

## ANALYSIS OF THE ZMIJEWSKI (X-SCORE) AND ALTMAN (Z-SCORE) MODELS IN PREDICTING BANKRUPTCY POTENTIAL OF PT WIJAYA KARYA (PERSERO) TBK

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### Abstract

The Rupiah exchange rate against the United States Dollar is an important indicator of Indonesia's macroeconomic stability. Exchange rate fluctuations are influenced by external factors, such as global monetary policy tightening, geopolitical uncertainty, and capital flow volatility, as well as domestic factors, including inflation, current account conditions, and market expectations. As the central bank, Bank Indonesia plays a strategic role in maintaining Rupiah stability through various monetary policy instruments, including benchmark interest rate adjustments, open market operations, foreign exchange market intervention, foreign exchange reserve management, and policy communication. This study aims to analyze Bank Indonesia's monetary policy strategy in maintaining Rupiah exchange rate stability during the 2020-2024 period. Using a descriptive qualitative approach, this study examines official reports, policy documents, and relevant literature to understand the implementation and effectiveness of Bank Indonesia's policy mix. The findings indicate that Bank Indonesia's monetary policy was relatively effective in containing excessive exchange rate volatility amid global and domestic pressures. Interest rate adjustments helped strengthen market confidence and reduce imported inflationary pressure, while foreign exchange intervention and reserve management supported short-term exchange rate stability. In addition, transparent and forward-looking policy communication contributed to reducing uncertainty and guiding market expectations. This study highlights that exchange rate stability is achieved not through a single instrument, but through an integrated, adaptive, and credible monetary policy strategy.

**Keywords:** Bank Indonesia; exchange rate stability; monetary policy; Rupiah; qualitative study

### INTRODUCTION

Companies operating in dynamic business environments inevitably face various internal and external challenges that may affect their financial performance and long-term sustainability. One of the most critical risks faced by companies is financial distress, a condition that may gradually reduce operational capacity, weaken profitability, increase debt pressure, and potentially lead to bankruptcy. Therefore, companies require an early warning system that can identify the initial signs of financial deterioration. Through early detection, management can formulate corrective strategies before financial problems develop into more serious business failure.

Bankruptcy is generally understood as a condition in which a company faces uncertainty in maintaining its operational activities due to declining financial performance (Lesmana, 2003). This condition represents a serious threat because it reflects the failure of a company to sustain its business activities and fulfill its financial obligations. For this reason, bankruptcy prediction is important not only for company management, but also for investors, creditors, regulators, and other stakeholders. By analyzing bankruptcy potential, stakeholders can assess the company's financial health and determine appropriate strategic decisions.

PT Wijaya Karya (Persero) Tbk, commonly known as WIKA, is one of Indonesia's State-Owned Enterprises engaged in the construction sector. As a major state-owned construction company, WIKA has played a strategic role in supporting national infrastructure development. However, in recent years, the company has faced significant financial pressure. High debt levels, liquidity constraints, declining profitability, and weakening project performance have become important indicators that the company's financial condition is under pressure. This situation makes PT Wijaya Karya (Persero) Tbk a relevant object for bankruptcy potential analysis.

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Financial statements are an important source of information for assessing a company's financial condition. Kasmir (2015) states that financial statements are records that describe the financial position of a company at a certain time or over a specific period. Through financial statement analysis, stakeholders can identify whether a company is experiencing declining performance and whether such decline may lead to financial distress. In this study, the bankruptcy potential of PT Wijaya Karya (Persero) Tbk is analyzed using the Zmijewski (X-Score) and Altman (Z-Score) models. The Altman Z-Score model emphasizes profitability, liquidity, solvency, and activity ratios as indicators of bankruptcy potential, while the Zmijewski X-Score model gives greater emphasis to profitability, leverage, and liquidity, particularly the company's debt burden.

PT Wijaya Karya (Persero) Tbk was established in 1960 under the name PN Widjaja Karja and later changed its name to PT Wijaya Karya (Persero) Tbk in 1972, based on Government Regulation No. 2 of 1960 and the Decree of the Minister of Public Works and Electric Power No. 5 dated March 11, 1960. The company's financial development during the 2020–2024 period provides an important basis for evaluating its bankruptcy potential, especially because this period reflects major pressures from the COVID-19 pandemic, post-pandemic recovery, and increasing financial burdens in the construction sector.

Table 1. Financial Data of PT Wijaya Karya Tbk, 2020-2024 (IDR million)

Year	Total Assets	Revenue	Total Liabilities	Equity	Net Income
2020	68,109,185	16,536,382	51,451,760	16,657,425	322,343
2021	69,385,794	17,809,718	51,950,717	17,435,078	214,425
2022	75,069,604	21,480,792	57,576,398	17,493,206	12,586
2023	65,981,236	22,530,356	56,409,623	9,571,613	(7,824,539)
2024	63,556,343	19,242,727	51,684,923	11,871,420	(2,513,814)

Source: Indonesia Stock Exchange (IDX), processed (2026).

Based on Table 1, PT Wijaya Karya Tbk showed a weakening financial trend during the 2020-2024 period. Total assets increased until 2022, reaching IDR 75.07 trillion, but then declined to IDR 65.98 trillion in 2023 and IDR 63.56 trillion in 2024. This decline indicates a contraction in the company's asset base, which may reflect reduced business capacity, asset restructuring, or pressure on operational performance. Revenue also fluctuated during the period, reaching its highest level in 2023 at IDR 22.53 trillion before declining to IDR 19.24 trillion in 2024. Although revenue showed improvement in several years, this was not accompanied by stable profitability.

The company's liabilities remained high throughout the observation period and consistently exceeded total equity. This condition indicates that WIKA's operations were heavily financed through debt. A capital structure dominated by liabilities may increase financial risk, particularly when the company's profitability weakens and interest expenses rise. Nida and Muyassaroh (2019) explain that when total liabilities exceed equity, the risk of financial loss becomes greater because the company bears a heavier obligation to creditors. This condition is evident in WIKA's financial performance, where net income continued to decline significantly from 2020 to 2022 and turned into substantial losses in 2023 and 2024.

The decline in profitability became one of the most critical indicators of WIKA's financial distress. In 2020, the company still recorded a net income of IDR 322.34 billion, but this figure declined sharply to IDR 214.43 billion in 2021 and only IDR 12.59 billion in 2022. The situation worsened in 2023 when WIKA recorded a net loss of IDR 7.82 trillion, followed by another loss of IDR 2.51 trillion in 2024. These losses were influenced by high interest expenses, financial restructuring pressures, and losses related to

investment in the Whoosh High-Speed Railway project. The combination of high liabilities, declining equity, asset contraction, and negative profitability indicates that the company faces serious financial pressure.

Based on these conditions, bankruptcy prediction analysis becomes highly relevant. The use of the Altman Z-Score and Zmijewski X-Score models is expected to provide a clearer picture of WIKA's financial distress potential. The Altman model can identify bankruptcy risk through a combination of liquidity, profitability, leverage, solvency, and activity indicators, while the Zmijewski model provides another perspective by emphasizing profitability, leverage, and liquidity. The comparison of these two models is important because each model has different sensitivity in detecting financial distress.

This study therefore formulates two main research questions. First, what bankruptcy risk signals are indicated by the Zmijewski and Altman models in PT Wijaya Karya (Persero) Tbk during the 2020-2024 period? Second, which model provides a more consistent and informative prediction of financial distress for state-owned construction enterprises? The findings of this study are expected to contribute theoretically to the literature on bankruptcy prediction and financial distress analysis, particularly in the context of state-owned construction companies. Practically, the results may serve as a reference for management, investors, creditors, and policymakers in evaluating financial risk and formulating appropriate strategic decisions.

## **LITERATURE REVIEW**

### **Bankruptcy and Financial Distress**

Bankruptcy and financial distress are closely related concepts in corporate financial analysis. Financial distress generally refers to a condition in which a company begins to experience financial pressure, particularly in meeting its short-term and long-term obligations. If this condition continues without effective corrective action, it may develop into bankruptcy. Lesmana (2003) defines bankruptcy as a condition of uncertainty regarding a company's ability to continue its operational activities when its financial condition deteriorates. In line with this view, Chua and Rustam (2023) explain that financial distress reflects a liquidity problem in which a company is unable to fulfill all of its obligations, and if not properly managed, this condition may eventually lead to bankruptcy.

In financial analysis, bankruptcy does not occur suddenly, but is usually preceded by several early warning signals. These signals can be identified through financial statements, particularly through profitability, liquidity, leverage, and solvency ratios. From the perspective of signaling theory, financial ratios disclosed in company reports provide important information for investors, creditors, and other stakeholders regarding the company's financial health. A decline in Return on Assets (ROA), an increase in leverage, weakening working capital, and declining liquidity may indicate that the company is facing increasing financial risk. Salman and Wulandari (2021) also identify several indicators of financial difficulty, including consecutive net losses, failure to distribute dividends for more than one year, workforce reductions, and the cessation of dividend payments.

In the context of PT Wijaya Karya (Persero) Tbk, financial distress analysis becomes relevant because the company has experienced pressure in profitability, liabilities, and liquidity in recent years. As a state-owned construction company with a major role in national infrastructure development, WIKA's financial condition needs to be assessed carefully. Bankruptcy prediction models can therefore serve as an early warning tool to evaluate whether the company's financial position indicates a potential risk of bankruptcy.

### The Zmijewski (X-Score) Model

The Zmijewski model is one of the bankruptcy prediction models developed to assess a company's financial condition by emphasizing profitability, leverage, and liquidity. Zmijewski (1984) developed this model by critically reviewing the sampling approaches used in previous bankruptcy prediction studies and proposing a probit-based model using a broader and more representative sample. The model is widely used because it provides a relatively simple but meaningful framework for identifying potential bankruptcy risk.

The Zmijewski model is formulated as follows:

$$X = -4.3 - 4.5(X_1) + 5.7(X_2) - 0.004(X_3)$$

In this formula,  $X_1$  represents Return on Assets, calculated by dividing net income by total assets. This ratio measures the company's ability to generate profit from its assets. A positive ROA indicates that the company is able to utilize its assets productively, while a negative ROA indicates weak profitability and possible operational inefficiency.  $X_2$  represents the debt ratio, calculated by dividing total debt by total assets. This ratio shows the extent to which company assets are financed by debt. A higher debt ratio indicates greater financial risk because the company relies more heavily on liabilities to support its operations. Meanwhile,  $X_3$  represents the current ratio, calculated by dividing current assets by current liabilities. This ratio reflects the company's ability to meet short-term obligations using available current assets.

The classification of the Zmijewski model is straightforward. A company is categorized as potentially bankrupt if the X-Score value is greater than zero, while a company is categorized as not potentially bankrupt if the X-Score value is less than or equal to zero. In the case of PT Wijaya Karya (Persero) Tbk, the Zmijewski model is relevant because the company has shown high liabilities and declining profitability, both of which are central components in the X-Score calculation.

### The Altman (Z-Score) Model

The Altman Z-Score model was developed by Edward I. Altman in 1968 using multiple discriminant analysis to predict corporate bankruptcy. This model is one of the most widely used bankruptcy prediction tools because it combines several financial ratios that represent liquidity, profitability, solvency, and operational efficiency. For non-publicly traded companies and emerging market contexts, the modified Altman Z-Score formula is commonly used as follows:

$$Z\text{-Score} = 6.56X_1 + 3.26X_2 + 6.72X_3 + 1.05X_4$$

In this model,  $X_1$  represents working capital divided by total assets. This ratio measures the company's net liquid assets relative to total assets and reflects its ability to meet short-term obligations (Fau, 2021).  $X_2$  represents retained earnings divided by total assets, which measures cumulative profitability and reflects the company's ability to accumulate earnings over time (Fau, 2021).  $X_3$  represents earnings before interest and taxes divided by total assets. This ratio measures the productivity of company assets in generating operating profit, regardless of financing structure and tax effects (Efendi et al., 2022). Meanwhile,  $X_4$  represents the book value of equity divided by the book value of total debt, which indicates the extent to which the company's equity can cover its liabilities (Mahmuda et al., 2020).

The Altman model classifies companies into three zones. A company with a Z-Score greater than 2.60 is categorized as being in the safe zone, meaning that it is not at significant risk of bankruptcy. A company with a Z-Score between 1.10 and 2.60 is categorized as being in the grey zone, indicating

uncertainty regarding its financial condition. Meanwhile, a company with a Z-Score of 1.10 or lower is categorized as being in the distress zone, indicating a high risk of bankruptcy.

The Altman model is suitable for analyzing PT Wijaya Karya (Persero) Tbk because it captures several important aspects of the company's financial condition, particularly working capital, accumulated earnings, operating profitability, and the relationship between equity and debt. These components are relevant to WIKA's recent financial performance, which has been marked by declining profitability, high liabilities, and pressure on equity.

### **Previous Studies**

Previous research has shown that the Altman and Zmijewski models are useful tools for predicting bankruptcy potential in companies experiencing financial pressure. Andi Mustika Amin et al. (2024) applied both the Altman and Zmijewski models in predicting corporate bankruptcy and found that the Altman model placed the company in the danger zone, while the Zmijewski model also indicated potential bankruptcy risk. This finding supports the use of a dual-model approach because each model provides a different perspective in assessing financial distress.

In the Indonesian context, prior studies have also demonstrated the relevance of these models for analyzing companies, including state-owned enterprises, that face structural financial challenges. The use of both models is important because the Zmijewski model is generally more sensitive to changes in leverage and profitability, while the Altman model provides a broader assessment by incorporating working capital, retained earnings, operating profitability, and equity coverage. Therefore, applying both models allows researchers to obtain a more comprehensive understanding of bankruptcy potential.

### **METHODS**

This study employs a descriptive quantitative research design to analyze the bankruptcy potential of PT Wijaya Karya (Persero) Tbk using the Zmijewski X-Score and Altman Z-Score models. This approach was selected because the study focuses on measuring, calculating, and interpreting financial ratios derived from the company's financial statements. The descriptive quantitative method enables the researcher to objectively describe the company's financial condition and classify its bankruptcy risk based on the cut-off criteria of each prediction model.

The research uses secondary data obtained from the official website of the Indonesia Stock Exchange (IDX) at [www.idx.co.id](http://www.idx.co.id). The data consist of the annual financial statements of PT Wijaya Karya (Persero) Tbk, particularly the statements of financial position and statements of profit or loss for the 2020-2024 period. The population in this study includes all financial statements of PT Wijaya Karya (Persero) Tbk published on the IDX, while the sample consists of the company's financial statements for five consecutive years, from 2020 to 2024. This period was selected because it reflects important financial dynamics, including the impact of the COVID-19 pandemic, post-pandemic recovery, and the financial pressures faced by the state-owned construction sector.

Data collection was carried out through documentation and literature review techniques. The documentation technique was used to collect financial statement data, including total assets, total liabilities, equity, net income, current assets, current liabilities, retained earnings, and earnings before interest and taxes. Meanwhile, the literature review was conducted to strengthen the theoretical basis related to bankruptcy prediction, financial distress, and the application of the Zmijewski and Altman models in corporate financial analysis.

The data analysis technique in this study consists of two bankruptcy prediction models. First, the Zmijewski X-Score model is used to assess bankruptcy potential based on profitability, leverage, and liquidity indicators. The variables calculated in this model include Return on Assets, measured by net income divided by total assets; Debt Ratio, measured by total debt divided by total assets; and Current Ratio, measured by current assets divided by current liabilities. These variables are then substituted into the following formula:

$$X = -4.3 - 4.5(X_1) + 5.7(X_2) - 0.004(X_3)$$

A company is classified as having bankruptcy potential if the X-Score value is greater than zero. Conversely, if the X-Score value is less than or equal to zero, the company is categorized as not having bankruptcy potential.

Second, the Altman Z-Score model is used to assess financial distress by considering liquidity, cumulative profitability, operating performance, and solvency. The variables calculated in this model include Working Capital to Total Assets, Retained Earnings to Total Assets, EBIT to Total Assets, and Book Value of Equity to Book Value of Total Debt. These variables are then substituted into the following formula:

$$Z = 6.56X_1 + 3.26X_2 + 6.72X_3 + 1.05X_4$$

The results of the Altman Z-Score calculation are classified into three categories. A Z-Score greater than 2.60 indicates that the company is in the safe zone. A Z-Score between 1.10 and 2.60 indicates the grey zone, meaning the company is in an uncertain financial condition. Meanwhile, a Z-Score of 1.10 or lower indicates the distress zone, meaning the company has a high risk of bankruptcy.

After calculating the scores using both models, the results are compared to determine whether the Zmijewski and Altman models produce consistent bankruptcy signals for PT Wijaya Karya (Persero) Tbk. This comparison is intended to identify which model provides a more informative assessment of the company's financial distress condition during the 2020–2024 period. Through this process, the study is expected to provide a clearer understanding of WIKA's bankruptcy potential based on its financial statement performance.

This study employs a descriptive qualitative approach to examine Bank Indonesia's monetary policy in maintaining Rupiah exchange rate stability. The qualitative approach was selected because the study does not aim to test statistical hypotheses, but rather to provide an in-depth understanding of how Bank Indonesia formulates, implements, and communicates monetary policy in response to exchange rate pressures. Through this approach, monetary policy is viewed not only as a technical economic instrument, but also as an institutional response to complex macroeconomic dynamics.

## RESULTS AND DISCUSSION

### Zmijewski (X-Score) Analysis

The Zmijewski X-Score model classifies companies into two categories, namely potentially bankrupt when the X-Score is greater than zero and not potentially bankrupt when the X-Score is less than or equal to zero. In this study, the Zmijewski model is used to assess the bankruptcy potential of PT Wijaya Karya (Persero) Tbk by examining three main financial indicators: Return on Assets, Debt Ratio, and Current Ratio. These three indicators reflect the company's profitability, leverage, and liquidity conditions during the 2020-2024 period.

Table 2. Return on Assets ( $X_1$ ) of PT Wijaya Karya Tbk, 2020-2024

Year	Net Income (IDR)	Total Assets (IDR)	$X_1$	Description
2020	322,342,513	68,109,185,213	4.73	Positive
2021	214,424,794	69,385,794,346	3.09	Positive
2022	12,586,435	75,069,604,222	0.17	Positive
2023	(7,824,538,997)	65,981,235,888	-0.12	Negative
2024	(2,513,814,335)	63,556,342,748	-0.04	Negative

Source: IDX Financial Statements, processed (2026).

Based on Table 2, PT Wijaya Karya Tbk experienced a significant decline in profitability during the observation period. The highest ROA value was recorded in 2020 at 4.73, indicating that the company was still able to generate profit from its asset base. However, this condition continued to weaken in the following years. In 2021, ROA declined to 3.09, then dropped sharply to 0.17 in 2022. The company began recording negative ROA in 2023 and 2024, reflecting its inability to generate positive returns from total assets. This deterioration indicates a serious decline in asset productivity and becomes an early signal of financial distress.

Table 3. Debt Ratio ( $X_2$ ) of PT Wijaya Karya Tbk, 2020-2024

Year	Total Debt (IDR)	Total Assets (IDR)	$X_2$	Description
2020	51,451,760,142	68,109,185,213	0.76	High leverage
2021	51,950,716,634	69,385,794,346	0.75	High leverage
2022	57,576,398,034	75,069,604,222	0.77	High leverage
2023	56,409,622,846	65,981,235,888	0.85	Very high leverage
2024	51,684,922,956	63,556,342,748	0.81	Very high leverage

Source: IDX Financial Statements, processed (2026)

Table 3 shows that WIKA's debt ratio remained consistently high throughout the 2020-2024 period. The ratio ranged from 0.75 in 2021 to 0.85 in 2023, meaning that most of the company's assets were financed by liabilities. This condition reflects a highly leveraged capital structure and indicates that the company carried substantial financial obligations. The increase in the debt ratio in 2023 further strengthened the indication that WIKA faced serious financial pressure, especially when the high debt burden was not supported by strong profitability.

Table 4. Current Ratio ( $X_3$ ) of PT Wijaya Karya Tbk, 2020-2024

Year	Current Assets (IDR)	Current Liabilities (IDR)	$X_3$	Description
2020	47,980,945,725	44,212,529,936	1.09	Adequate
2021	37,186,634,112	36,969,569,903	1.01	Barely adequate
2022	39,634,794,697	36,135,331,415	1.10	Adequate
2023	30,801,655,982	38,437,293,595	0.80	Below 1.0
2024	30,238,518,571	19,023,299,774	1.59	Improved

Source: IDX Financial Statements, processed (2026).

In terms of liquidity, Table 4 indicates that the company's current ratio fluctuated during the study period. In 2020 and 2022, the current ratio remained above 1.0, suggesting that current assets were still sufficient to cover short-term liabilities. However, in 2021 the ratio declined to 1.01, indicating a very narrow liquidity margin. The weakest liquidity position occurred in 2023, when the current ratio fell to 0.80, meaning that current liabilities exceeded current assets. Although the current ratio improved to 1.59 in 2024, this recovery was mainly driven by a decline in current liabilities and did not fully eliminate concerns over the company's overall financial health.

Table 5. Zmijewski (X-Score) Results for PT Wijaya Karya Tbk, 2020-2024

No.	Year	$X_1$	$X_2$	$X_3$	X-Score	Classification
1	2020	4.73	0.76	1.09	-21.25	Not Potentially Bankrupt
2	2021	3.09	0.75	1.01	-13.93	Not Potentially Bankrupt
3	2022	0.17	0.77	1.10	-0.68	Not Potentially Bankrupt
4	2023	-0.12	0.85	0.80	-4.15	Not Potentially Bankrupt
5	2024	-0.04	0.81	1.59	0.49	Potentially Bankrupt

Source: Data processed by authors (2026).

The results of the Zmijewski model show a declining financial trend. In 2020, WIKA recorded an X-Score of -21.25, placing the company in the not potentially bankrupt category. The score continued to weaken in the following years, reaching -13.93 in 2021 and -0.68 in 2022. Although the company was still categorized as not potentially bankrupt until 2023, the trend indicated a gradual deterioration in financial health. In 2024, the X-Score increased to 0.49, exceeding the cut-off value of zero and placing the company in the potentially bankrupt category.

### Altman (Z-Score) Analysis

The Altman Z-Score model classifies companies into three categories: safe zone, grey zone, and distress zone. A company is categorized as safe when the Z-Score is greater than 2.60, uncertain or in the grey zone when the Z-Score is between 1.10 and 2.60, and financially distressed when the Z-Score is less than or equal to 1.10. In this study, the Altman model is used to assess WIKA's bankruptcy potential based on working capital, retained earnings, EBIT, and equity-to-debt structure.

Table 6. Working Capital to Total Assets ( $X_1$ ) - Altman Model

Year	Working Capital (IDR)	Total Assets (IDR)	$X_1$	Description
2020	3,768,415,789	68,109,185,213	0.06	Positive
2021	217,064,209	69,385,794,346	0.003	Near zero
2022	3,699,463,282	75,069,604,222	0.05	Positive
2023	(7,635,637,613)	65,981,235,888	-0.12	Negative
2024	11,215,218,797	63,556,342,748	0.18	Improved

Source: IDX Financial Statements, processed (2026).

The working capital ratio shows that WIKA's liquidity position weakened considerably in 2021 and 2023. The negative value in 2023 indicates that current liabilities exceeded current assets, reflecting short-term financial pressure. Although the ratio improved in 2024, the previous deterioration suggests that the company had experienced serious liquidity constraints.

Table 7. Retained Earnings to Total Assets ( $X_2$ ) - Altman Model

Year	Retained Earnings (IDR)	Total Assets (IDR)	$X_2$	Description
2020	348,575,904	68,109,185,213	0.005	Low
2021	415,521,462	69,385,794,346	0.005	Low
2022	330,903,755	75,069,604,222	0.004	Low
2023	(6,865,135,999)	65,981,235,888	-0.10	Negative
2024	(9,203,381,263)	63,556,342,748	-0.14	Negative

Source: IDX Financial Statements, processed (2026).

Table 7 indicates that WIKA's retained earnings remained very low from 2020 to 2022 and turned negative in 2023 and 2024. This condition reflects the accumulation of losses and weak internal capital formation. Negative retained earnings also suggest that the company's previous profits were insufficient to absorb current financial pressures.

Table 8. EBIT to Total Assets ( $X_3$ ) - Altman Model

Year	EBIT (IDR)	Total Assets (IDR)	$X_3$	Description
2020	1,463,941,728	68,109,185,213	0.03	Low positive
2021	1,122,984,859	69,385,794,346	0.02	Low positive
2022	1,715,151,718	75,069,604,222	0.03	Low positive
2023	(3,828,451,221)	65,981,235,888	-0.06	Negative
2024	1,986,001,949	63,556,342,748	0.04	Recovered

Source: IDX Financial Statements, processed (2026)

The EBIT to total assets ratio shows that WIKA's operating profitability was relatively weak throughout the observation period. The most severe decline occurred in 2023, when EBIT became negative. In 2024, EBIT recovered to a positive level, indicating some improvement in operating performance. However, this recovery was not yet strong enough to fully restore the company's financial stability.

Table 9. Book Value of Equity to Book Value of Debt ( $X_4$ ) - Altman Model

Year	Book Value of Equity (IDR)	Book Value of Debt (IDR)	$X_4$	Description
2020	16,657,425,071	51,451,760,142	0.33	Low
2021	17,435,077,712	51,950,716,634	0.34	Low
2022	17,493,206,188	57,576,398,034	0.30	Low
2023	9,571,613,042	56,409,622,846	0.17	Very low
2024	11,871,419,792	51,684,922,956	0.22	Slightly improved

Source: IDX Financial Statements, processed (2026)

The equity-to-debt ratio remained low during the entire period, indicating that WIKA's equity was relatively small compared to its debt obligations. The sharp decline in 2023 shows that the company's capital structure weakened significantly. Although there was slight improvement in 2024, the ratio remained low, suggesting that the company still had limited equity capacity to cover total liabilities.

Table 10. Altman (Z-Score) Results for PT Wijaya Karya Tbk, 2020-2024

Year	$X_1$	$X_2$	$X_3$	$X_4$	Z-Score	Classification	Zone
2020	0.60	0.005	0.03	0.33	4.48	Not Potentially Bankrupt	Safe
2021	0.003	0.005	0.02	0.34	0.50	Potentially Bankrupt	Distress
2022	0.50	0.004	0.03	0.30	3.80	Not Potentially Bankrupt	Safe
2023	-0.12	-0.10	-0.06	0.17	-1.33	Potentially Bankrupt	Distress
2024	0.18	-0.14	0.04	0.22	1.22	Grey Zone	Grey

Source: Data processed by authors (2026)

The Altman Z-Score results reveal a fluctuating pattern in WIKA's financial condition. In 2020, the company was classified in the safe zone with a Z-Score of 4.48. However, in 2021 the score dropped sharply to 0.50, placing the company in the distress zone. This decline was mainly caused by the weakening of working capital and low operating profitability. In 2022, the company returned to the safe zone with a Z-Score of 3.80, reflecting temporary improvement in financial indicators.

The most severe financial pressure occurred in 2023, when the Z-Score fell to -1.33. This result placed WIKA in the distress zone and reflected a combination of negative working capital, negative retained earnings, negative EBIT, and weak equity coverage. In 2024, the Z-Score improved to 1.22, placing the company in the grey zone. This indicates that although WIKA showed signs of recovery, the company had not yet reached a financially safe condition. The negative retained earnings and low equity-to-debt ratio show that financial vulnerability remained significant.

### Comparative Analysis and Discussion

The results of the Zmijewski and Altman models show that PT Wijaya Karya (Persero) Tbk experienced serious financial pressure during the 2020-2024 period, although both models produced different classifications in certain years. The Zmijewski model classified the company as not potentially bankrupt from 2020 to 2023, but placed it in the potentially bankrupt category in 2024. In contrast, the Altman model showed a more volatile pattern, classifying WIKA as being in the distress zone in 2021 and 2023, in the safe zone in 2020 and 2022, and in the grey zone in 2024.

The difference in classification is influenced by the different emphasis of each model. The Zmijewski model is more sensitive to profitability and leverage, particularly ROA and debt ratio. Therefore, the

company's negative profitability and high debt ratio in 2024 caused the X-Score to exceed the bankruptcy threshold. Meanwhile, the Altman model captures broader dimensions, including working capital, retained earnings, operating profitability, and equity-to-debt capacity. This explains why the Altman model was able to detect distress earlier in 2021 and 2023, particularly when working capital and EBIT weakened sharply.

The findings indicate that 2023 was the most critical year for WIKA's financial condition. Both models show strong signs of financial deterioration during that year. The company recorded negative profitability, negative working capital, negative retained earnings, and a very low equity-to-debt ratio. These conditions suggest that WIKA faced pressure not only in terms of short-term liquidity, but also in long-term financial sustainability. The large loss in 2023, partly associated with high financing costs and losses from the Whoosh High-Speed Railway project, further weakened the company's financial position.

Several factors contributed to WIKA's financial distress. First, the company relied heavily on debt financing to support infrastructure projects, resulting in a high debt ratio throughout the observation period. Second, the COVID-19 pandemic disrupted revenue performance and weakened the company's financial resilience. Third, investment-related losses and high interest expenses placed additional pressure on profitability and retained earnings. These conditions are consistent with the findings of Andi Mustika Amin et al. (2024), which show that construction companies with high leverage are more vulnerable to bankruptcy risk when analyzed using bankruptcy prediction models.

From a signaling theory perspective, the results of both models provide important signals for investors, creditors, and management. The Altman model indicates that although WIKA moved from the distress zone in 2023 to the grey zone in 2024, the company had not yet fully recovered. At the same time, the Zmijewski model shows that WIKA entered the potentially bankrupt category in 2024, indicating that the improvement in some financial indicators was not sufficient to eliminate bankruptcy risk. Therefore, the two models jointly suggest that WIKA remains in a vulnerable financial position.

Overall, the comparison of the Zmijewski and Altman models shows that both models are useful in identifying bankruptcy risk, but they provide different analytical perspectives. The Zmijewski model is more effective in highlighting the impact of profitability decline and high leverage, while the Altman model provides a broader picture of liquidity, accumulated earnings, operating performance, and solvency. In the case of PT Wijaya Karya (Persero) Tbk, the combined use of both models provides a more comprehensive understanding of financial distress. The findings suggest that WIKA needs to strengthen profitability, reduce debt dependence, improve capital efficiency, and continue financial restructuring to prevent a return to deeper distress conditions.

## **CONCLUSION**

This study concludes that PT Wijaya Karya (Persero) Tbk experienced significant financial pressure during the 2020–2024 period, as reflected in declining profitability, consistently high leverage, fluctuating liquidity, negative retained earnings, and weakening equity capacity. The financial condition of the company deteriorated most severely in 2023, when WIKA recorded substantial losses, negative working capital, negative EBIT, and a very low equity-to-debt ratio. These indicators show that the company faced serious financial distress, particularly due to high debt dependence, weak profitability, and pressure from large-scale infrastructure project financing.

The Zmijewski X-Score model indicates that PT Wijaya Karya was categorized as not potentially bankrupt from 2020 to 2023, but shifted into the potentially bankrupt category in 2024. This result shows that the company's declining ROA and persistently high debt ratio became the main factors increasing bankruptcy risk. Although liquidity improved in 2024, this improvement was not strong enough to offset the negative impact of weak profitability and high leverage. Therefore, the Zmijewski model provides an important warning that WIKA's financial risk remained serious at the end of the observation period.

Meanwhile, the Altman Z-Score model produced a more fluctuating pattern. The company was classified in the safe zone in 2020 and 2022, entered the distress zone in 2021 and 2023, and moved into the grey zone in 2024. This finding indicates that although WIKA showed signs of recovery in 2024, the company had not yet achieved a financially stable condition. The grey zone classification suggests that WIKA remained vulnerable and could return to the distress zone if improvements in profitability, liquidity, and capital structure are not sustained.

Overall, both models show that PT Wijaya Karya (Persero) Tbk faced a high level of financial vulnerability during the study period, although they differ in classification sensitivity. The Zmijewski model is more sensitive to profitability decline and leverage pressure, while the Altman model provides a broader assessment by capturing working capital, retained earnings, operating profitability, and solvency. Therefore, the use of both models provides a more comprehensive understanding of WIKA's bankruptcy potential. The findings imply that the company needs to strengthen profitability, reduce debt dependence, improve capital efficiency, and continue financial restructuring to restore financial stability and reduce bankruptcy risk in the future.

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**ANALYSIS OF THE ZMIJEWSKI (X-SCORE) AND ALTMAN (Z-SCORE) MODELS IN PREDICTING BANKRUPTCY POTENTIAL OF PT WIJAYA KARYA (PERSERO) TBK**

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