Analysis and Equation with Moderation**

The panel data regression model with a moderation approach in this study was prepared to analyze the influence of independent variables (X1, X2, X3, and X4) on dependent variables (Y), as well as evaluate the role of moderation variables (Z) in influencing these relationships. This approach also includes testing the interaction between independent variables and moderation variables (X1Z, X2Z, X3Z, and X4Z) to identify whether the presence of the Z variable strengthens or attenuates the influence of the independent variable on the bound variable.

The model estimation was carried out using the Panel Least Squares (PLS) method on panel data consisting of 205 entities over a five-year period (2019–2023), resulting in 1,025 observations. By incorporating the interaction component into the model, this analysis was able to capture the dynamics of more complex relationships and reveal the effect of linear moderation of the Z variable on the relationship between each independent variable and the dependent variable.

**Table 6. Panel Data Regression with Moderation Variables**

Method: Panel Least Squares				
Date: 04/28/25 Time: 14:09				
Sample: 2019 2023				
Periods included: 5				
Cross-sections included: 205				
Total panel (balanced) observations: 1025				
Variabel	Coefficient	Std. Error	t-Statistic	Prob.
C	-23.37519	7.391783	-3.162320	0.0016
X1	-0.710131	0.149864	-4.738501	0.0000
X2	34.18545	14.51431	2.355292	0.0187
X3	-0.196284	0.243859	-0.804907	0.4211
X4	12.66743	9.897136	1.279909	0.2009
X1Z	0.058038	0.012204	4.755534	0.0000
X2Z	-1.480756	0.941931	-1.572043	0.1163
X3Z	0.015669	0.016489	0.950283	0.3423
X4Z	-0.818572	0.667793	-1.225787	0.2206
With	1.696465	0.498630	3.402251	0.0007
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.794551	Mean dependent var	3.215713	
Adjusted R-squared	0.740592	S.D. dependent var	4.439221	
S.E. of regression	2.260989	Akaike info criterion	4.652863	
Sum squared resid	4145.888	Schwarz criterion	5.682661	
Log likelihood	-2170.592	Hannan-Quinn criter.	5.043789	
F-statistic	14.72512	Durbin-Watson stat	1.419356	
Prob(F-statistic)	0.000000			

Source : Prepared by the author (2025)

$$Y_{it} = -23.37519 - 0.710131X1_{it} + 34.18545X2_{it} - 0.196284X3_{it} + 12.66743X4_{it} + 1.696465Sit + 0.058038X1Sit - 1.480756X2Sit + 0.015669X3Sit - 0.818572X4Sit + \epsilon_{it}$$

Information:

And : Financial distress

X1 : Liquidity

X2 : Profitability

X3 : Institutional Ownership

X4 : Independence of the Council

X1Z : Interaction between X1 and Variable Z Moderation

X2Z : Interaction between X2 and Variable Z Moderation

X3Z : Interaction between X3 and Variable Z Moderation

X4Z : Interaction between X4 and Variable Z Moderation

E : error term

it : Individual Observations I in Time Period t

Based on the results of the panel regression model estimation, a number of important findings were obtained regarding the influence of independent variables, moderation variables, and intervariable interactions on dependent variables (Y).

The variable X1 shows a negative coefficient of -0.710131, which indicates that an increase in X1 will decrease the value of Y, assuming the other variables are fixed. However, this negative effect can be compensated by the presence of a moderation variable (Z), as reflected in X1Z's



positive interaction of 0.058038, which suggests that an increase in Z is able to weaken the negative influence.

The X2 variable showed a strong and significant positive influence on Y, with a coefficient of 34.18545. This indicates that X2 is one of the main contributors in driving the improvement of Y and is likely to represent a productive or strategic factor in the company's structure. However, the interaction between X2 and Z results in a negative coefficient of -1.480756, which means that an increase in Z actually weakens X2's positive effect on Y.

For X3, a negative coefficient of -0.196284 was obtained, indicating that this variable tends to inhibit Y growth, although the effect is relatively small. This may reflect that X3 is a less productive or risky factor. The interaction with the variable Z (X3Z) resulted in a positive coefficient of 0.015669, which means that Z slightly amplifies the influence of X3 on Y, although the moderation effect is relatively weak.

The X4 variable has a positive influence on Y with a coefficient of 12.66743, indicating a significant contribution to the increase in Y although it has no significant effect. This can be attributed to efficiency or a good organizational structure. However, the interaction with Z (X4Z) results in a negative coefficient of -0.818572, which means that Z attenuates the positive effect of X4 on Y. Thus, in this context Z acts as a negative moderator of the influence of X4.

The moderation variable Z itself has a positive coefficient of 1.696465, which indicates that in addition to acting as a moderator, Z also has a positive direct influence on Y. This indicates that the size of the company (Z), in this context, not only moderates relationships, but also acts as an independent driving factor in increasing the value of Y.

### Analysis of Determination Coefficient and Simultaneous Test Test Results (F Test)

#### *Analysis of Determination Coefficient Test Results and Simultaneous Test (F Test) Without Moderation Variables*

The correlation coefficient (R) serves to measure how strong the relationship between independent variables together is to the bound variable. In addition, the correlation coefficient is used to assess the percentage of relationship between the independent variable (X) and the bound variable. The greater the value of the correlation coefficient (r) or the closer it is to 100%, the stronger the relationship between variables. On the other hand, if the value of the correlation coefficient (r) is close to 0, then the relationship between variables is categorized as weak (Muslifiansyah et al., 2022).

**Table 7. Coefficient of Determination & Simultaneous Test (F Test)**

Cross-section fixed (dummy variabels)			
R-squared	0.783834	Mean dependent var	3.215713
Adjusted R-squared	0.728733	S.D. dependent var	4.439221
S.E. of regression	2.312095	Akaike info criterion	4.693956
Sum squared resid	4362.157	Schwarz criterion	5.699694
Log likelihood	-2196.652	Hannan-Quinn criter.	5.075748
F-statistic	14.22535	Durbin-Watson stat	1.382333
Prob(F-statistic)	0.000000		

Source : Prepared by the author (2025)

In the panel data regression model with the Fixed Effect Model (FEM) approach, the evaluation of the overall accuracy of the model was carried out through two main tests, namely simultaneous F-test and determination coefficient analysis (R-squared). Simultaneous F-tests are used to test whether all independent variables together have a significant influence on the dependent variables. Meanwhile, the R-squared value is used to measure the extent to which variations in dependent variables can be explained by the combination of independent variables

contained in the model. These two indicators provide a preliminary picture of the model's predictive power in aggregate. In addition, the analysis also takes into account the Adjusted R-squared value, which provides a more accurate estimate than regular R-squared because it has been adjusted for the number of independent variables and the number of observations in the model.

The results of the estimation show that the R-squared value is 0.783834, which means that about 78.38% of the variation in the dependent variable (Y) can be explained by the whole of the independent variables in the model. This value is relatively high and indicates that the model has good predictive capabilities. Given that the model covered 205 cross-sections over a five-year observation period, these results suggest that the model is able to effectively capture dynamics between entities as well as between time.

Furthermore, the Adjusted R-squared value of 0.728733 shows that after adjusting for the number of variables and observations, the model is still able to explain about 72.28% of the variation in Y. This reinforces the suspicion that the model is not overfitting, but is indeed relevant in explaining the relationships between variables in the context of data panels.

As for measuring the simultaneous significance of the model, an F-statistic value of 14.22535 with a probability (p-value) of 0.000000 was used. This value is well below the 5% significance threshold, so it can be concluded that the regression model as a whole is statistically significant. Thus, the null hypothesis that the entire regression coefficient is equal to zero is rejected, meaning that the independent variables (X1, X2, X3, and X4) together have a significant influence on Y, reinforcing the validity of the model in explaining the variation of dependent variables.

#### ***Analysis of Determination Coefficient Test Results and Simultaneous Test (F Test) with Moderator***

The following are the results of statistical processing for the determination coefficient and simultaneous test F on the model variables X1, X2, X3, X4, Z, and their interactions (including the moderating variables and their interactions).

**Table 8. Coefficient of Determination & Simultaneous Test (F Test) with Moderator**

R-squared	0.794551	Mean dependent var	3.215713
Adjusted R-squared	0.740592	S.D. dependent var	4.439221
S.E. of regression	2.260989	Akaike info criterion	4.652863
Sum squared resid	4145.888	Schwarz criterion	5.682661
Log likelihood	-2170.592	Hannan-Quinn criter.	5.043789
F-statistic	14.72512	Durbin-Watson stat	1.419356
Prob(F-statistic)	0.000000		

Source: Author's Preparation (2025)

The results of the data determination coefficient test are seen from the R-Square value in the table of 0.794551. Approximately 79.45% of the variation in the dependent variables can be explained by all independent variables in the model, demonstrating strong predictive capabilities. With a five-year panel data coverage and 205 cross-sections, the model effectively captures inter-company dynamics and time. Adjusted R-squared is 0, 740592 is also relatively high, indicating that after considering the number of variables and observations, about 74.05% of the Y variation can still be accurately explained.

In simultaneous testing, the analysis refers to the F-statistical value. The F-statistical value of 14.72512 with a probability level (p-value) of 0.000000 indicates that the regression model built has overall statistical significance. This provides strong empirical evidence that all the independent variables used in the model (X1, X2, X3, X4, Z, as well as their interaction with Z) together affect

the dependent variable (Y). This shows that the variation in dependent variables can be significantly explained by the combination of independent variables incorporated into the model

### Partial Test Results Analysis (t-test)

#### *Partial Test Results Analysis (t-Test) Without Moderation Variables*

**Table 9. Test Results t**

Dependent variable: Y

Method: Panel Least Squares

Date: 04/28/25 Time: 19:04

Sample: 2019 2023

Periods included: 5

Cross-sections included: 205

Total panel (balanced) observations: 1025

Variabel	Coefficient	Std. Error	t-Statistic	Prob.
C	2.209995	0.484634	4.560131	0.0000
X1	-0.000612	0.010300	-0.059413	0.9526
X2	12.47417	1.736790	7.182312	0.0000
X3	0.038348	0.026170	1.465366	0.1432
X4	0.773719	1.127644	0.686138	0.4928

Source: Author's Preparation (2025)

Partial t-tests are used to assess whether each independent variable in the model has a statistically significant effect on the dependent variable, by controlling for the other variables to remain constant. In this panel regression, t-tests are performed on each independent variable and interaction variable (moderation) to test their individual influence on Y.

The interpretation of the t-test is based on t-statistical values and p-values. If the p-value < 0.05, the variable is considered to have a significant effect at a significance level of 5%. In contrast, a p-value  $\geq 0.05$  indicates the absence of sufficient evidence to assert a significant influence.

The X1 variable has a coefficient of -0.000612 with a t-statistical value of -0.059413 and a p-value of 0.9526, which far exceeds the significance level of 5% ( $\alpha = 0.05$ ). This shows that X1 has no statistically significant effect on Y, even though the direction of the relationship indicated is negative. Thus, each one-unit increase in X1 is expected to decrease Y by 0.000612 units, but this effect is not statistically strong enough to be considered a real effect in the model.

The X2 variable shows a coefficient of 12.47417, with a t-statistic value of 7.182312 and a p-value of 0.0000. Since the p value is far below the threshold of 0.05, it can be concluded that X2 has a positive and significant effect on Y. Each increase of one unit in X2 will increase the value of Y by 12.47417 units. These findings suggest that X2 is a major predictor in the model, which contributes significantly to variation in dependent variables.

The X3 variable has a coefficient of 0.038348, with a t-statistic value of 1.465366 and a p-value of 0.1432. Since the p-value > 0.05, it can be concluded that X3 has no significant effect on Y. This means that the partial change in the value of X3 is not strong enough to explain the variation in Y, especially when other variables in the model are also taken into account.

The X4 variable has a coefficient of 0.773719, with a t-statistic value of 0.686138 and a p-value of 0.4928. With a p-value that exceeds the significance limit of 0.05, it can be concluded that X4 also does not have a significant influence on Y partially. Although the direction of the relationship is positive, the contribution of this variable to Y is not strong enough to be considered significant in the regression model constructed.

#### **Analysis of Partial Test Results (t-Test) with Moderation Variables**

**Table 10. Partial Test Results (t-Test) With Moderation**

Method: Panel Least Squares				
Date: 04/28/25 Time: 14:09				
Sample: 2019 2023				
Periods included: 5				
Cross-sections included: 205				
Total panel (balanced) observations: 1025				
Variabel	Coefficient	Std. Error	t-Statistic	Prob.
C	-23.37519	7.391783	-3.162320	0.0016
X1	-0.710131	0.149864	-4.738501	0.0000
X2	34.18545	14.51431	2.355292	0.0187
X3	-0.196284	0.243859	-0.804907	0.4211
X4	12.66743	9.897136	1.279909	0.2009
X1Z	0.058038	0.012204	4.755534	0.0000
X2Z	-1.480756	0.941931	-1.572043	0.1163
X3Z	0.015669	0.016489	0.950283	0.3423
X4Z	-0.818572	0.667793	-1.225787	0.2206
With	1.696465	0.498630	3.402251	0.0007
Effects Specification				
Cross-section fixed (dummy variabels)				

Source : Prepared by the author (2025)

The X1 variable shows a coefficient of -0.710131, with a t-statistic of -4.738501 and a p-value of 0.0000. Since the p-value is smaller than 0.05, it can be concluded that X1 has a negative and significant effect on Y. Each increase of one unit on X1 will decrease Y by 0.710131 units, assuming other variables are constant. These results indicate that X1 is one of the main predictors in the model.

The X2 variable has a coefficient of 34.18545, with a t-statistic of 2.355292 and a p-value of 0.0187, which is also smaller than 0.05. This shows that X2 has a positive and significant effect on Y, with a fairly strong contribution. A one-unit increase in X2 would increase the Y-value by 34.18545 units, indicating that X2 plays an important role in the model.

The X3 variable shows a coefficient of -0.196284, with a t-statistic of -0.804907 and a p-value of 0.4211. Since the p-value > 0.05, X3 has no statistically significant effect on Y, even though the direction of the effect is negative. This means that the change in X3 is not strong enough to partially explain the variation in Y.

The variable X4 has a coefficient of 12.66743, a t-statistic of 1.279909, and a p-value of 0.2009, which also exceeds the significance threshold. This shows that X4 has no significant effect on Y, although the direction of the coefficient shows a positive relationship.

The Z variable (moderator) has a coefficient of 1.696465, a t-statistic of 3.402251, and a p-value of 0.0007. With a p< value of 0.05, it can be concluded that Z has a positive and significant effect on Y, which means that in addition to acting as a moderation variable, Z also makes a significant direct contribution to increasing Y.

The X1Z interaction has a coefficient of 0.058038, a t-statistic of 4.755534, and a p-value of 0.0000. This value indicates that Z significantly moderates the relationship between X1 and Y, where an increase in Z value will weaken X1's negative influence on Y. In other words, Z acts as a positive moderator in this relationship.

The X2Z interaction shows a coefficient of -1.480756, a t-statistic of -1.572043, and a p-value of 0.1163, which is above the significance threshold. Thus, it can be concluded that Z does not significantly moderate the relationship between X2 and Y.

The X3Z interaction has a coefficient of 0.015669, a t-statistic of 0.950283, and a p-value of 0.3423. Since the  $p > \alpha$  value is 0.05, then Z does not significantly moderate the relationship between X3 and Y.

The X4Z interaction shows a coefficient of -0.818572, t-statistic -1.225787, and a p-value of 0.2206. Thus, Z also does not have a significant moderation role to the relationship between X4 and Y, even though the direction of moderation is negative.

### CONCLUSION

This study investigates how company size moderates the effects of financial ratios—specifically current ratio and return on assets—and corporate governance practices, including institutional ownership and board independence, on financial distress in manufacturing firms from 2019 to 2023. Findings reveal that return on assets significantly reduces financial distress, while the current ratio's effect varies with company size, showing that high liquidity in large firms does not guarantee financial health. Institutional ownership and board independence were not significant predictors, whereas company size directly influenced financial distress and acted as a moderator. The study concludes that firms should prioritize profitability and tailor financial management to their scale, recognizing that liquidity alone is insufficient for financial stability, alongside maintaining sound corporate governance. For future research, it is suggested to explore additional moderating factors such as industry characteristics, macroeconomic variables, and firm age, incorporate qualitative methods to deepen understanding of governance impacts, extend the study to other sectors and longer periods, and assess the effectiveness of specific governance and financial strategies relative to company size.

### REFERENCES

- Sukamulja, Sukmawati (2021). *Manajemen Keuangan Korporat : Teori, Analisis dan Aplikasi dalam Melakukan Investasi*. Yogyakarta : Fakultas Ekonomi dan Bisnis UGM
- Kementerian Perindustrian.(2014). *Undang-Undang Nomor 3 Tahun 2014*. <https://peraturan.bpk.go.id/Details/38572/uu-no-3-tahun-2014>. [13 Desember 2024].
- Bursa Efek Indonesia (tahun tidak tercantum). *Idx Industrial Classification Perusahaan Terdaftar Di Bursa Efek Indonesia*. [https://gopublik.idx.co.id/media/1401/daftar-sektor\\_web-go-publik\\_id.pdf](https://gopublik.idx.co.id/media/1401/daftar-sektor_web-go-publik_id.pdf). [21 Januari 2025].
- Markit Ekonomi. (2024). *PMI Nikkei Indonesia*. <https://id.investing.com/economic-calendar/indonesia-nikkei-pmi-1096> [13 Desember 2024].
- Antonius Purwanto. (2022). *Industri Pengolahan Indonesia: Sejarah, Kebijakan, Potret, dan Peta Jalan*. <https://kompaspedia.kompas.id/baca/paparan-topik/industri-pengolahan-indonesia-sejarah-kebijakan-potret-dan-peta-jalan> [13 desember 2024].
- IDX.(2025). *Daftar Saham*. <https://www.idx.co.id/id/data-pasar/data-saham/daftar-saham>. [23 Januari 2025]
- Asian Development Bank & Bappenas.(2019). *Policies to Support the Development of Indonesia's Manufacture Sector during 2020-2024*. Philipines:ADB
- Taufik Akhmad.(2022). *Pertumbuhan Ekonomi Indonesia di masa Pandemi Covid 19*. Muttaqien, Vol. 3. No. 1 Januari 2022, 67 – 77
- Amalia Nur Fitri.(2024). *PMI Manufaktur Indonesia Menurun, INDEF Sebutkan Dampak Sosial yang akan Terjadi*. <https://nasional.kontan.co.id/news/pmi-manufaktur-indonesia-menurun-indef-sebutkan-dampak-sosial-yang-akan-terjadi>. [22 Januari 2024].
- Mentari Puspadini.(2024). *Dinyatakan Bangkrut, OJK Bebaskan 8 Emiten dari Kewajiban Laporan*. <https://www.cnbcindonesia.com/market/20240913133848-17-571670/dinyatakan-bangkrut-ojk-bebaskan-8-emiten-dari-kewajiban-laporan>. [21 Januari 2025].

- Barbara Gunawan, & Hutomo Cahya Putra.,(2020). *Determinant of Financial distress (Empirical Study of Manufacturing Companies Listed on the Indonesia Stock Exchange and Malaysia Stock Exchange Period 2017 -2018)*. Advances in Engineering Research, volume 201
- Yin Shi & Xiaoni Li. (2021). *Determinants of Financial distress in the European air transport industry: The moderating effect of being a flag-carrier*. PLOS ONE. 16. e0259149. 10.1371/journal.pone.0259149.
- Eka Handriana, Imam Ghozalib and Hersugodo.(2020). *Corporate governance on Financial distress : Evidence from Indonesia*. Management Science Letters 11 (2021) 1833–1844
- Ainnun Masita & Purwohandoko, P. (2020). *Analisis Pengaruh Rasio Keuangan, Kepemilikan Manajerial, dan Kepemilikan Institusional terhadap Financial distress pada Perusahaan Sektor Perdagangan, Jasa, dan Investasi yang Terdaftar di BEI Tahun 2015-2018*. Jurnal Ilmu Manajemen, 8(3), 894–908. <https://doi.org/10.26740/jim.v8n3.p894-908>.
- Ferdy Muslifiansyah, Pompong Budi Setiadi and Sri Rahayu (2022). *The effect of the independen board of commissioners and motivation on Financial distress* . World Journal of Advanced Research and Reviews, 14(3), 385-394. <https://doi.org/10.30574/wjarr.2022.14.3.0569>.
- Fransisco Pandapotan & Fitria Puspitasari. (2022). *The Effect of Cash Flow, Board Independence, and Company Size on Financial distress* . Saudi Journal of Economics and Finance. 6. 311-318. 10.36348/sjef.2022.v06i09.003.
- Anggita Prameswari, Irni Yunita., Muhammad Azhari (2018). *Prediksi Kebangkrutan Dengan Metode Altman-Z-Score, Springate Dan Zmijewski Pada Perusahaan Delisting Di Bursa Efek Indonesia (BEI)*. Jurnal Riset Akuntansi Kontemporer Volume 10, No 1, April 2018, Hal. 8-15.(2023).
- Acep Komara, Imam Ghozali, Indira Januarti.(2019). *Examining the Firm Value Based on Signaling Theory*. Advances in Economics, Business and Management Research, volume 123.
- Elita Nuraini & Listiya Ike Purnomo.(2024). *Pengaruh Asimetri Informasi, Manajemen Laba, Dan Pengungkapan Modal Intelektual Terhadap Biaya Ekuitas (Studi Empiris Pada Perusahaan Sub Sektor Farmasi Yang Terdaftar di Bursa Efek Indonesia (BEI) Periode 2017 – 2021)*. Jurnal Ilmiah Ekonomi Dan Manajemen Vol.2, No.1 Januari 2024 e-ISSN: 3025-7859; p-ISSN: 3025-7972, Hal 99-112 DOI: <https://doi.org/10.61722/jiem.v2i1.665>
- Ni Luh Made Ayu Widhiari & Ni K. Lely Aryani Merkusiwati. (2015). *Pengaruh Rasio Likuiditas, Leverage, Operating Capacity, Dan Sales Growth Terhadap Financial distress* . E-Jurnal Akuntansi, 11(2), 456–469
- Thian, Alexander (2022). *Mengenal & Memahami Laporan Keuangan*. Yogyakarta.: Penerbit Andi.
- Noman Younas, Shahab UdDin, Tahira Awan, Muhammad Yar Khan. (2021). *Corporate governance and Financial distress : Asian emerging market perspective*. Corporate Governance: The International Journal of Business in Society. 10.1108/CG-04-2020-0119.
- Titman, Sheridan.,Keown, Arthur J., Martin, John D.(2017). *FinancialManagement Principle and Application*. London : Pearson
- I Ketut Alit Sukadana & Nyoman Triaryati.(2018). *Pengaruh Pertumbuhan Penjualan, Ukuran Perusahaan, dan Leverage terhadap Profitabilitas pada Perusahaan Food And Beverage Bei*." E-Jurnal Manajemen Universitas Udayana, vol. 7, no. 11, 2018, doi:10.24843/EJMUNUD.2018.v07.i11.p16.
- Zinkin, John Louis Rishad.(2019).*Better governance Across the Board. Creating Value Through Reputation, People, and Process*. Boston/Berlin : Walter de Gruyter Inc.,
- Michael Spence. (1973). *Job Market Signaling*. The Quarterly Journal of Economics, 87(3), 355–374. doi:10.2307/1882010
- Yonas Nigussie Isayas . (2021) *Financial distress and its determinants: Evidence from insurance companies in Ethiopia*, Cogent Business & Management, 8:1, 1951110, DOI: 10.1080/23311975.2021.1951110
- Khiem Dieu Truong. (2022). *Corporate governance and Financial distress : An endogenous switching regression model approach in vietnam*, Cogent Economics & Finance, 10:1, 2111812, DOI: 10.1080/23322039.2022.2111812

- Farhaan Rashid, Ishtiaq Hussain Qureshi. (2023). *A Comprehensive Review of the Altman-Z-Score Model Across Industries*. 27. 10.2139/ssrn.5044057.
- Darush Yazdanfar, Peter Ohman . (2020). *Financial distress determinants among SMEs: empirical evidence from Sweden*. Journal of Economic Studies. 10.1108/JES-01-2019-0030.
- Sumaira Ashraf, Elisabete G. S. Félix dan Zélia Serrasqueiro (2019). *Do Traditional Financial distress Prediction Models Predict the Early Warning Signs of Financial distress ?* Journal of Risk and Financial Management, 12(2), 55. <https://doi.org/10.3390/jrfm12020055>
- Umar Farooq, Muhammad Ali Jibrán Qamar, Abdul Haque .(2017). *A Three-Stage Dynamic Model Of Financial distress* . Managerial Finance; Patrington Vol. 44, Iss. 9, (2018): 1101-1116. DOI:10.1108/MF-07-2017-0244
- Nur Sayidah, Aminullah Assagaf and Zulfikar Faiz.(2020) *Does Earning Management Affect Financial distress ? Evidence From State-Owned Enterprises In Indonesia*. Cogent Business & Management (2020), 7: 1832826
- Rudolf Lumbantobing.(2019). *The Effect of Financial Ratios on the Possibility of Financial distress in Selected Manufacturing Companies Which Listed in Indonesia Stock Exchange*. Advances in Economics, Business and Management Research, volume 132 6th Annual International Conference on Management Research (AICMaR 2019).
- Aries Widya Gunawan, Aminullah Assagaf, Nur Sayidah, dan Alvy Mulyaningtyas, (2019) *Financial distress di BUMN dan Faktor-faktor Yang Mempengaruhi*. Ekuitas: Jurnal Ekonomi dan Keuangan, 3 (2). pp. 226-243. ISSN 2548-298X
- Mauli Permata Sari & Irni Yunita.(2019). *Analisis Prediksi Kebangkrutan Dan Tingkat Akurasi Model Springate, Zmijewski, Dan Grover Pada Perusahaan Sub Sektor Logam Dan Mineral Lainnya Yang Terdaftar Di Bursa Efek Indonesia Tahun 2012-2016*. JIM UPB (Jurnal Ilmiah Manajemen Universitas Putera Batam): Vol. 7 No. 2 (2019): JIM UPB Volume 7 No 2 2019
- Nurhayati, Imas.(2023). *Peran Kepemilikan Manajerial Dalam Memoderasi Pengaruh Struktur Modal, Profitabilitas Dan Pembayaran Dividen Terhadap Nilai Perusahaan Pada Sub Sektor Bank Yang Terdaftar Pada Bursa Efek Indonesia Tahun 2013-2021*. Thesis Magister Pada Feb Telkom University. Tidak Diterbitkan.
- Iba, Zainuddin & Wardhana, Aditya.(2024). *Operasionalisasi Variabel, Skala Pengukuran & Instrumen Penelitian Kuantitatif*. Jawa Tengah : EUREKA MEDIA AKSARA.
- Iba, Zainuddin & Wardhana, Aditya. (2023). *Metode Penelitian*. Jawa Tengah : CV Eureka Media Aksara
- Angela Dirman.(2020). *Financial distress : The Impacts Of Profitability, Liquidity, Leverage, Firm size, And Free Cash Flow*. International Journal of Business, Economics and Law, Vol. 22, Issue 1.
- Prihadi, T. (2019.) *Analisis Laporan Keuangan Konsep dan Aplikasi*. Jakarta : PT. Gramedia Pustaka Utama.
- Undari Sulung & Mohamad Muspawi. (2024). *Memahami Sumber Data Penelitian : Primer, Sekunder, Dan Tersier*. *Edu Research*, 5(3), 110-116. <https://doi.org/10.47827/jer.v5i3.238>
- Nurul Madany, Ruliana, Zulkifli, Rais.(2022). *Regresi Data Panel dan Aplikasinya dalam Kinerja Keuangan terhadap Pertumbuhan Laba Perusahaan Idx Lq45 Bursa Efek Indonesia*. VARIANSI: Journal of Statistics and Its Application on Teaching and Research. Vol. 4 No. 2 (2022), 79-94.
- Iqbal Firman Alamsyah , Rut Esra, Salwa Awalia, Darnah Andi Nohe.(2022). *Analisis Regresi Data Panel Untuk Mengetahui Faktor Yang Mempengaruhi Jumlah Penduduk Miskin Di Kalimantan Timur*. Prosiding Seminar Nasional Matematika, Statistika, dan Aplikasinya Terbitan II, Mei 2022, Samarinda, Indonesia.
- Altman, Edward I. & Hotchkiss, Edith.(2006). *Corporate Financial distress and Bankruptcy : Predict and Avoid Bankruptcy, Analyze and Invest in Distressed Debt*. New Jersey: John Wiley & Son. Inc
- Edward I. Altman.(2018). *A fifty-year retrospective on credit risk models, the Altman-Z-score family of models and their applications to financial markets and managerial strategies*. Journal of Credit Risk 14(4), 1–34
- Basuki, Agus Tri .(2021). *Analisis Data Panel Dalam Penelitian Ekonomi Dan Bisnis (Dilengkapi Dengan Penggunaan Eviews)* (Edisi Pertama). UMY: Yogyakarta

- Greissela A. Sehangunaung, Silvya L. Mandey, Ferdy Roring .(2023). *Analisis pengaruh harga, promosi dan kualitas pelayanan terhadap kepuasan konsumen pengguna aplikasi lazada di kota manado* Jurnal.EMBA Vol. 11, No. 3. Juli 2023
- Ajija, Shochrul Rohmatul, dkk. (2011). *Cara Cerdas Menguasai Eviews*. Jakarta: Salemba Empat.
- Supendi. (2022 ).*Analisis Regresi Data Panel Antara Faktor Jenis Ikan Terhadap Volume Produksi Perikanan (Ton) Di Tingkat Nasional Periode Tahun 2010-2020*. JURNALAGRISIA-Vol.15No.1 Tahun 2022
- Farida Titik Kristanti & Sekarayu Pancawitri Rais.(2024). *Some Factors Affecting Financial distress in Telecommunication Companies in Southeast Asia*. Jurnal Business: Theory and Practice. Vilnius Gediminas Technical University.
- Komang Ridha Pranita & Farida Titik Kristanti (2020). *Analisis Financial distress Menggunakan Analisis Survival*. Barometer Riset Akuntansi dan Manajemen. Volume 9 No 2 (2020).
- Farida Titik Kristanti, Sri Rahayu, Akhmad Nurul Huda (2016). *The Determinant of Financial distress on Indonesian Family Firm*. Procedia - Social and Behavioral Sciences 219 ( 2016 ) 440 – 447.
- Thao Tran, Ngoc Hong Nguyen, Binh Thien Le, Nam Thanh Vu, Duc Hong Vo.(2024). *Examining Financial distress of the Vietnamese Listed Firms Using Accounting-Based Models*. PLoS ONE 18(5): e0284451
- Eugene F. Fama & Michael C. Jensen (1983). *Separation of Ownership and Control*. Journal of Law and Economics, 26(2), 301–325.

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