Z-Score Analysis as a Tool for Predicting Financial Distress in Insurance Sector Companies Listed on the Indonesia Stock Exchange

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Article Info	Abstract
	This study aims to analyze the application of the Altman Z-Score model in predicting financial distress in insurance sector companies listed on the Indonesia Stock Exchange for the 2020-2022 period. The research utilized secondary data from the financial statements of nine companies selected through purposive sampling. Data analysis was conducted by calculating financial ratios and interpreting Z-Scores to classify the financial condition of companies into healthy, gray, or distressed categories. The findings revealed that companies like ABDA and AMAG consistently fell within the healthy category, indicating stable financial management. Conversely, companies like MTWI experienced significant financial declines with negative Z-Scores, indicating a high risk of bankruptcy. Other companies fell in the gray area with opportunities for improvement through enhanced profitability and capital management. The conclusion highlights the effectiveness of Altman Z-Score as a predictive tool, capable of providing early warnings about financial risks in Indonesia's insurance sector.

Introduction

The insurance sector plays a crucial role in stabilizing the economic environment by managing risks through financial instruments. However, despite its growing contributions globally, the insurance industry in Indonesia continues to face challenges, such as stagnating growth and low penetration rates compared to other ASEAN countries. Between 2017 and 2021, the industry's insurance premium penetration only increased from 3.00% to 3.13%, well below the ASEAN average of 3.9%. This condition indicates an urgency to address inefficiencies and potential financial risks within the sector, which could otherwise impair its ability to fulfill obligations to policyholders (Kutzin & World Health Organization, 1995; Novianti & TP, 2021.)

In recent years, financial distress among Indonesian insurance companies has become a recurring issue. Notable cases, including PT Asuransi Jiwasraya and Asuransi Jiwa Bersama Bumiputera 1912, have highlighted the lack of effective financial management, poor investment decisions, and governance failures. These incidents not only jeopardized company operations but also eroded public trust in the insurance industry (Radiansyah et al., 2023; Lusianti, 2017). Identifying financial distress early is therefore imperative to ensuring sustainable operations and instilling confidence in the market (Suhardi, 2021; Zhao et al., 2024; lo Conte & Sancetta, 2023; Urip, 2010).

Altman's Z-Score model, with its high predictive accuracy, offers a robust mechanism for assessing a company's likelihood of financial distress. It combines various financial ratios into a single predictive index, categorizing firms as healthy, distressed, or in a gray area (Koech, 2018). Previous studies have established its reliability, with notable application to both

manufacturing and service industries. However, research focusing on Indonesia's insurance sector remains limited, creating a gap in literature that this study aims to fill (Amimi, 2022; Dartanto et al., 2020; Rokx, 2009; Djalante, 2018).

The Z-Score analysis is one of the tools used to detect a company's decline. The Z-Score method is a technique for predicting bankruptcy and is considered to have a 95% accuracy rate (Hafsari &Setiawanta, 2021).

Several studies have been conducted to predict the potential occurrence of financial distress. Among them is the research by Amimi (2022), which involved 10 Islamic Commercial Banks over the 2017–2021 period with a total sample of 50. The analysis results indicate that financial ratios significantly influence financial distress conditions, although their impacts vary depending on the method used. The analysis reveals that the Springate Method has better accuracy compared to the Altman Z-Score and Zmijewski X-Score methods based on the standard deviation and mean calculations. Meanwhile, the study by Wahyuni & Rubiyah (2021), which analyzed financial distress conditions in plantation sector companies listed on the Indonesia Stock Exchange during the 2014–2018 period, showed that the Altman Z-Score method had the highest accuracy level (76.00%), followed by Zmijewski (70.67%), and Springate and Grover, both of which had the same accuracy level (69.33%).

This research adopts a quantitative approach, utilizing Altman's Z-Score model to evaluate the financial health of insurance companies listed on the Indonesia Stock Exchange during the 2020-2022 period. By analyzing their financial ratios and categorizing their Z-Scores, the study seeks to identify patterns of distress and provide insights for strategic interventions.

The study hypothesizes that a significant portion of Indonesia's insurance sector operates within vulnerable financial conditions, warranting timely corrective actions. The ultimate objectives include identifying critical indicators of financial distress, establishing actionable recommendations for stakeholders, and strengthening the industry's overall stability to compete globally.

Methods

This study employs a quantitative approach to analyze the application of the Altman Z-Score in predicting financial distress in insurance sector companies listed on the Indonesia Stock Exchange (IDX) for the 2020-2022 period. The data used in this study is secondary data sourced from the companies' financial statements, obtained through the official IDX website. The population for this study consists of 15 insurance sector companies listed on the Indonesia Stock Exchange. A sample of 9 companies was selected using purposive sampling based on the following criteria: 1) Insurance sector companies engaged in general and conventional insurance; 2) Insurance companies that have published complete financial statements for the 2020-2022 period.

Table 1. Research Sample

No	Stock Code	Company Name
1	ABDA	Asuransi Bina Dana Arta Tbk.
2	AHAP	Asuransi Harta Aman Pratama Tbk.
3	AMAG	Asuransi Multi Artha Guna Tbk.
4	ASDM	Asuransi Dayin Mitra Tbk.
5	ASJT	Asuransi Jasa Tania Tbk.
6	ASMI	Asuransi Maximus Graha Persada

7	LPGI	Lippo General Insurance Tbk.
8	VINS	Victoria Insurance Tbk.
9	MTWI	Malacca Trust Wuwungan Insurance Tbk

The stages of data analysis in this study include: 1) Calculating the financial ratios of insurance sector companies for the 2020-2022 period; 2) Calculating the Altman Z-Score bankruptcy model for insurance sector companies for the 2020-2022 period.

The formula applied is:

$Z'' = 6.56 X1 + 3.26 X2 + 6.72 X3 + 1.05 X4$

Where:

X1 = Working Capital / Total Assets

X2 = Retained Earnings / Total Assets

X3 = Earnings Before Interest and Taxes / Total Assets

X4 = Book Value of Equity / Book Value of Total Debt

The scores obtained from the Altman Z-Score calculation for the companies in this study are compared to the cut-off values for the following categories:

Table 2. Cut-Off Values for Altman Z-Score Model

Cut-Off Value	Prediction
Z'' < 1.1	Unhealthy (Distress)
1.1 < Z'' < 2.60	Grey Area
Z'' > 2.60	Healthy (Non-Distress)

Source: Riyanto (2001)

Classifying the financial condition of the companies based on the predetermined cut-off points.

Interpreting the results of the data analysis

Result and Discussion

This research calculated Z-Scores for each financial distress prediction model based on the applicable financial ratios and classified the scores according to predetermined cut-off points.

The Altman Z-Score model utilizes four financial ratios to predict a company's financial distress.

Table 3. Altman Z-Score Analysis Results

Stock Code	Indicator	2020	2021	2022
ABDA	Working Capital / Total Assets (X1)	0,136	0,187	0,170
	Retained Earnings / Total Assets (X2)	0,415	0,458	0,479
	EBIT / Total Assets (X3)	0,074	0,077	0,048
	Book Value of Equity / Total Liabilities (X4)	1,272	1,537	1,557
	Z-Score	4,080	4,851	4,633
	Information	Non-Distress	Non-Distress	Non-Distress
AHAP	Working Capital / Total Assets (X1)	0,040	0,058	0,234
	Retained Earnings / Total Assets (X2)	-0,151	-0,167	-0,128
	EBIT / Total Assets (X3)	0,002	0,022	-0,015

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	Book Value of Equity / Total Liabilities (X4)	0,297	0,224	0,290
	Z-Score	0,097	0,224	1,328
	Information	Distress	Distress	Grey Area
AMAG	Working Capital / Total Assets (X1)	0,440	0,350	0,381
	Retained Earnings / Total Assets (X2)	0,224	0,206	0,187
	EBIT / Total Assets (X3)	0,026	0,032	0,029
	Book Value of Equity / Total Liabilities (X4)	0,735	0,666	0,566
	Z-Score	4,561	3,886	3,898
	Information	Non-Distress	Non-Distress	Non-Distress
ASDM	Working Capital / Total Assets (X1)	0,396	0,441	0,415
	Retained Earnings / Total Assets (X2)	0,363	0,389	0,365
	EBIT / Total Assets (X3)	0,036	0,028	0,028
	Book Value of Equity / Total Liabilities (X4)	0,692	0,785	0,697
	Z-Score	4,750	5,168	4,833
	Information	Non-Distress	Non-Distress	Non-Distress
ASJT	Working Capital / Total Assets (X1)	0,297	0,402	0,427
	Retained Earnings / Total Assets (X2)	0,221	0,154	0,164
	EBIT / Total Assets (X3)	-0,019	0,001	-0,002
	Book Value of Equity / Total Liabilities (X4)	1,341	1,406	1,754
	Z-Score	3,945	4,622	5,162
	Information	Non-Distress	Non-Distress	Non-Distress
ASMI	Working Capital / Total Assets (X1)	0,145	0,129	0,105
	Retained Earnings / Total Assets (X2)	0,139	0,160	0,068
	EBIT / Total Assets (X3)	-0,104	0,012	-0,086
	Book Value of Equity / Total Liabilities (X4)	0,810	0,893	0,549
	Z-Score	1,554	2,383	0,911
	Information	Grey Area	Grey Area	Distress
LPGI	Working Capital / Total Assets (X1)	0,277	0,268	0,228
	Retained Earnings / Total Assets (X2)	0,262	0,266	0,254
	EBIT / Total Assets (X3)	0,040	0,025	0,033
	Book Value of Equity / Total Liabilities (X4)	0,441	0,416	0,332
	Z-Score	3,402	3,227	2,893
	Information	Non-Distress	Non-Distress	Non-Distress
MTWI	Working Capital / Total Assets (X1)	0,045	0,042	-0,354
	Retained Earnings / Total Assets (X2)	-0,040	-0,034	-0,027
	EBIT / Total Assets (X3)	0,011	0,009	-0,013
	Book Value of Equity / Total Liabilities (X4)	0,320	0,346	0,320
	Z-Score	0,572	0,585	-2,163
	Information	Distress	Distress	Distress
VINS	Working Capital / Total Assets (X1)	0,616	0,702	0,671

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Retained Earnings / Total Assets (X2)	0,114	0,124	0,162
EBIT / Total Assets (X3)	0,020	0,032	0,029
Book Value of Equity / Total Liabilities (X4)	1,334	2,074	1,688
Z-Score	5,944	7,404	6,896
Information	Non-Distress	Non-Distress	Non-Distress

Source: Data processed

Findings based on table 2 The Altman Z-Score analysis from 2020–2022 revealed significant variations in financial health across companies. The analysis focused on four main indicators: Working Capital/Total Assets (X1), Retained Earnings/Total Assets (X2), EBIT/Total Assets (X3), and Book Value of Equity/Total Liabilities (X4). Each indicator directly impacts the Z-Score, offering a comprehensive view of the company's liquidity, profitability, efficiency, and solvency.

The Altman Z-Score model has been used to assess the financial health of insurance companies listed on the Indonesia Stock Exchange (IDX). The results from 2020 to 2022 categorize companies into three financial conditions: "Non-Distress" (healthy), "Grey Area" (at risk), and "Distress" (financially troubled). Overall, the findings reveal: 1) Non-Distress Category: Companies like ABDA, AMAG, ASDM, ASJT, LPGI, and VINS reported high Z-Scores, reflecting financial stability during the analysis period; 2) Grey Area Category: Companies such as ASMI and AHAP were in the at-risk condition, with fluctuating scores or scores close to the "Distress" threshold; 3) Distress Category: MTWI consistently recorded negative or near-zero scores, indicating poor financial health.

Asuransi Bina Dana Arta Tbk. (ABDA)

The company exhibited consistent financial stability within the "Non-Distress" category throughout the 2020-2022 period. The Z-Score ranged at high levels (4.080 – 4.851), reflecting a healthy financial structure and profit generation capacity. Retained earnings to total assets ratio (X2) significantly improved from 0.415 to 0.479, indicating a strong reinvestment capacity. Equity to liabilities ratio (X4) remained high (1.272 – 1.557), signifying a solid funding structure. Measured operational strategies, such as effective risk management and product diversification, are pivotal.

Asuransi Harta Aman Pratama, Tbk (AHAP)

AHAP's performance fluctuated between "Distress" and "Grey Area" categories. In 2022, improvements in the working capital to total assets ratio (X1: 0.040 to 0.234) pushed the Z-Score to the grey area (1.328). Retained earnings remained negative (–0.151 to –0.128), indicating weaknesses in profit management. EBIT (X3) turned negative in 2022 (–0.015), reflecting operational pressures. AHAP should improve operational efficiency and prioritize debt management strategies to support profit growth.

Asuransi Multi Artha Guna Tbk. (AMAG)

AMAG consistently remained in the "Non-Distress" category, maintaining stable Z-Scores (3.886 – 4.561). Consistent working capital to total assets ratio (X1: 0.350 – 0.381) demonstrated good liquidity. Retained earnings to total assets ratio (X2) declined (0.224 – 0.187) but was sufficient to sustain stability. AMAG should sustain EBIT levels and continue cost-efficiency efforts to support profit sustainability.

Asuransi Dayin Mitra Tbk. (ASDM)

ASDM showcased outstanding performance with a Z-Score increase from 4.750 in 2020 to 5.168 in 2021, then slightly decreased to 4.833 in 2022. Growth in working capital to total assets ratio (X1: 0.396 – 0.415). Stability in retained earnings to total assets ratio (X2: 0.363 – 0.365), indicating sound financial management. ASDM has opportunities to maximize profits through asset optimization and more effective investments.

Asuransi Jasa Tania Tbk. (ASJT)

This company maintained its "Non-Distress" status, with its Z-Score increasing from 3.945 to 5.162 over the 2020-2022 period. Significant rise in the working capital to total assets ratio (X1: 0.297 – 0.427). Impressive equity to liabilities ratio (X4: 1.341 – 1.754), reflecting strong equity funding. ASJT should address EBIT (X3) fluctuations near zero to improve profitability.

Asuransi Maximus Graha Persada (ASMI)

ASMI remained in the grey area until 2021 but entered the "Distress" category in 2022 (Z-Score: 0.911). Decline in EBIT to total assets ratio (X3: –0.012 to –0.086), indicating profitability pressures. Decrease in working capital to total assets ratio (X1: 0.145 to 0.105), highlighting liquidity constraints. Improving operational efficiency and enhancing working capital management are crucial steps for ASMI.

Lippo General Insurance Tbk. (LPGI)

LPGI consistently fell within the "Non-Distress" category, with its Z-Score decreasing from 3.402 in 2020 to 2.893 in 2022. Retained earnings to total assets ratio (X2: 0.262 – 0.254) remained stable. Decline in equity to liabilities ratio (X4: 0.441 – 0.332) could indicate increasing debt risk. LPGI needs to focus on reducing liabilities and improving EBIT performance to maintain stability.

Malacca Trust Wuwungan Insurance Tbk (MTWI)

This company has been in the "Distress" category for three consecutive years, with its Z-Score sharply declining to –2.163 in 2022. Negative working capital in 2022 (X1: –0.354). Negative EBIT (–0.013) indicates operational losses. Retained earnings to total assets ratio (X2) remained negative. MTWI requires substantial restructuring efforts to improve liquidity and operational performance.

Victoria Insurance Tbk (VINS)

VINS recorded exceptionally high Z-Scores (5.944 – 7.404), indicating excellent financial health. Working capital to total assets ratio (X1: 0.616 – 0.671) demonstrates exceptional liquidity. Equity to liabilities ratio (X4: 1.334 – 2.074) reflects a strong capital structure. VINS can leverage its position to expand its market presence and maintain long-term stability.

A comprehensive analysis of corporate financial performance during the 2020–2022 period reveals significant differences in financial management capabilities across various categories of companies. Companies in the "Distress" category face severe liquidity pressures, requiring immediate strategic measures focused on optimizing working capital, restructuring debt, and managing operational costs to improve cash flow. On the other hand, companies in the "Non-Distress" category have greater opportunities to enhance their competitiveness through product diversification, market expansion, and increased investment in high-value sectors that can drive long-term growth. Tailored, data-driven strategies are crucial to addressing the unique challenges faced by each category.

Conceptually, the Altman Z-Score offers a holistic perspective on a company's financial health, reflecting key elements such as liquidity management, profitability, operational efficiency, and

capital structure. High scores typically indicate a company's ability to maintain net income, keep low fixed asset-to-debt ratios, and strengthen equity over the long term. Conversely, low scores highlight vulnerabilities that, if unaddressed, may lead to bankruptcy. Consequently, companies with low Z-Scores must promptly adopt risk mitigation strategies, such as renegotiating with creditors, implementing effective cost-reduction policies, or securing additional capital to restore financial stability.

Overall, the success of financial risk management heavily depends on a deep understanding of the core components embedded in the Altman Z-Score. By utilizing this score as a diagnostic tool, companies can take a proactive approach in making strategic decisions that focus on strengthening their financial position, navigating global challenges, and seizing growth opportunities.

Conclusion

The financial health of insurance companies listed on the Indonesia Stock Exchange (IDX) varies significantly, as shown by the results of the analysis. Companies with consistent stability in the Non-Distress category, such as ABDA, AMAG, ASDM, ASJT, LPGI, and VINS, demonstrated robust financial performance with Z-Scores consistently above the threshold for financial distress during the 2020–2022 period. These companies effectively managed liquidity, retained earnings, profitability, and equity structure, ensuring their financial health remained stable. Conversely, companies like ASMI, which shifted from Grey Area to Distress in 2022, experienced a decline in financial performance, while AHAP showed slight improvement by transitioning from Distress to Grey Area in 2022, though it still requires significant attention. MTWI consistently remained in the Distress category, reflecting severe financial challenges that demand immediate corrective actions. Based on these findings, companies facing financial distress are recommended to enhance operational efficiency and improve financial performance by focusing on liquidity and profitability metrics. Additionally, strengthening risk management practices is essential to improve capital structure and mitigate the risk of bankruptcy. Regular monitoring using early warning systems like the Altman Z-Score should also be implemented to identify and address potential financial distress proactively.

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