Available online at http://www.iorajournal.org/index.php/ijgor/index

International Journal of Global Operations Research

e-ISSN: 2722-1016
p-ISSN: 2723-1739

Vol. 6, No. 4, pp. 264-270, 2025

Bankruptcy Prediction and Financial Risk Analysis of PT AIA Financial and PT Allianz Life Insurance Indonesia Using The Altman Z-Score Model

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Abstract

This study analyzes and compares the bankruptcy risk of PT AIA Financial and PT Asuransi Allianz Life Indonesia using the Altman Z-Score model based on financial reports for the period 2018–2024. The results show that both companies are in the grey zone, indicating potential financial risk even though they have not actually gone bankrupt. PT Allianz was in the distress zone in 2018 before improving, while PT AIA showed better stability with an upward trend in Z-Score in recent years. The Altman Z-Score model has proven to be effective as an early warning system for monitoring the financial health of insurance companies and supporting decision-making in risk mitigation.

Keywords: Altman Z-Score, bankruptcy, financial risk, insurance company.

1. Introduction

Insurance companies play an important role in the national and global financial systems as non-bank financial institutions that provide risk protection services for the future. The life insurance industry, in particular, serves as a risk management instrument and provider of financial certainty for the public. However, with the increasing complexity of the economy and uncertainty in the financial markets, the risk of bankruptcy among insurance companies has become a serious concern for stakeholders.

The phenomenon of bankruptcy or financial distress in the insurance industry has occurred in various countries, including Indonesia. For example, PT Asuransi Jiwasraya, a state-owned insurance company, experienced serious financial problems to the extent that it failed to pay customer claims and allegations of corruption arose. From 2010 to 2017, it was in the gray zone to the danger of bankruptcy according to Altman Z-Score predictions, indicating a real risk of bankruptcy (Siahaan, 2024). This situation underscores the need for an early warning system for insurance companies in Indonesia.

In addition to internal and macroeconomic challenges, the global insurance industry is also increasingly facing an existential threat from climate change, such as the increasing frequency and intensity of hydrometeorological disasters (floods, storms, droughts) that significantly increase the probability of default (failure to pay) by insurance companies (Alokla et al., 2025). These climate risks force insurance companies to make large and unexpected claim payments, which can erode capital and profitability, thereby worsening financial distress and pushing companies toward bankruptcy.

In this context, PT AIA Financial and PT Asuransi Allianz Life Indonesia are two leading life insurance companies with combined assets reaching IDR 92 trillion (OJK, 2023). Both companies are among the top 10 life insurance companies in Indonesia based on total premiums, but face competitive pressures and macroeconomic challenges such as rising interest rates, inflation, and financial market volatility.

Research on predicting insurance company bankruptcy is important because failure in this sector not only affects the company itself, but also has the potential to cause systemic effects on national economic stability. One method that can be used to detect a company's bankruptcy level is the Altman Z-score method. The Altman Z-score method is a bankruptcy prediction method that refers to key financial ratios of a company such as working capital, retained earnings, EBIT, and leverage (Beaty, 2025). This method provides predictions based on historical data that can help classify companies into safe, gray (potentially bankrupt), or danger zones (high risk of bankruptcy). Applying this model to two

large companies in Indonesia, PT AIA Financial and PT Asuransi Allianz Life Indonesia, provides a comprehensive picture of the bankruptcy risk level and financial health of life insurance companies in the domestic market.

Although many studies have been conducted on predicting corporate bankruptcy using the Altman Z-Score model, most of the research focus is still on manufacturing, banking, or individual companies such as PT Jiwasraya. This study contributes to filling the gap in the literature by conducting a comparative analysis of bankruptcy predictions between PT AIA Financial and PT Asuransi Allianz Life Indonesia through the application of the Altman Z-score model. The study focuses on two leading life insurance companies in Indonesia with an approach that not only utilizes the classic Altman Z-score model, but also integrates it with the specific risk context of the insurance industry and considers the latest economic and regulatory dynamics.

Through analysis of the latest annual financial reports, this study not only provides empirical insights for management and regulators, but also develops a risk assessment framework that can be adapted for other insurance companies in Indonesia and developing countries with similar characteristics.

2. Literature Review

2.1 Bankruptcy

In Salsabilla et al. (2025), Mandalurang et al. state that bankruptcy occurs when a company no longer has sufficient resources to continue its operations. Meanwhile, according to Rosyada (2025), bankruptcy is a condition in which a company fails to meet its financial obligations due to various factors, including economic instability. Thus, bankruptcy can be defined as a situation in which a company is unable to carry out its business activities due to a lack of production resources.

The impact of bankruptcy on the survival of a company is significant, such as a decline in investor confidence, layoffs, a drop in stock prices, and even the closure of the company (Abadi, 2021). The phenomenon of bankruptcy is common in the business world and can be caused by internal and external factors (Jariah et al., 2024). The factors that cause bankruptcy include: (1) political factors, such as government stability, conflict risk, corruption, and weak law enforcement; (2) economic factors, including fluctuations in inflation, interest rates, exchange rates, and difficulties in accessing capital; (3) social factors, such as demographic changes and mismatched workforce skills; (4) technological factors, which affect the competitiveness and operating costs of companies; (5) environmental factors, including strict regulations and the impact of climate change; and (6) legal factors, such as weak copyright protection and regulations that limit the flexibility of companies in conducting business (Lehmberg, 2025).

2.2 Financial Report

Financial statements are documents prepared by comparing the financial condition of a company in a certain period with the previous period or with other entities, as one of the requirements in the presentation of financial statements. According to PSAK No. 1, financial statements are a reporting process that includes the presentation of financial position statements and other comprehensive income statements. These reports contain data that describes the financial condition of a company during a certain period, so that interested parties can understand the company's current financial situation or its financial situation over a certain period of time. They usually consist of a balance sheet, income statement, and statement of changes in equity. The balance sheet shows the amount of assets, liabilities, and equity of the company on a specific date. The financial statements presented reflect the financial position and operating results at a specific time or during a specific period (Probowulan, 2024).

According to Probowulan et al. (2024), common types of financial statements include balance sheets (financial position statements), income statements, statements of changes in equity, and cash flow statements. Although financial statements are only numbers on paper, it is important to understand the real assets and resources behind those numbers. Financial statements are very important for businesses because they help to understand the details of a company's financial condition. Even though companies have accounting departments that manage these reports, management and business owners must understand financial statements to ensure that the business can grow properly. The quality of a business can be seen through its financial statements, but many entrepreneurs ignore the importance of these reports and therefore do not know the benefits and functions of financial statements optimally. As a result, businesses that have been running can experience setbacks and lose direction, and creditors cannot evaluate the company's performance.

2.3 Financial Report Analysis

Financial statement analysis is the final result of the accounting process that serves to provide an overview of the financial condition, operating results, and changes in the financial position of a company within a certain period.

Through financial statement analysis, the financial position of a company can be assessed by examining various aspects of the report so that a deep understanding is obtained and becomes a strong basis for managerial decision making (Shafira and Darwis, 2021).

2.4 Altman Z-Score

The Altman Z-Score is widely considered an effective model for predicting corporate financial distress. This score is obtained through several financial ratios that can describe a company's liquidity, profitability, and corporate performance. Previous studies have used the Altman model as a tool for predicting financial distress, demonstrating significant accuracy in determining a company's potential bankruptcy up to four years before the event (Hashim et al., 2024).

According to Hashim et al. (2024), the Altman Z-Score is designed to predict financial difficulties using five key ratios, which can be described as follows: working capital to total assets ratio, which measures liquidity; retained earnings to total assets as an indicator of a company's ability to generate profits from its assets; EBIT to total assets as an assessment of operating profitability; book value of equity to total debt, which reflects the effect of debt on assets; and sales to total assets ratio, which illustrates the effectiveness of asset utilization in generating sales.

The Altman Z-Score is a widely used quantitative model for estimating the probability of bankruptcy within a two-year period. This model was first developed by Edward I. Altman in 1968 based on data from manufacturing companies in the United States. However, the direct application of this model to companies in other countries, such as Malaysia, is still questionable for several reasons, including global economic developments since the original model was developed, differences in market conditions between countries, and variations in industry characteristics that are not always comparable to the manufacturing sector. Therefore, the Altman Z-Score model has been modified using Multiple Discriminant Analysis (MDA) to combine several financial ratios simultaneously in assessing the risk of financial difficulties outside the US context. This approach adopts a multivariate statistical technique known as Z-Score, which allows for combined ratio analysis (Hashim et al., 2024).

The Altman Z-Score model used is a model for non-manufacturing companies. This model combines four financial ratios, which are weighted and combined into a single score. The Altman Z-Score equation can be written as follows (Altman, 1968):

$$Z = 6{,}56x_1 + 3{,}26x_2 + 6{,}27x_3 + 1{,}05x_4 \quad (1)$$

With:
x_1 : Working capital/total assets
x_2 : Retained earnings/total assets
x_3 : Earnings before interes and taxes (EBIT)/total assets
x_4 : Book value of equity/total liabilities
Each ratio component in this model not only serves as an input for calculating the Z' score, but also reflects the company's financial risk profile (Asif, 2024):

a) Working capital to total assets (x_1)
This ratio measures a company's ability to meet its short-term obligations by comparing working capital (current assets - current liabilities) to total assets. This ratio measures a company's liquidity risk, where a low value indicates difficulty in meeting its current obligations.

b) Retained earnings to total assets (x_2)
This ratio shows the company's ability to generate and retain profits from its business operations. Retained earnings are profits that are not distributed to shareholders. This ratio measures the accumulation of profitability and the company's ability to finance growth internally.

c) EBIT to total assets (x_3)
A ratio that shows a company's ability to generate returns from its assets before interest and tax payments. This ratio measures the ratio of operational profitability and efficiency of asset utilization in generating net income.

d) Book value of equity/book value of debt (x_4)
The ratio comparing book value of equity and total liabilities shows the extent to which equity can cover the company's liabilities. This ratio measures the company's solvency risk and capital structure, where a low value indicates high dependence on debt financing.

Table 1: Bankruptcy risk criteria (Altman,1968)

Zone	Z'-Score Criteria	Description

Safe Zone	Z' > 2,60	A company in a healthy financial condition
Grey Zone	1,10 < Z'<2,60	The company is located in a potentially risky area
Distress Zone	Z'<1,10	High-risk companies are prone to bankruptcy

3. Materials and Methods

3.1 Materials

This study uses a quantitative approach by utilizing secondary data in the form of annual financial reports of PT AIA Financial and PT Asuransi Allianz Life Indonesia for the period 2018 to 2024. The data was obtained from the official websites of each company. The specific financial reports used are the Balance Sheet (Statement of Financial Position) and Income Statement.

3.2 Methods

This study consists of data collection, variable calculation, and analysis using the Altman Z-Score model. The stages are arranged sequentially as follows:

1) Collect annual financial reports for PT AIA Financial and PT Asuransi Allianz Life Indonesia for the years 2018-2024.
2) The financial data obtained to calculate the model components is extracted mathematically from the annual financial statements.
3) Calculate the value of each ratio (x_1, x_2, x_3, x_4) for both companies annually during the 2018-2024 period.
4) These ratios are entered into the Altman Z-Score formula (1) to obtain each company's annual Z' score. Then, classify each annual Z' score into the appropriate criteria, namely the Safe Zone, Gray Zone, or Distress Zone.
5) Analyze Z'-Score movement patterns over six years to assess the stability, improvement trends, or decline in the financial condition of each company.
6) Conduct a comparative analysis between the Z'-Score and classification zones of PT AIA Financial and PT Asuransi Allianz Life Indonesia to evaluate the relative financial risk positions of both companies.
7) Examine the contribution of each ratio component (x_1, x_2, x_3, x_4) to the final Z' score to identify the main sources of financial risk and the driving factors behind the predicted bankruptcy rate.
8) Interpretation of research results through examination of the movement of each individual ratio to provide comprehensive recommendations regarding financial health and risk profile.

4. Results and Discussion

Based on the Altman Z-Score calculation results, the financial ratios obtained from the 2018-2024 annual reports of PT AIA Financial and PT Allianz Life Indonesia. The results show that neither company has ever reached the safe zone category, but rather most of them are in the grey zone, which reflects a vulnerable condition that indicates susceptibility to financial risk, because companies with grey zone scores are more likely to experience liquidity pressure and a decline in profit performance in the event of external shocks. In the early period, PT Allianz Life Indonesia even entered the distress zone, which means that the risk of bankruptcy is relatively higher than PT AIA Financial, which tends to be more stable in the grey zone.

Table 2: Z-Score calculation results

Year	**Z-Score Value**	
	PT AIA Financial	**PT Allianz Life Indonesia**
2018	1.2569271	1.0797041
2019	1.1689557	1.3442208
2020	1.2528849	1.3630026
2021	1.103819	1.1115061
2022	1.2868773	1.3212638
2023	1.2423767	1.150071
2024	1.6629023	1.5279342

Based on Table 1, it can be seen that the movement of the Z-Score between PT AIA Financial and PT Allianz Life Indonesia shows a relatively similar pattern throughout the observation period. PT AIA Financial's Z-Score tends to fluctuate with quite significant variations in the early years, although in 2024 there was an improvement in value. Meanwhile, PT Allianz Life Indonesia recorded a more vulnerable condition in 2018 as it was below the distress threshold, before then experiencing a gradual increase. However, this increase was not enough to shift its position out of the grey zone, so that financial risk still remains.

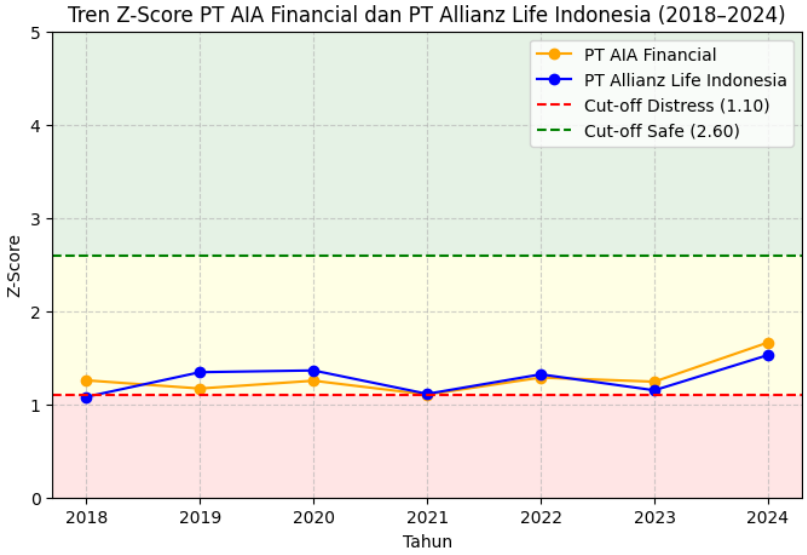

Figure 1: Z-Score trends for PT AIA Financial and PT Allianz Life Indonesia

The movement pattern can be seen in the Z-Score of both companies, which shows their respective positions relative to the risk zone threshold. The boundary lines at 1.10 and 2.60 help to illustrate the differences in financial vulnerability more intuitively, including when PT Allianz entered the distress category and the trends experienced by PT AIA. Comparatively, PT AIA Financial performed better for most of the year, although Allianz showed better scores in 2021 and 2022. These differences illustrate the variations in the financial strategies implemented by each company.

Table 3: Comparation between PT AIA Financial and PT Allianz Life Indonesia

Company	Z-Score Zone	Potential Bankruptcy	Financial Risk Implication
PT AIA Financial	Grey Zone (2018-2024)	Not Bankrupt	Liquidity risk and short-term profitability still need to be watched closely
PT Allianz Life Indonesia	Distress (2018), Grey Zone (2019-2024)	Not Bankrupt	Solvency risk was higher at the beginning of the period, improvements have been made but conditions are not yet secure

Analysis of the ratio components $(x_1 - x_4)$ shows that differences in Z' scores are influenced by variations in financial risk sources. PT AIA Financial tends to be more dependent on operational profitability (x_3), so that a decline in operating profit has a significant impact on the Z' value. Meanwhile, PT Allianz is more supported by retained earnings (x_2) and capital structure (x_4), so that its risk is more related to long-term solvency.

Overall, the findings of this study confirm that both companies still face significant financial vulnerabilities. PT AIA Financial needs to strengthen its operational efficiency and diversify its sources of profit so that it is not overly dependent on short-term performance. Meanwhile, PT Allianz needs to focus on debt management and increasing equity in order to maintain long-term stability. From a regulatory perspective, these results show that the Altman Z-Score can be used as an early warning system to monitor the financial health of insurance companies and anticipate potential distress in the future.

5. Conclusion

This study aims to analysis and compare the bankruptcy risk levels of two leading life insurance companies in Indonesia, namely PT AIA Financial and PT Asuransi Allianz Life Indonesia, using the Altman Z-Score model for the period 2018–2024. The results show that neither company has ever reached the safe zone category and both have consistently remained in the grey zone, indicating potential financial risk even though it has not yet led to actual bankruptcy. PT Allianz Life Indonesia was in the distress zone in 2018, indicating solvency vulnerability at the beginning of the period, but has gradually improved until 2024. Meanwhile, PT AIA Financial showed a more stable condition with an upward trend in Z-Score values in recent years, although short-term liquidity and profitability risks still need to be watched.

The main difference between the two companies lies in their sources of financial risk. PT AIA Financial is more influenced by fluctuations in operational profitability, as reflected in its equity position of around Rp8.9 trillion in 2024. A relatively high equity value indicates the company's ability to bear operational risks and maintain liquidity, but it also makes its financial performance sensitive to changes in investment returns. Meanwhile, PT Allianz is more concerned with its capital structure and ability to maintain equity, with an equity position of around IDR 6.4 trillion in 2024. PT Allianz's smaller equity value compared to PT AIA Financial makes it more vulnerable to changes in claim expenses or asset fluctuations, making capital management efficiency a key factor in maintaining financial stability. Overall, the results of this study confirm that the Altman Z-Score model is effective as an early warning system for monitoring the financial condition of insurance companies. These findings can serve as a reference for management and regulators in improving operational efficiency, strengthening financial structures, and mitigating the risk of bankruptcy in the future.

Acknowledgments

We would like to express our gratitude to Mr. Moch. Panji Agung Saputra, M.Mat, lecturer of Modeling and Risk Theory, for his guidance and direction, which enabled this research to be completed properly and on time. We would also like to express our gratitude for the cooperation within the group and the support from various parties who have helped us directly and indirectly. We hope that this research will be beneficial and add to the knowledge of our readers.

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