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DETERMINANTS OF FINANCIAL DISTRESS IN CONSTRUCTION  
STATE-OWNED ENTERPRISES LISTED ON THE INDONESIAN STOCK  
EXCHANGE FOR THE PERIOD 2015-2024 BASED ON ALTMAN Z-SCORE

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**Abstract**

State-owned construction companies face structural financial pressures due to massive debt burdens to finance national infrastructure projects, exacerbated by the COVID-19 pandemic, which caused a 5.67% contraction in the construction sector in 2020, resulting in the suspension of trading of PT Waskita Karya and PT Wijaya Karya shares, which could potentially be delisted from the Indonesia Stock Exchange. This condition confirms that state-owned company status does not provide immunity from bankruptcy, as evidenced by PT Merpati Nusantara Airlines and PT Istaka Karya, which have been declared bankrupt. This study analyzes financial distress conditions based on the Altman Z-Score and identifies the influence of Operating Cash Flow, Company Size, Asset Growth, and Company Age on financial distress for the period 2015–2024, based on Agency Theory and Signaling Theory. Secondary data from four state-owned construction companies listed on the IDX were analyzed using multiple linear regression with SPSS version 31. PT Waskita Karya recorded the lowest Z-Score of -1.96, placing it in the distress zone. Partially: Operating Cash Flow had no significant effect ( $p = 0.457 > 0.05$ ); Company Size had a significant negative effect ( $p < 0.001 < 0.05$ ); Asset Growth had a significant positive effect ( $p = 0.030 < 0.05$ ); Company Age had no significant effect ( $p = 0.494 > 0.05$ ). Simultaneously, the four variables have a significant effect ( $p < 0.001 < 0.05$ ) with an Adjusted R<sup>2</sup> of 47.7%, confirming that the financial distress of state-owned construction companies is multidimensional and requires holistic improvement interventions.

**Keywords:** Financial Distress, Altman Z-Score, Construction SOEs, Indonesia Stock Exchange, Agency Theory



## INTRODUCTION

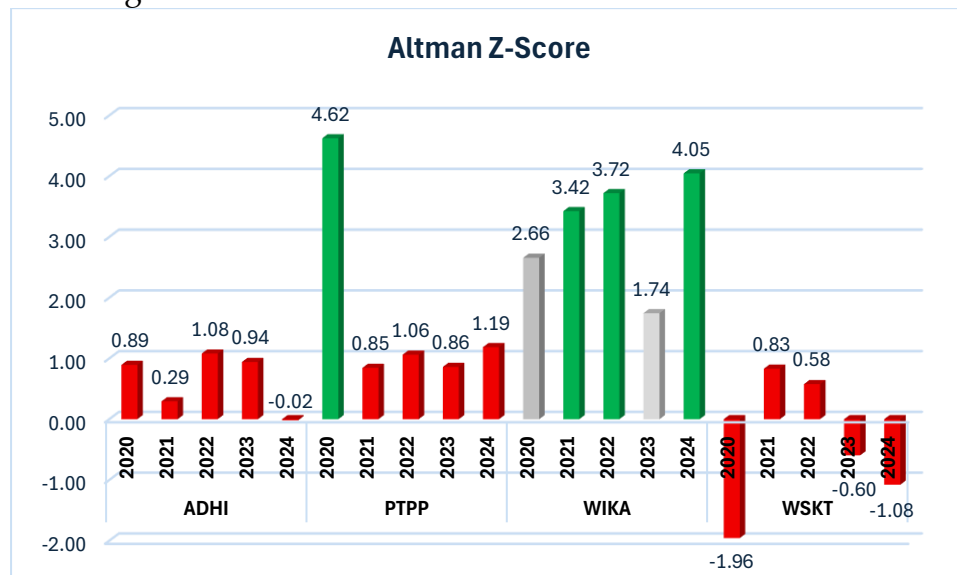
State-Owned Enterprises (SOEs) carry a dual role that is not insignificant in the Indonesian economic system, namely generating profits as a source of state revenue while also driving national economic development (Gunawan et al., 2019; Marota et al., 2019). Among the various SOE clusters, the construction sector, known as BUMN Karya, holds the most strategic position because it is directly tasked with implementing large-scale national infrastructure projects. PT Adhi Karya (Persero) Tbk, PT PP (Persero) Tbk, PT Wijaya Karya (Persero) Tbk, and PT Waskita Karya (Persero) Tbk are four companies from this group whose shares are traded on the Indonesia Stock Exchange (IDX).

State support through State Capital Participation (PMN) and easy access to loans from government banks does not necessarily guarantee that SOEs will be immune from financial difficulties. Historical records show that SOEs have suffered losses for many years: in 2013, total losses reached IDR 32.6 trillion, in 2014 they amounted to IDR 10.2 trillion, and continued until 2016 and 2017, amounting to IDR 5.6 trillion and IDR 5.852 trillion, respectively, with around 22–27 SOEs still suffering losses each year (Marota et al., 2019). This condition peaked in 2018 when 12 SOEs were declared bankrupt based on financial performance assessments using the Altman Z-Score index (Gunawan et al., 2019). In fact, seven SOEs eventually had to be dissolved because they were unable to escape bankruptcy, including PT Merpati Nusantara Airlines, PT Istaka Karya, and PT Kertas Leces, while 15 other SOEs are still undergoing restructuring programs (Hamzah, 2016). In line with this, the Ministry of SOEs noted that seven SOEs under the management of PT Perusahaan Pengelola Aset also recorded losses during the 2015–2019 period despite receiving large amounts of PMN (Permana & Serly, 2021). These facts clearly prove that the status of a state-owned company does not provide absolute immunity from bankruptcy.

The same threat, with greater intensity, now haunts state-owned construction companies. The national strategic infrastructure projects they are undertaking require massive financing that is not entirely covered by the government, forcing companies to rely on debt as their main source of capital. The financial obligations of the four companies have ballooned: PT Waskita Karya Tbk has debts of IDR 84.37 trillion, PT Wijaya Karya Tbk has IDR 55.76 trillion, PT PP Tbk has IDR 43.81 trillion, and PT Adhi Karya Tbk has IDR 30.29 trillion, based on the 2023 first quarter financial reports (Perbiani et al., 2024). This pressure was also evident in the stock market: PT Adhi Karya's stock return was recorded at minus 56.51%, PT PP at minus 32.92%, and PT Wijaya Karya at minus

33.85% throughout 2014–2019 (Laksmiwati & Priyanto, 2020). This already difficult situation was further exacerbated by the COVID-19 pandemic, which caused a 5.67% contraction in the construction sector in 2020, triggered by a decline in new contracts, cuts in government infrastructure budgets, and massive cash flow disruptions (Yuliandi & Ramadhan, 2025).

The cumulative impact of debt pressure and the pandemic can be seen empirically through the Altman Z-Score measurement for the 2020–2024 period, as shown in Figure 1 below.



Description: Safe Zone (Green) (Z-Score > 2.90); Grey Zone (1.23 ≤ Z-Score ≤ 2.90); Distress Zone (Red) (Z-Score < 1.23)

**Figure 1.**

**Altman Z-Score Values of Listed State-Owned Enterprises at  
The Indonesia Stock Exchange (IDX) from 2020 to 2024**

Source: Secondary data processed by the researcher (2026)

The graph shows that PT Waskita Karya (WSKT) consistently remained in the distress zone (Z-Score < 1.23) throughout the observation period, with the lowest value of  $-1.96$  in 2020 and continuing to decline to  $-1.08$  in 2024. PT Adhi Karya (ADHI) also recorded a value of  $-0.02$  in 2024, indicating a similar condition. Overall, most of the large construction SOEs in the last decade have been in the grey area or at risk of bankruptcy (Bahrum et al., 2024). This situation peaked when, at the end of December 2025, the IDX included PT Waskita Karya Tbk and PT Wijaya Karya Tbk in the list of 70 issuers with the potential for



delisting, with PT Waskita Karya even having been suspended since May 2023 due to its inability to complete debt restructuring (Yuliandi & Ramadhan, 2025).

This phenomenon can be understood through two complementary theoretical frameworks. Agency theory (Jensen & Meckling, 1976) explains that pressure from the government as the principal to accelerate infrastructure development encourages management as agents to make aggressive funding decisions without adequately considering long-term financial risks, resulting in agency costs in the form of massive debt burdens that lead to systemic financial distress (Susilo & Ria, 2022; Permana & Serly, 2021). Meanwhile, signaling theory explains that a consistent decline in the Altman Z-Score is a negative signal read by the capital market in the form of declining investor confidence, increasing capital acquisition costs, and narrower access to new funding for companies (Yuliandi & Ramadhan, 2025; Laksmiwati & Priyanto, 2020).

Previous studies on the determinants of financial distress have shown inconsistent results. Operating Cash Flow, Company Size, Asset Growth, and Company Age provide different directions of influence depending on the industry context and observation period (Wahyuni & Dewi, 2025; Wangsih et al., 2021; Astria & Norisanti, 2023; Isayas, 2021; Widiyasari, 2018). This inconsistency confirms that the relationship between the four variables and financial distress cannot yet be conclusively explained, especially in state-owned construction companies, which have their own unique characteristics: they are under double pressure between commercial targets and social development assignments with a debt-based capital structure.

This study aims to fill this gap by simultaneously testing the influence of these four variables on financial distress, measured using the 1995 revised Altman Z-Score model ( $Z''$ ) on four SOEs listed on the IDX during the period 2015–2024. The  $Z''$  model was chosen because it is specifically designed for non-manufacturing companies, including the construction services sector, with a prediction accuracy of around 95%, and is capable of integrating the dimensions of liquidity, profitability, and solvency into a single comprehensive index (Kukreja et al., 2020; Alcalde et al., 2022; Esfandiatri, 2023).

The novelty of this research lies in its coverage of the 2015–2024 period, which comprehensively records the financial dynamics of BUMN Karya in three distinct phases, namely before the pandemic, during the pandemic, and post-pandemic, a time span that has never been used before in the simultaneous testing of these four variables specifically in the construction SOE segment in Indonesia (Abdillah & Ratnasari, 2023; Bahrum et al., 2024; Darmawan, 2022).



## LITERATURE REVIEW

### **Agency Theory**

Agency theory explains that the agency relationship between principals and agents inherently contains conflicts of interest due to information asymmetry, thereby incurring agency costs in the form of monitoring costs, bonding costs, and residual losses (Jensen & Meckling, 1976; Kyere & Ausloos, 2021). In the context of SOEs, pressure from the government as the principal encourages management to make aggressive funding decisions that drastically increase leverage, triggering systemic financial distress (Susilo & Ria, 2022; Susilo et al., 2025).

### **Signaling Theory**

Signaling theory explains how management conveys the company's condition to the market through financial instruments that can be observed by external parties (Spence, 1973; Jan, 2021). A consistent decline in the Altman Z-Score is a negative signal that reduces investor confidence and makes it difficult to access new funding (Yuliandi & Ramadhan, 2025; Laksmiwati & Priyanto, 2020).

### **Financial Distress**

Financial distress is a condition of serious financial deterioration in which a company fails to meet its obligations to its creditors and generally precedes formal bankruptcy or forced liquidation (Isayas, 2021; Fauzi & Saluy, 2021). This condition is characterized by negative operating cash flow, liabilities exceeding assets, and an inability to maintain adequate working capital (Baghai et al., 2021; Crespí-Cladera et al., 2021). This study uses the 1995 revised Altman Z-Score model (Z") specifically designed for non-manufacturing companies with a prediction accuracy of around 95% (Kukreja et al., 2020; Alcalde et al., 2022; Esfandiatri, 2023).

### **Operating Cash Flow**

Operating Cash Flow reflects a company's ability to generate cash from its operational activities independently. Strong operating cash flow indicates the ability to pay off liabilities without relying on high-cost external financing (Wahyuni et al., 2021; Ball & Nikolaev, 2022), while disruptions are an early signal of increased financial distress risk (Wahyuni & Dewi, 2025; Laghari et al., 2023).

### **Company Size**

Company Size describes the scale and financial capacity of a company. Larger entities generally have broader access to financing and better risk diversification capabilities, making them more resistant to financial distress

(Isayas, 2021; Ribeiro-Navarrete et al., 2021; Ozdemir et al., 2022), but in the context of BUMN Karya, large size accompanied by massive leverage actually creates financial complexity that exacerbates the risk of financial difficulties (Wangsih et al., 2021). This variable is measured using the natural logarithm of total assets (Putri & Handayani, 2022).

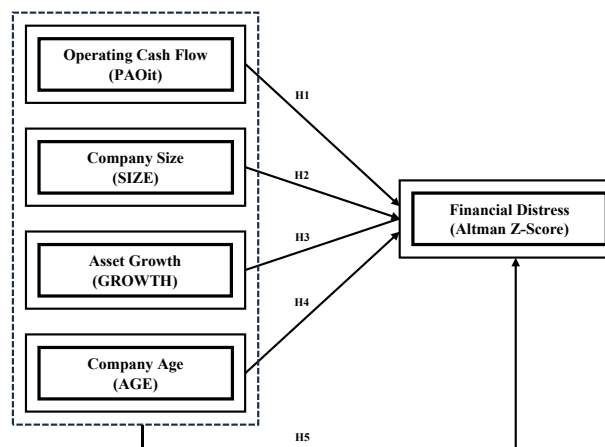
### Asset Growth

Asset Growth describes the expansion of a company's asset base between periods. From a signaling theory perspective, consistent asset growth should be a positive signal of business expansion (Anggraini, 2025; Vuković et al., 2022), but growth driven by debt rather than organic profitability actually exacerbates financial pressure because interest expenses must be paid before assets generate sufficient income (Abdi et al., 2022; Zhou et al., 2022), a condition that is highly relevant for SOEs whose asset expansion depends on government project financing (Ni Ketut Yuni Dewantari et al., 2023).

### Company Age

Company Age reflects the accumulation of operational experience and corporate governance maturity. Older companies generally have more proven internal control systems, making them better able to avoid financial distress (Isayas, 2021; Abdi et al., 2022; Habib, 2023). However, within the framework of agency theory, frequent management rotation in SOEs prevents institutional memory from accumulating optimally as the company ages, so that contemporary factors are more dominant in determining financial health (Susilo & Ria, 2022; Mufidah & Istanti, 2024; Jessica & Triyani, 2022).

### Conceptual Framework



**Figure 2.**

### Research Conceptual Framework

Source: Data processed by the researcher (2026)



## **Hypothesis Development**

### **The Effect of Operating Cash Flow on Financial Distress**

Healthy operating cash flow is a strong signal of a company's ability to meet its short-term obligations independently; an increase in operating cash flow indicates maintained liquidity health, so the risk of financial distress should be reduced (Laghari et al., 2023; Wahyuni & Dewi, 2025). Conversely, declining or negative operating cash flow, which is common in state-owned construction companies due to delays in government project disbursements, has the potential to significantly exacerbate financial pressure (Wuriani & Indarti, 2025; Bachtiar & Handayani, 2022).

H1: Operating Cash Flow has a significant effect on Financial Distress in SOE construction companies listed on the IDX for the period 2015–2024.

### **The Effect of Company Size on Financial Distress**

Large companies have more diverse access to financing and stronger risk absorption capabilities, so they are theoretically more resilient to financial distress (Isayas, 2021; Ribeiro-Navarrete et al., 2021). However, in the case of SOEs, large-scale accompanied by massive debt and an increasing number of project assignments can actually weaken their financial position, so the relationship with financial difficulties needs to be tested empirically in this specific context (Wangsih et al., 2021; Ozdemir et al., 2022).

H2: Company Size has a significant effect on Financial Distress in SOE construction companies listed on the IDX for the period 2015–2024.

### **The Effect of Asset Growth on Financial Distress**

Asset growth driven by debt rather than organic profitability creates a fixed interest burden that must be paid off before the assets generate income, a condition that increases the risk of financial distress, especially when cash flow is disrupted (Vuković et al., 2022; Abdi et al., 2022). In SOEs whose asset expansion is highly dependent on government project financing, the dynamics of asset growth are expected to have a significant influence on financial distress (Pratiwi et al., 2023; Astria & Norisanti, 2023).

H3: Asset Growth has a significant effect on Financial Distress in SOE construction companies listed on the IDX for the period 2015–2024.

### **The Effect of Company Age on Financial Distress**

Older companies accumulate experience, reputation, and more mature governance systems, so that theoretically they are better able to avoid financial distress (Isayas, 2021; Habib, 2023). Higher organizational maturity enables more effective agency monitoring mechanisms to suppress risky decision-making and access to more established financing networks, so that the influence of company



age on financial health needs to be empirically verified in the context of BUMN Karya (Abdi et al., 2022; Mufidah & Istanti, 2024).

H4: Company Age has a significant effect on Financial Distress in SOE construction companies listed on the IDX for the period 2015–2024.

**Simultaneous Influence on Financial Distress**

Financial distress is a manifestation of systemic failure that cannot be explained by a single variable; the company's cash position, scale, growth, and maturity interact simultaneously in shaping the risk profile of financial difficulties (Crespí-Cladera et al., 2021; Li et al., 2021). Simultaneous testing is necessary to ensure that the four variables collectively provide significant explanatory power for the variation in Altman Z-Score values in SOEs (Wahyuni & Dewi, 2025; Wangsih et al., 2021).

H5: Operating Cash Flow, Company Size, Asset Growth, and Company Age simultaneously have a significant effect on Financial Distress in SOE construction companies listed on the IDX for the period 2015–2024.

**RESEARCH METHOD**

**Type of Research**

This study uses a quantitative approach with a comparative causal method to examine the effect of Operating Cash Flow, Company Size, Asset Growth, and Company Age on the Financial Distress of state-owned construction companies listed on the IDX for the period 2015-2024, processed using SPSS version 31 (Sugiyono, 2019; Ghozali, 2021).

**Population and Sample**

The research population consists of all state-owned construction companies in the Infrastructure Cluster based on the Minister of State-Owned Enterprises' Instruction No. INS-1/MBU/09/2020. Using the census method, four companies were found to meet the criteria of being listed on the IDX and publishing complete audited financial reports for the 2015-2024 period, namely PT Adhi Karya, PT PP, PT Wijaya Karya, and PT Waskita Karya, with a total of 40 observations (4 companies × 10 years). PT Hutama Karya and PT Brantas Abipraya were excluded because they are not listed on the IDX (Sugiyono, 2019).

**Table 1.**

**Research Sample Evaluation**

No	Criteria	Number
1	State-Owned Construction Companies in the Infrastructure Cluster	6



No	Criteria	Number
2	Companies not listed on the IDX for the period 2015-2024	(2)
3	Number of companies sampled	4
4	Research period (years)	10
5	<b>Total observations</b>	<b>40</b>

Source: Data processed by the researcher (2026)

**Operational Definition of Variables**

The research variables consist of four independent variables and one dependent variable measured based on the audited financial report data of the sample companies, as presented in the following table:

**Table 2.**

**Operational Definition of Variables**

No	Variable	Operational Definition	Formula	Measurement Scale
1	Operating Cash Flow (PAOit)	Change in the company's ability to generate cash from operating activities in the current year ( ) compared to the previous year	$PAO_{it} = \frac{AO_{it} - AO_{it-1}}{AO_{it-1}} \times 100\%$ <p>Source: Wahyuni et al. (2021)</p>	Ratio
2	Company Size (SIZE)	The scale of the company based on the natural logarithm of total assets	$SIZE = Ln(Total\ assets)$ <p>Source: Putri &amp; Handayani (2022)</p>	Ratio
3	Asset Growth (GROWTH)	The rate of growth in total assets of the company in the current	$GROWTH = \frac{TA_t - TA_{t-1}}{TA_{t-1}} \times 100\%$ <p>Source: Dewantari et al. (2023)</p>	Ratio



No	Variable	Operational Definition	Formula	Measurement Scale
		year compared to the previous year		
4	Company Age (AGE)	The length of time the company has been operating since its establishment until the year of observation	$AGE = Year\ of\ Observation - Year\ of\ Establishment$ Source: Jessica & Triyani (2022)	Ratio
5	Financial Distress (Altman Z-Score)	Financial distress conditions predicted using the 1995 revised Altman Z-Score model	$Altman\ Z-Score = 6.56X_1 + 3.26X_2 + 6.72X_3 + 1.05X_4$ Source: Fauzi & Saluy (2021)	Ratio

Source: Data processed by the researcher (2026)

Data Type and Data Collection Techniques

Secondary data in the form of audited financial reports for the 2015-2024 period were obtained through documentation methods from the official website of the Indonesia Stock Exchange (www.idx.co.id) and the official websites of each sample company, including total assets, operating cash flow, working capital, retained earnings, EBIT, equity, liabilities, and the year of establishment of the company (Ghozali, 2021).

Data Analysis Techniques

Descriptive Statistical Analysis

Classical assumption tests were conducted to ensure that the model met the Best Linear Unbiased Estimator (BLUE) criteria (Gujarati & Porter, 2009), including the Kolmogorov-Smirnov normality test with a sig. > 0.05, the



multicollinearity test with the criteria of Tolerance > 0.10 and VIF < 10, the Glejser heteroscedasticity test with the criteria of sig. > 0.05, and the Run Test for autocorrelation with a significance criterion of sig. > 0.05; all classical assumptions were met, so the regression model was suitable for use (Ghozali, 2021).

### Multiple Linear Regression Analysis

Multiple linear regression analysis was used to test the effect of Operating Cash Flow, Company Size, Asset Growth, and Company Age on Financial Distress with the following equation model:

$$\text{Altman Z - Score} = \alpha + \beta_1 \text{PAOit} + \beta_2 \text{SIZE} + \beta_3 \text{GROWTH} + \beta_4 \text{AGE} + \varepsilon$$

Where  $\alpha$  is the constant,  $\beta_1$  to  $\beta_4$  are the regression coefficients, and  $\varepsilon$  is the error term (Ghozali, 2021).

### Hypothesis Testing

Hypothesis testing was conducted to test the significance of the influence of independent variables on dependent variables, consisting of: (1) t-test (partial) to test the influence of each independent variable on the dependent variable individually with a significance level of 0.05 two-tailed because the direction of influence was not predetermined; (2) F test (simultaneous) to test the influence of all independent variables together on the dependent variable with a significance criterion of < 0.05 (Sugiyono, 2019; Ghozali, 2021).

### Determination Coefficient Test

The coefficient of determination ( $R^2$ ) is used to measure the extent to which independent variables explain the variation in the dependent variable (Ghozali, 2021). The  $R^2$  value ranges from 0 to 1, where a value close to 1 indicates that the independent variables provide almost all the information needed to predict the variation in the dependent variable.

### Correlation Analysis

Correlation analysis is used to measure the strength and direction of the linear relationship between two variables, with the interpretation of the Pearson correlation coefficient: 0.00-0.199 (very low), 0.20-0.399 (low), 0.40-0.599 (moderate), 0.60-0.799 (strong), and 0.80-1.00 (very strong) (Sugiyono, 2019).



RESULTS AND DISCUSSION  
Descriptive Statistical Analysis

Table 3.  
Results of Descriptive Statistical Analysis

	N Statistic	Min Statistic	Maximum Statistic	Statistic
Operating Cash Flow (PAOit)	40	-27.45	1.56	-2.5985
Company Size (SIZE)	40	23.70	32.45	29.7782
Asset Growth (GROWTH)	40	-.46	2.00	.2181
Company Age (AGE)	40	3.00	20.00	11.25
Financial Distress (Altman Z-Score)	40	-1.96	5.09	2.0820
Valid N (listwise)	40			

Source: Data processed using SPSS 31 (2026)

Based on Table 3, Operating Cash Flow has a minimum value of -2,745.00% (PT Wijaya Karya, 2021) and a maximum of 156.00% (PT Adhi Karya, 2020) with an average of -259.85%, indicating that the majority of companies experienced cash flow pressure due to the COVID-19 pandemic. Company Size ranges from 23.70 to 32.45 (Ln) with an average of 29.78 (Ln), reflecting a very large asset scale. Asset Growth ranged from -46.00% (PT PP, 2020) to 200.00% (PT Waskita Karya, 2015) with an average of 21.81%, depicting positive asset growth but with high variation. Company Age ranged from 3.00 to 20.00 years, with an average of 11.25 years. Financial Distress shows a minimum value of -1.96 (PT Waskita Karya, 2020) in the very serious distress zone and a maximum of 5.09 (PT Waskita Karya, 2015) in a very healthy condition, with an average of 2.08, indicating that the sample companies as a whole are in the gray zone. PT Waskita Karya and PT Adhi Karya experienced the most drastic decline in financial performance, while PT Wijaya Karya was relatively more stable, and PT PP showed high volatility with a peak Z-Score of 4.62 in 2020.



Classical Assumption Test  
Normality Test

Table 4.  
Results of the Kolmogorov-Smirnov Normality Test  
One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual	
N		40	
Normal Parameters <sup>a, b</sup>	Mean	.000000	
	Std. Deviation	1.17015689	
Most Extreme Differences	Absolute	.133	
	Positive	.133	
	Negative	-.078	
Test Statistic		.133	
Asymp. Sig. (2-tailed) <sup>c</sup>		.074	
Monte Carlo Sig. (2-tailed) <sup>d</sup>	Sig.	.074	
	99% Confidence Interval	Lower Bound	.067
		Upper Bound	.081

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

d. Lilliefors' method based on 10,000 Monte Carlo samples with starting seed 2,000,000.

Source: Data processed with SPSS 31 (2026)

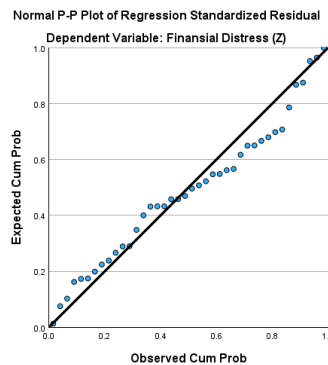


Figure 3.

Results of the P-P Plot Normality Test

Source: Data processed with SPSS 31 (2026)



The Kolmogorov-Smirnov normality test results in Table 4 show an Asymp. Sig. (2-tailed) of 0.074 > 0.05, reinforced by a mean residual value of 0.0000000 that is close to zero and points on the Normal P-P Plot graph that are scattered along the diagonal line, so that the regression model residuals are normally distributed and suitable for further analysis.

Multicollinearity Test

Table 5. Multicollinearity Test Results Coefficients<sup>a</sup>

Table with 4 columns: Model, Variable, Tolerance, VIF. Rows include Operating Cash Flow (PAOit), Company Size (SIZE), Asset Growth (GROWTH), and Company Age (AGE).

a. Dependent Variable: Financial Distress (Altman Z-Score)

Source: Data processed using SPSS 31 (2026)

Based on Table 5, all independent variables have Tolerance values > 0.10 and VIF < 10, so the regression model is free from multicollinearity issues and each independent variable provides unique information in explaining the variation in Financial Distress.

Heteroskedasticity Test

Table 6. Results of Glejser's Heteroscedasticity Test Coefficients<sup>a</sup>

Table with 8 columns: Model, Unstandardized Coefficients (B, Standard Error), Standardized Coefficients (Beta), t, Sig., Collinearity Statistics (Tolerance, VIF). Rows include (Constant) and Operating Cash Flow (PAOit).

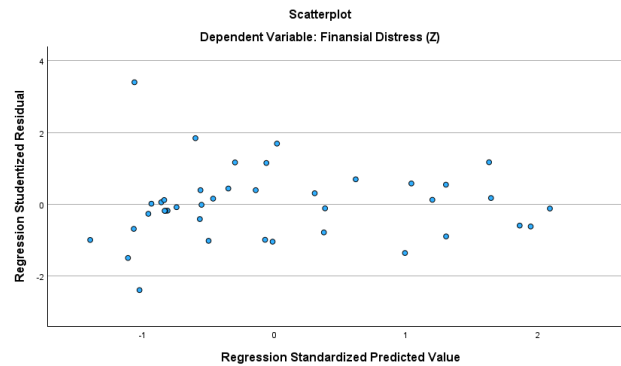


**Coefficients<sup>a</sup>**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Standard Error	Beta			Tolerance	VIF
Company Size (SIZE)	.022	.046	.080	.473	.639	.937	1,067
Asset Growth (GROWTH)	-.585	.403	-.290	-1.450	.156	.664	1,506
Company Age (AGE)	-.034	.039	-.176	-.873	.389	.653	1.531

a. Dependent Variable: ABS\_RES

Source: Data processed with SPSS 31 (2026)



**Figure 4.**

**Heteroscedasticity Test Results Scatterplot**

Source: Data processed with SPSS 31 (2026)

Based on Table 6, all independent variables have a significance value > 0.05, and the points on the Scatterplot graph are scattered randomly without forming a specific pattern, so there is no heteroscedasticity, and the residual variance is homogeneous.



Autocorrelation Test

Table 7. Results of the Run Test for Autocorrelation Runs Test

Table with 2 columns: Test Value, Unstandardized Residual. Rows include Test Value, Cases < Test Value, Cases >= Test Value, Total Cases, Number of Runs, Z, and Asymp. Sig. (2-tailed).

a. Median

Source: Data processed with SPSS 31 (2026)

The results of the Run Test autocorrelation test in Table 7 show an Asymp. Sig. (2-tailed) value of 0.149 > 0.05 with a Z value of -1.442 and a number of runs of 16 out of 40 observations, indicating that the residuals are random so that the regression model is free from autocorrelation problems.

Multiple Linear Regression Analysis

Table 8. Multiple Linear Regression Analysis Results Coefficients

Table with 6 columns: Model, Unstandardized Coefficients (B, Std. Error), Standardized Coefficients (Beta), t, Sig. Rows include (Constant), Operating Cash Flow (PAOit), Company Size (SIZE), Asset Growth (GROWTH), and Company Age (AGE).

a. Dependent Variable: Financial Distress (Altman Z-Score)

Source: Data processed with SPSS 31 (2026)



Based on Table 8, a multiple linear regression equation can be formed:
Altman Z-Score = 13.376 + 0.026 PAOit - 0.372 SIZE + 1.343 GROWTH - 0.040 AGE + ε.

Based on Table 8, the regression equation is formed: Altman Z-Score = 13.376 + 0.026 PAOit - 0.372 SIZE + 1.343 GROWTH - 0.040 AGE + ε. The constant 13.376 indicates the Z-Score value when all independent variables are zero.

Hypothesis Testing
t-Test (Partial Test)

The t-test was used to test the effect of each independent variable on the dependent variable partially at a significance level of 0.05 two-tailed because the direction of the effect was not predetermined, with the decision criterion being that if the significance value was less than 0.05, the independent variable had a significant effect on the dependent variable.

F Test (Simultaneous Test)

Table 9.
F Test Results (Simultaneous Test)
Model Summary<sup>b</sup>

Table with 6 columns: Model, R, R Square, Adjusted R-Square, Standard Error of the Estimate, Durbin-Watson. Row 1: 1, .728<sup>a</sup>, .530, .477, 1.23521, 1.549



- a. Predictors: (Constant), Company Age (AGE), Operating Cash Flow (PAOit), Company Size (SIZE), Asset Growth (GROWTH)
- b. Dependent Variable: Financial Distress (Altman Z-Score)

Source: Data processed using SPSS 31 (2026)

The F-test results show an F value of 13.142 with  $p < 0.001 < 0.05$ , so H5 is accepted. The four variables simultaneously have a significant effect on Financial Distress with an Adjusted R<sup>2</sup> of 47.7%, confirming that the regression model is valid and that the financial distress of BUMN Karya is multidimensional and cannot be explained by a single factor.

**Coefficient of Determination**

**Table 10.**  
**Coefficient of Determination Test Results**  
**Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted R-Square	Standard Error of the Estimate
1	.728 <sup>a</sup>	.530	.477	1.23521

- a. Predictors: (Constant), Company Age (AGE), Operating Cash Flow (PAOit), Company Size (SIZE), Asset Growth (GROWTH)
- b. Dependent Variable: Financial Distress (Altman Z-Score)

Source: Data processed using SPSS 31 (2026)

The results of the coefficient of determination test in Table 10 show a value of R = 0.728 (strong relationship), R Square = 0.530, and Adjusted R Square = 0.477 or 47.7%, meaning that the four independent variables are able to explain 47.7% of the variation in Financial Distress, while the remaining 52.3% is explained by other factors outside the model, such as liquidity ratio, profitability, leverage, or macroeconomic factors.

**Correlation Analysis**

**Table 11.**  
**Results of Pearson Correlation Analysis**

Independent Variables	Pearson Correlation	Sig. (2-tailed)	Interpretation
Operating Cash Flow (PAOit)	-0.054	0.740	Very low and insignificant negative correlation
Company Size (SIZE)	-0.622**	<0.001	Strong and significant negative correlation



Asset Growth (GROWTH)	0.344*	0.030	Low positive correlation and significant
Company Age (AGE)	-0.144	0.375	Very low negative correlation and not significant

Note: \*\* Correlation is significant at the 0.01 level (2-tailed); \* Correlation is significant at the 0.05 level (2-tailed)

Source: Data processed with SPSS 31 (2026)

The results of Pearson's correlation analysis in Table 11 show that Operating Cash Flow has a very low and insignificant negative correlation (r = -0.054; p = 0.740 > 0.05), Company Size has a strong and significant negative correlation (r = -0.622; p < 0.001 < 0.05), Asset Growth has a low positive and significant correlation (r = 0.344; p = 0.030 < 0.05), while Company Age has a very low negative and insignificant correlation (r = -0.144; p = 0.375 > 0.05). Simultaneously, the value of R = 0.728 indicates a strong relationship between all independent variables and Financial Distress.

**Financial Distress Conditions of State-Owned Construction Companies Based on Altman Z-Score**

The results of the Altman Z-Score measurement for the 2015–2024 period show that the majority of SOEs experienced serious financial deterioration, especially since 2020. PT Waskita Karya recorded the lowest value of -1.96 (2020) to -1.08 (2024), while PT Adhi Karya fell into the distress zone with a value of -0.02 in 2024. These findings are in line with Bahrum et al. (2024) and Esfandiatri (2023), which confirm that the majority of construction SOEs have been in the grey area in the last decade, resulting in PT Waskita Karya and PT Wijaya Karya being included in the list of issuers with the potential for delisting from the IDX in December 2025 (Yuliandi & Ramadhan, 2025).

Table 12.

**Altman Z-Score Values and Financial Health Zones of State-Owned Construction Companies for the Period 2015-2024**

Company	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
ADHI	4.16	3.13	3.38	3.56	1.69	0.89	0.29	1.08	0.94	-0.02
PTPP	2.43	2.83	2.38	2.18	1.86	4.62	0.85	1.06	0.86	1.19
WIKA	3.81	4.55	3.71	4.33	4.34	2.66	3.42	3.72	1.74	4.05
WSKT	5.09	1.67	0.83	1.38	0.84	-1.96	0.83	0.58	-0.60	-1.08

Description: Safe Zone (Green) (Z-Score > 2.90); Grey Zone (Grey) (1.23 ≤ Z-Score ≤ 2.90); Distress Zone (Red) (Z-Score < 1.23)

Source: Data processed by the researcher (2026)



This condition proves that state-owned enterprise status does not provide immunity from bankruptcy, as evidenced by PT Merpati Nusantara Airlines and PT Istaka Karya, which have been declared bankrupt (Hamzah, 2016; Permana & Serly, 2021). From an agency theory perspective, pressure from the government as the principal encourages management to make aggressive debt-based financing decisions that result in massive liabilities and systemic structural deterioration (Jensen & Meckling, 1976; Susilo & Ria, 2022), as evidenced by the collapse of PT Garuda Indonesia and PT Indofarma due to the accumulation of unhealthy debt structures and failure to manage growth simultaneously (Laksmiwati & Priyanto, 2020; Marota et al., 2019).

### **The Effect of Operating Cash Flow on Financial Distress**

Operating Cash Flow does not have a significant effect on Financial Distress ( $t = 0.752$ ;  $p = 0.457 > 0.05$ ), so H1 is rejected. The average Operating Cash Flow of all companies in the sample reached  $-259.85\%$  with an extreme value of  $-2,745.00\%$  at PT Wijaya Karya in 2021, but this enormous cash flow pressure did not significantly affect the Altman Z-Score value. The strongest explanation lies in the structural peculiarities of SOEs, namely, easy access to government bank loans and the issuance of government-guaranteed bonds, so that the operating cash flow deficit can be overcome without immediately worsening the overall financial distress (Susilo et al., 2025).

From a signaling theory perspective, the simultaneous cash flow deficits during the 2020–2022 pandemic were perceived by the market as a temporary external impact, not a signal of fundamental corporate failure, thus not triggering an extreme negative reaction in the Altman Z-Score assessment (Yuliandi & Ramadhan, 2025). These findings are consistent with Wuriyani and Indarti (2025) and Widiasari (2018), who found no significant effect of cash flow on companies with strong access to funding, but differ from Wahyuni and Dewi (2025), who found a significant negative effect on the general infrastructure sector because private companies do not have the same access to loans as state-owned enterprises.

### **The Effect of Company Size on Financial Distress**

Company Size has a negative and significant effect on Financial Distress ( $t = -5.519$ ;  $p < 0.001 < 0.05$ ), thus accepting H2, meaning that the larger the company size, the higher the potential for financial distress. This pattern is clearly evident in the data: PT Waskita Karya, with the largest asset size (Ln 32.45), experienced the most severe distress, while PT Wijaya Karya, which is relatively smaller in size, was more stable. In the context of state-owned construction companies, large



size does not mean resilience, but rather reflects increasingly uncontrollable debt complexity, as seen in PT PLN with liabilities of IDR 646.68 trillion and PT Garuda Indonesia with IDR 110.33 trillion before restructuring (Perbiani et al., 2024; Marota et al., 2019).

Within the framework of agency theory, large size creates greater monitoring complexity and increases moral hazard because management tends to take aggressive funding risks due to expectations of a bailout from the government, making agency costs in the form of massive debt burdens inevitable (Permana & Serly, 2021; Gunawan et al., 2019). These findings are in line with Wangsih et al. (2021) and Marota et al. (2019), who proved the significant negative influence of company size on the financial health of SOEs, and consistent with the argument of Ozdemir et al. (2022) that the complexity of large scale hinders risk management efficiency.

#### **The Effect of Asset Growth on Financial Distress**

Asset Growth has a positive and significant effect on Financial Distress ( $t = 2.259$ ;  $p = 0.030 < 0.05$ ), thus H3 is accepted, indicating that higher asset growth is associated with a better Altman Z-Score or lower distress risk. PT Wijaya Karya, which was able to maintain positive asset growth during most of the research period, consistently showed better financial health than PT Waskita Karya and PT Adhi Karya, which experienced stagnation and even asset contraction since 2020. From a signaling theory perspective, consistent asset growth is a signal of healthy business expansion to investors and creditors, thereby expanding access to funding and reducing distress risk (Anggraini, 2025; Vuković et al., 2022).

These findings are consistent with Astria and Norisanti (2023), who found a significant positive effect of asset growth on financial health, although this contrasts with Pratiwi et al. (2023), who found no significant effect in the food and beverage sector. These differences indicate the relevance of industry context in shaping the relationship between these two variables. Abdi et al. (2022) and Zhou et al. (2022) add that asset growth driven by organic profitability, rather than debt alone, will be more effective in reducing the risk of financial distress in a sustainable manner.

#### **The Effect of Company Age on Financial Distress**

Company Age does not have a significant effect on Financial Distress ( $t = -0.691$ ;  $p = 0.494 > 0.05$ ), so H4 is rejected. The pattern in the data is actually contrary to theoretical expectations: PT Adhi Karya, as the most senior company in the sample, experienced the most drastic decline in Z-Score, while PT Waskita Karya, which is relatively younger, had already been in the distress zone much earlier. This proves that organizational maturity does not necessarily protect



SOEs from structural financial pressure, as financial distress is more determined by contemporary factors such as debt size, capital structure, and government project assignments (Gunawan et al., 2019; Isayas, 2021).

Relatively frequent management rotation in SOEs also prevents institutional memory from accumulating optimally, so that longevity does not automatically result in risk management advantages (Susilo & Ria, 2022). This is also evident in other senior SOEs such as PT Krakatau Steel (Laksmiwati & Priyanto, 2020), which is more than five decades old but continues to experience prolonged losses (Laksmiwati & Priyanto, 2020). These findings align with Mulyani and Ritonga (2025) and Theresa and Pradana (2022), who did not find a significant effect of company age on financial distress.

### **Simultaneous Influence of Operating Cash Flow, Company Size, Asset Growth, and Company Age on Financial Distress**

Simultaneously, all four variables significantly influence Financial Distress ( $F = 13.142$ ;  $p < 0.001 < 0.05$ ; Adjusted  $R^2 = 47.7\%$ ), thus accepting H5. Although not all variables are partially significant, the collective interaction of the four variables is able to explain almost half of the variation in the Altman Z-Score, which is a substantial explanatory power considering the complexity of the determinants of financial distress in the state-owned construction industry. Massive debt, asset stagnation, cash flow pressure, and the large scale of the company working together create layered pressures that push the company into a distress zone, especially when the COVID-19 pandemic exacerbates all of these conditions at once (Bahrum et al., 2024; Laksmiwati & Priyanto, 2020).

These findings confirm that financial distress in SOEs is multidimensional and cannot be explained by a single factor, as evidenced by the collapse of PT Garuda Indonesia and PT Indofarma, which was the result of weak profitability, an unhealthy debt structure, and a failure to manage growth simultaneously (Laksmiwati & Priyanto, 2020; Marota et al., 2019). From the perspective of agency theory and signaling theory, the complex interaction between large company size, asset stagnation, and cash flow deficits creates layered negative signals to the capital market, which ultimately deepens systemic distress conditions. Therefore, interventions to improve BUMN Karya must be carried out holistically, not partially (Crespí-Cladera et al., 2021; Li et al., 2021).

## **CONCLUSION**

This study proves that the majority of state-owned construction companies experienced serious financial deterioration between 2015 and 2024, with PT



Waskita Karya recording the lowest Z-Score of  $-1.96$ , confirming that state-owned status does not provide immunity from financial distress. Partially, Company Size has a significant negative effect ( $p < 0.001 < 0.05$ ) and Asset Growth has a significant positive effect ( $p = 0.030 < 0.05$ ), while Operating Cash Flow ( $p = 0.457 > 0.05$ ) and Company Age ( $p = 0.494 > 0.05$ ) did not significantly influence the results. Simultaneously, all four variables had a significant effect ( $p < 0.001 < 0.05$ ) with an Adjusted  $R^2$  of 47.7%, confirming that the financial distress of BUMN Karya is multidimensional, influenced by complex interactions between company scale, asset growth, cash flow, and company age, so that improvement interventions must be carried out holistically, not partially.

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