
Comparative Analysis of Modified Altman Z-Score and Springate Models in Predicting Financial Distress: Evidence from Property Companies Listed on the Indonesia Stock Exchange (2018-2022)

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Abstract

This research aims to analyze differences in bankruptcy prediction results using two methods, the Altman Z-Score and Springate, for property companies listed on the Indonesian Stock Exchange during 2018-2022. This type of research is both quantitative and descriptive. Purposive sampling was used; four companies were selected according to the criteria, and those that regularly published their financial reports in 2018-2022 were included as samples in this research. The results show that the Modified Altman Z-Score provides a more realistic assessment of gradual financial deterioration. At the same time, the Springate model is overly sensitive to short-term declines in profitability and tends to overclassify firms as financially distressed during the pandemic. The findings suggest that the Modified Altman Z-Score is a more suitable early warning tool for financial distress in the property sector, with important implications for monitoring working capital and EBIT as key indicators of financial resilience.

Keywords: financial distress; Altman z-score; Springate; property companies

JEL Classification: G32; G33; L85

INTRODUCTION

Property is usually understood as a tangible object, a form of ownership, whether use rights, ownership rights, or the right to use an item, depending on its function. However, it is always associated with a tangible object. Certainly not! Apart from being familiar with the meaning of visible objects, property can also be an intangible object. For example, intellectual property is intangible yet plays a significant role in sustaining life.

Currently, people compete to increase their assets by buying various types of property. Property is synonymous with securities, land, houses, cars, and so on. In the current era, many companies have been established to provide products and services that meet market demand. Institutions that oversaw these supplier companies were also established as bridges that connect sellers and buyers. We usually refer to this institution as the Indonesian Stock Exchange (BEI).

The company's main objective in carrying out its operational activities is to make a profit to maintain its survival. Companies that show exemplary performance can be identified by their annual net profit (Aslamiah et al., 2023). Every company is undoubtedly familiar with the term financial distress'. A decline in company performance characterizes this financial difficulty, including the company's inability to meet obligations, cash flow problems, liquidity challenges, layoffs, and other conditions. However, every difficulty must be easy, as Allah SWT states in QS. Al-Insyirah: 5.

Property companies listed on the Indonesian Stock Exchange (BEI) also experience this difficulty. A Property Company develops and builds land or land into a property product, whether physical or not, owned by a person or group, or owned by a legal entity. Property companies registered on the IDX comply with the rules and regulations of the Indonesian Stock Exchange. (Harjono, 2016) The Indonesian Stock Exchange (BEI) is a capital market in Indonesia. Its role in society is as a means of investment, and for companies that go public, BEI is a means to obtain additional capital by issuing shares as a sign of ownership (Sriwahyuni & Saputra, 2017)

As stated in his book, there is relief from every difficulty, including financial distress. From an economic perspective, the solution to financial challenges is to prevent or minimize the risk of bankruptcy by monitoring financial conditions through financial analysis. The financial analysis results from recording a company's financial transactions and consist of a financial position report (balance sheet), a profit and loss report, and a cash flow report (Prihadi, 2019). Analyzing these financial reports provides material for future evaluations to estimate and predict a company's performance in the coming period.

Financial Distress occurs when a company's operating cash flow is insufficient to meet current liabilities (such as interest expense and trade payables). *Financial Distress* is a condition in which a company experiences financial difficulties before it experiences bankruptcy. A company's inability to predict financial distress is a cause of its bankruptcy (Atika & Handayani, 2013). This condition indicates that the company is in crisis and unhealthy. This condition can last for years until the company becomes bankrupt. To overcome financial distress, financial reports are

needed to identify this problem so that a company can improve its condition before it reaches a crisis (bankruptcy). To fulfill its obligations, the company must have current assets that exceed its obligations. When a company can fund and meet its short-term obligations, its risk of financial distress is lower (Susanti et al., 2020).

The Altman Z-score is a method for assessing a company's financial health and predicting its likelihood of bankruptcy (Puspitasari, 2014). The Altman Z-Score model was revised several times to create a new equation applicable to manufacturing companies that have gone public or private. Altman (1968) used the Multiple Discriminant Analysis (MDA) method with five financial ratios: working capital to total assets, retained earnings to total assets, earnings before interest and taxes to total assets, market value of equity to book value of total debt, and sales to total assets. The Altman Z-score prediction model achieved an accuracy of over 80%.

The Springate prediction model is a bankruptcy prediction method developed following the Altman model procedure, as researched and developed by Springate (1978). This model uses four financial ratios to predict a company's potential financial difficulties. The accuracy of this Springate model reaches 92.5% in predicting bankruptcy (Puspitasari, 2014).

Several efforts, such as those mentioned above, are appropriate when facing financial difficulties. However, as religious people, remember that all their efforts will be worthwhile only if accompanied by prayer. Patience and trust are the final steps after you have dealt with financial distress as best you can. If so, in sha'a Allah, everything will improve again as desired, as Allah SWT says in his book, QS. At-Thalaq: 2-3.

Financial stress analysis is critical for companies, as it provides insights into their financial health and the potential risk of bankruptcy. Various studies have highlighted the effectiveness of financial stress models, such as the Altman Z-Score and Zmijewski models, in predicting financial instability. For example, research on Indonesian telecommunications companies shows that the Zmijewski model offers a higher accuracy rate (93%) than the Grover model (77%) in assessing financial distress, thus assisting investors in making informed decisions (H. Wijaya et al., 2024). Similarly, a study using the modified Altman method found that most companies listed on the Jakarta Islamic Index were financially sound, suggesting that proactive financial monitoring can help prevent financial distress (Ilyas et al., 2024). In addition, external factors, such as the COVID-19 pandemic, have been shown to affect financial stability significantly, with many firms facing an increased risk of bankruptcy during this period (Hashim et al., 2024). Specifically, during the 2018–2022 observation window of this study, the pandemic severely disrupted the property sector's operations and sales (Chai et al., 2024; Gunarto et al., 2024). This macroeconomic shock is inherently captured by the predictive models utilized in this study. For instance, the sharp decline in property sales directly eroded operating profits, significantly suppressing the EBIT-to-Total Assets ratio in the Altman Z-Score. Furthermore, the Springate model, which places heavy weight on net profit margins, is highly sensitive to sudden liquidity constraints and profit

contractions experienced by property developers at the peak of the global health crisis.

Financial stress analysis is essential for risk mitigation and strategic planning in corporate finance (Akbar & Lanjarsih, 2024; Say, 2024). In addition, financial stress analysis provides investors with critical insights to mitigate risks and improve their investment strategies, including metrics such as the current ratio and return on assets, which are associated with financial distress (Gunanto, 2023). By contrast, the debt-to-asset ratio and total asset turnover have a positive effect (E. Wijaya & Melly, 2024). In the plantation sector, Surono and Lastari (2024) used five models, including the Altman Z-score, to assess financial performance and concluded that certain companies consistently showed good financial health. Say (2024) emphasized that financial distress precedes bankruptcy, highlighting the importance of monitoring liquidity and asset management. Ghaffary et al. found inconsistent results in the tourism industry when comparing the Altman and Zmijewski models, suggesting the need for multiple methodologies to improve prediction accuracy (Ginta & Handri, 2024). Finally, Ilyas et al. applied a modified Altman method, revealing that most companies in their sample were in the financially secure category for five years (Ilyas et al., 2024). These studies underscore the complexity of financial stress analysis and the need for a customized approach across different industries.

Analyzing financial distress using the Altman Z-score and Zmijewski methods can also be incorporated into the Springate method. The Springate method is valuable for analyzing financial distress in various sectors, including banking and real estate. Research shows that this method effectively predicts financial distress by calculating the Springate S-score, which assesses a company's financial health based on specific ratios. For example, a study of Islamic commercial banks in Southeast Asia found that all sample banks were classified as distressed during 2017-2021, highlighting the usefulness of this method for identifying financial distress in a challenging economic climate exacerbated by the COVID-19 pandemic (Septiawan et al., 2024). Similarly, in the property sector, Springate's analysis revealed that financial stress significantly impacts company performance, underscoring its role as an early warning system for potential bankruptcy (Herdyan et al., 2024). The Springate method is a critical analytical framework for assessing financial distress, enabling timely intervention to prevent bankruptcy (Ayu et al., 2024; Lumbanraja, 2023).

In this study, we analyze financial distress using the Altman Z-score and Springate methods. This is because combining the Altman Z-score and the Springate method can improve the analysis of economic distress by leveraging the strengths of both models. While the Altman Z-score is widely recognized for its predictive ability, research shows that its accuracy can vary across sectors, evidenced by an analysis of Malaysian companies during the COVID-19 pandemic, which noted significant financial distress (Hashim et al., 2024). Although less frequently discussed, the Springate method has been shown to complement Z-scores by providing additional insights into financial health, especially in specific industries such as manufacturing (Apsari et al., 2024). Integrating these methods

can provide a more robust framework, but requires careful consideration of sector-specific dynamics and potential limitations in predictive accuracy (Patricia et al., 2024; Irvan & Supriyanto, 2024). Thus, while the combined approach is promising, further empirical validation is required to optimize its effectiveness.

Financial distress predictions should be made before a company's bankruptcy occurs, and for each calculation. This model has advantages and disadvantages. A particular calculation model may be correct in specific circumstances but unsuitable in others (Husein & Pambekti, 2014).

METHODOLOGY

This type of research uses quantitative descriptive methods. Descriptive analyses were conducted to identify and explain the variables studied at a site. This research was taken and analyzed from the website www.idx.co.id. This research analyzes financial distress in property companies listed on the Indonesia Stock Exchange from 2018-2022.

The research population includes all property companies listed on the Indonesia Stock Exchange (IDX). To ensure high data homogeneity and longitudinal consistency, a purposive sampling technique was applied. While the final sample consists of four companies, this limited number is a deliberate result of a rigorous elimination process designed to maintain data integrity. The methodological justification for this sample size is based on the following specific inclusion criteria:

1. Property companies consistently listed on the IDX throughout the observation period (January 1, 2018, to December 31, 2022).
2. Companies that published complete and audited annual financial reports consecutively during 2018-2022.
3. Financial reports containing all necessary data variables for both the Altman Z-Score and Springate models (including working capital, EBIT, retained earnings, and total liabilities).

Table 1. Research Sample

No	Emiten	Emiten Code
1.	PT. Graha Andrasentra Propertindo Tbk	JGLE
2.	PT. Maha Properti Indonesia Tbk	MPRO
3.	PT. Pollux Properties Indonesia Tbk	POLL
4.	PT. Urban Jakarta Propertindo Tbk	URBN

This restrictive sampling ensures that the analysis avoids biases caused by data fragmentation, such as those arising from delisting, trading suspensions, or incomplete reporting during the COVID-19 pandemic. In financial distress research, prioritizing data completeness and consistency over a larger but fragmented sample is essential to maintaining model predictive accuracy.

The analysis applies two widely recognized bankruptcy prediction models: the Modified Altman Z-Score and the Springate model. The modified Altman Z-Score model is specifically tailored for non-manufacturing companies and entities

in emerging markets (Altman et al., 2017). The predictive validity of this modified approach remains high across various international market contexts. The equation utilized is formulated as follows:

$$Z'' = 6.56X_1 + 3.26X_2 + 6.72X_3 + 1.05X_4 \dots\dots\dots(1)$$

Where: X_1 = Working Capital / Total Assets; X_2 = Retained Earnings / Total Assets; X_3 = EBIT / Total Assets; X_4 = Book Value of Equity / Total Liabilities.

Classification Criteria: Companies with $Z'' > 2.6$ are categorized in the "Safe Zone" (Non-Distress); $1.1 < Z'' < 2.6$ indicates a "Grey Area"; and $Z'' < 1.1$ classifies the firm in the "Distress Zone".

The Springate model utilizes a distinct weighting of four specific financial ratios to assess a firm's vulnerability to bankruptcy. The contemporary relevance and reliability of this model for predicting financial distress, particularly during challenging economic periods, are supported by recent empirical studies, including Septiawan et al. (2024). The equation used is:

$$S = 1.03A + 3.07B + 0.66C + 0.4D \dots\dots\dots(2)$$

Where: A = Working Capital / Total Assets; B = Net Profit Before Interest and Taxes / Total Assets; C = Net Profit Before Taxes / Current Liabilities; D = Sales / Total Assets

Classification Criteria: A score of $S > 0.862$ designates a company as financially sound (Non-Distress), whereas $S < 0.862$ firmly indicates financial distress.

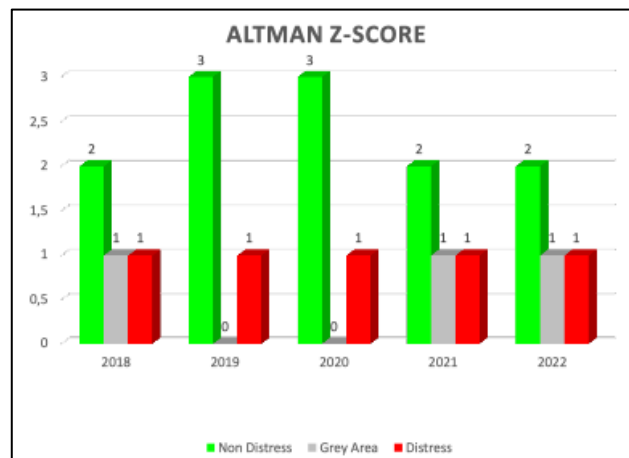
RESULTS AND DISCUSSIONS

This study uses the Altman z-score and Springate methods for Property Companies listed on the Indonesia Stock Exchange (BEI) in 2018-2022. The financial distress analysis results indicate that several companies are experiencing financial difficulties at both mild and severe levels, as measured by the Altman Z-score and Springate methods. Several predictions do not align with the actual financial situations of companies listed on the Indonesian Stock Exchange. Even though there are discrepancies in predictions, these results can serve as indicators and benchmarks to assess a company's future sustainability by paying attention to several factors that can influence the occurrence of financial difficulties, so the company can overcome them if they arise.

Based on the analysis of the four sampled property companies for the 2018–2022 period using the Modified Altman Z-Score and Springate methods, the classification results are as follows:

Table 2. Calculation Results

No.	Nama Perusahaan	Periode	Z"-Score		Springate	
			Nilai	Kategori	Nilai	Kategori
1	MPRO	2018	1,23	Grey Area	-0,28	Distress
		2019	3,43	Non Distress	-0,01	Distress
		2020	3,27	Non Distress	-0,09	Distress
		2021	2,93	Non Distress	-0,22	Distress
		2022	2,73	Non Distress	-0,31	Distress
2	POLL	2018	1,00	Distress	0,28	Distress
		2019	0,71	Distress	0,15	Distress
		2020	-0,26	Distress	-0,03	Distress
		2021	-0,52	Distress	-0,17	Distress
		2022	0,83	Distress	0,40	Distress
3	JGLE	2018	3,39	Non Distress	0,29	Distress
		2019	3,00	Non Distress	-0,05	Distress
		2020	3,65	Non Distress	-0,13	Distress
		2021	4,04	Non Distress	0,15	Distress
		2022	3,96	Non Distress	0,13	Distress
4	URBN	2018	6,93	Non Distress	0,96	Non Distress
		2019	5,49	Non Distress	0,94	Non Distress
		2020	3,20	Non Distress	0,31	Distress
		2021	2,52	Grey Area	0,17	Distress
		2022	2,16	Grey Area	0,09	Distress

Figure 1. Calculation Results for *Financial Distress* Using the Altman Z-Score Method

In 2018, this model predicted that two companies would experience non-distress, namely PT. Graha Andrasentra Propertindo Tbk and PT. Urban Jakarta Propertindo Tbk, a company in a gray area, namely PT. Maha Properti Indonesia Tbk, and one company experiencing distress, PT. Pollux Properties of Indonesia Tbk. In 2019 PT. The Pollux Properties Indonesia Tbk is experiencing distress again, and three other companies, namely PT, are in a non-distress position. Maha Properti Indonesia Tbk, PT. Urban Jakarta Propertindo TBK and PT. Graha Andrasentra Propertindo tbk. In 2020, three companies experienced no distress, and one company experienced distress. A company experiencing distress is PT. Pollux Properties Indonesia Tbk and the company PT. Maha Properti Indonesia Tbk, PT.

Urban Jakarta Propertindo Tbk and PT. Graha Andrasentra Propertindo Tbk is in a non-distress condition. In 2021, this model predicted PT. Pollux Properties Indonesia Tbk is experiencing distress. PT. Urban Jakarta Propertindo Tbk experiences a gray area, whereas PT. Maha Properti Indonesia Tbk and PT. Graha Andrasentra Propertindo Tbk experienced non-distress in 2022 PT. Pollux Properties Indonesia Tbk is again predicted to experience distress, while PT. Urban Jakarta Propertindo Tbk is in a gray-area position and PT. Maha Properti Indonesia Tbk is in a non-distress condition, along with PT. Graha Andrasentra Propertindo Tbk.

The Springate calculation method predicts that many companies will experience bankruptcy or distress. In 2018, it was expected that only one company would be in a non-distress condition, namely, PT. Urban Jakarta Propertindo Tbk and three companies that experienced distress were PT. Maha Properti Indonesia Tbk, PT. Graha Andrasentra Propertindo Tbk, and PT. Pollux Properties of Indonesia Tbk. The following year, it is predicted that the number of companies in non-distress and distress will be the same as in 2018. This model predicts that all companies will be distressed from 2020 to 2022. None of the sample companies that were the subject of the research achieved a score above 0.862, indicating that these companies were in distress in 2020-2022.

Therefore, the results obtained in the above categories are as follows:

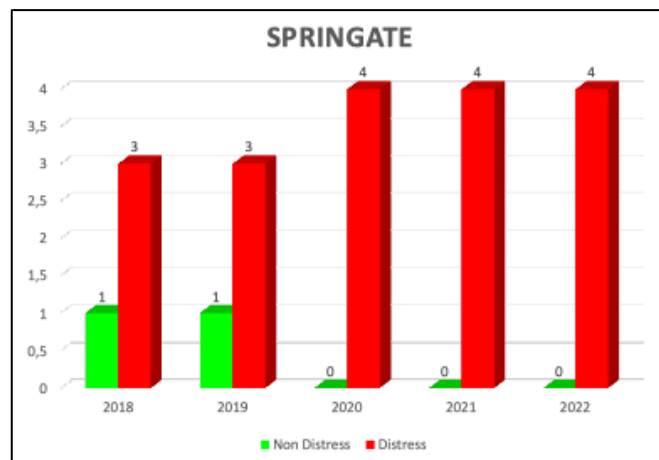


Figure 2. Financial Distress Calculation Results Using the Springate Method

CONCLUSION

This study concludes that there are significant differences in bankruptcy prediction outcomes between the Modified Altman Z-Score and the Springate model when applied to property companies listed on the Indonesia Stock Exchange during 2018-2022. The Modified Altman Z-Score demonstrates superior capacity to reflect the gradual deterioration of financial condition, including the movement of firms through the gray area before entering actual financial distress. In contrast, the Springate model exhibits limited tolerance for short-term profitability fluctuations and tends to overestimate distress, classifying all sampled firms as financially distressed during the pandemic-affected period (2020-2022). The findings therefore

suggest that the Modified Altman Z-Score is a more appropriate early-warning system for assessing financial distress in the property sector, particularly during temporary macroeconomic shocks. From a practical perspective, investors and corporate management should closely monitor working capital and EBIT as core buffers against financial vulnerability. Future research is recommended to extend the analysis to other sectors, enlarge the sample, and incorporate additional macroeconomic control variables further to validate the robustness and generalizability of these predictive models.

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