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The Zmijewski Model as an Early Indicator of Financial Distress in Retail Companies Listed on the Indonesia Stock Exchange

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Abstract
Purpose: This study aims to evaluate the effectiveness of the Zmijewski Model as an early warning tool for detecting financial distress in retail companies listed on the Indonesia Stock Exchange.
Methodology/approach: The research focuses on 7 companies in the food and staples retailing subsector, using the Zmijewski Model developed in 1984, which includes three financial ratios: current ratio (CR), debt to equity ratio (DER), and return on assets (ROA). The analysis uses annual financial statements, applying a descriptive quantitative approach to calculate and interpret the X-scores.
Results/Findings: The results indicate that the Zmijewski Model accurately predicts financial distress. Companies with positive X-scores are at higher risk of financial problems, while those with positive scores are considered stable.
Conclusions: The Zmijewski Model proves to be an effective tool in identifying early signs of financial distress using basic financial ratios, aiding managers and investors in making better financial decisions.
Limitations: The model does not account for external factors such as market conditions or economic crises, which could impact a company's financial stability.
Contribution: This study contributes to financial management and accounting by demonstrating how a simple model can be utilized to detect financial distress early, benefiting investors, company managers, auditors, and researchers in the field.

Keywords: *Financial Distress, Financial Ratios, Retail Companies, Zmijewski.*

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1. Introduction

The term financial distress is commonly used when an organization, whether a company or a country, experiences difficulty in meeting its financial obligations potentially lecial distress is commonly used (Haris et al., 2022). This condition serves as a key indicator of a firm's financial health and can significantly influence investors, creditors and government stakeholders. In Indonesia, financial distress is often exacerbated by various external factors beyond corporate control, including global economic turbulence, exchange rate volatility, and unexpected events such as natural disasters, all of which intensify the pressure on liquidity and corporate financial stability.

Capital adequacy ratios, commonly referred to as the Capital Adequacy Ratio (CAR), along with credit risk levels, profitability, and capital sufficiency, significantly affect the likelihood of financial distress (Haris et al., 2022). These findings suggest that operational efficiency and risk management are critical for sustaining the viability of financial institutions. Such insights are also relevant to other industries,

including retail, which structurally depend on operational cash flows and access to external financing sources. The Zmijewski model, developed in 1984, is a financial ratio based predictive approach designed to estimate the probability of corporate bankruptcy. This model employs three primary variables leverage, liquidity, and profitability to measure bankruptcy risk (Mark E. Zmijewski, 1984). These ratios are assumed to accurately reflect a firm's financial condition, regardless of internal and external influences.

However, the application of the Zmijewski model in Indonesia, particularly within retail companies listed on the Indonesia Stock Exchange (IDX), presents several challenges, most notably in terms of predictive accuracy. The complexity of the domestic market and frequent macroeconomic fluctuations are not always directly captured by internal financial ratios, which creates limitations in model performance. Although the Zmijewski model is effective in identifying firms with high bankruptcy risk, it does not adequately account for the impact of external factors on their financial performance. Gupta (2024) highlights that one of the model's primary weaknesses lies in its inability to incorporate external variables such as government policy and political uncertainty, leading to an overreliance on internal financial conditions as the sole determinants of distress. In reality, financial conditions are much more complex.

As explained by Kanapickienė et al. (2023), the Zmijewski model's effectiveness can be enhanced by integrating relevant managerial and macroeconomic variables. Such integration is expected to provide a more comprehensive assessment of financial risks. Incorporating variables such as fiscal policy, interest rates, and inflation may improve the model's adaptability to changing economic conditions. Previous studies on financial distress have largely focused on companies in developed countries, characterized by relatively stable markets and well-established financial reporting systems. Limited research has examined specific sectors or subsectors in developing countries, including Indonesia's retail sector. Nevertheless, Winarto et al. (2024) argue that local factors, such as inflation volatility and high dependence on imported raw materials, significantly influence Indonesia's long-term economic performance in the long run. These factors directly affect cost structures and increase the risk of financial distress, particularly for retail firms that rely on thin profit margins and high sales volumes.

This issue is increasingly relevant as the food and essential goods retail subsector continues to expand while simultaneously bearing substantial operational and debt burdens on the sector. Through product diversification strategies and market expansion, companies such as PT Duta Intidaya Tbk and PT Hero Supermarket Tbk have mitigated these challenges. Such strategies enable firms to increase their revenue while reducing their dependence on specific products or sectors. However, as noted by Girardone et al. (2024), high operational costs and reliance on debt financing are major issues that affect corporate financial stability.

Financial distress becomes increasingly critical when firms experience declining profitability and deteriorating debt-to-equity ratios, signaling their inability to meet financial obligations through sufficient earnings. Santosa et al. (2020) emphasize that return on equity and current ratio serve as important indicators for identifying potential financial crises. A notable example is PT Matahari Putra Prima Tbk., which has experienced recurring losses, increased vulnerability to market fluctuations, and declining consumer purchasing power. This case demonstrates that the Zmijewski approach can be used as an effective early warning tool. According to Taufik and Sugianto (2021), financial risk assessment in the retail industry becomes more accurate when internal financial ratios are combined with external macroeconomic factors, enabling management to implement preventive measures before the financial conditions deteriorate further.

Despite numerous challenges, Indonesia's retail sector continues to demonstrate adaptability, particularly through digitalization. Changes in consumption patterns, including the rapid growth of e-commerce and online shopping, have accelerated this transformation. Edith Ebele Agu et al. (2024) argue that digitalization plays a crucial role in mitigating financial pressure by enhancing operational efficiency and expanding the market reach. Nevertheless, Li and Gao (2024) caution that technology adoption must be accompanied by effective cost-management strategies (Berry, 2024). In the long term,

poorly planned digital investments may exacerbate financial instability and liquidity constraints.

The analysis of financial distress is increasingly important given the retail sector's substantial contribution to the national GDP. This study indicates that although the retail sector generally continues to grow, many firms still suffer losses due to high operational costs and increasing debt levels. Consequently, there is a need for analytical methods that not only identify financial risk at an early stage but also provide a comprehensive understanding of the factors that drive such risks. In this context, the Zmijewski model, when combined with relevant macroeconomic and microeconomic variables, can serve as a flexible and accurate analytical tool for detecting financial distress in Indonesia's dynamic market environment (Afifah Putri Setiawan & Permata Sari, 2025a).

This study integrates the Zmijewski model with macroeconomic and microeconomic variables to analyze financial distress in Indonesia's retail sector. Such an approach has rarely been applied in developing countries, particularly Indonesia, where market dynamics are more complex and external influences are more pronounced than in developed economies. While the Zmijewski model has proven effective in predicting bankruptcy, it remains limited in capturing external factors such as government policy, global economic fluctuations, and political uncertainty factors that significantly affect corporate financial stability, especially in Indonesia's retail sector, which is highly dependent on imported raw materials and is burdened by high operational costs. Therefore, integrating macroeconomic variables such as inflation, interest rates, and fiscal policy into the Zmijewski model is expected to provide a more accurate and comprehensive assessment of the financial risks faced by Indonesian retail companies.

2. Literature Review

2.1 Previous Studies

Table 1. Previous Studies

Author	Year	Research Subject	Main Findings	Remarks
Zmijewski	1984	Bankruptcy Prediction Model	The Zmijewski model applies probit regression to predict bankruptcy using financial ratios.	The model is statistically more appropriate for dichotomous data (bankrupt or non-bankrupt).
Saha	2024	Non-Bank Financial Companies	The Zmijewski model achieved an accuracy rate of 68.39%, higher than the Altman and Springate models.	Zmijewski is more accurate in predicting bankruptcy.
Rosihana et al.	2025	PT Net Visi Media Tbk	The Zmijewski model did not indicate bankruptcy, while Altman and Springate suggested bankruptcy risk.	Differences in results highlight the importance of firm-specific characteristics.
Nabiil Afifah & Shinta Permata	2025	75 perusahaan sektor consumer non-cyclicals di BEI (2021–2023)	TATO and EPS significantly affect financial distress; ICR and NPM have no effect.	Uses Zmijewski model; binary logistic regression analysis with SPSS 26.
Novi Yanti et al.	2023	11 plantation sub-sector companies	Zmijewski identified two firms experiencing financial distress;	Application of the Zmijewski method to evaluate distress levels

		listed on IDX (2018–2021)	prediction accuracy was 36%.	and prediction accuracy.
Oktafianingsih & Suryaningsum	2024	20 property and real estate companies with special notation on IDX (2020–2023)	All models successfully predicted distress; Zmijewski achieved the highest accuracy at 83%.	Comparative analysis of Altman, Grover, and Zmijewski models.
Safira Cintyarani & Indrawati	2024	10 transportation sub-sector companies on IDX (2020–2022)	Differences were found between Altman and Zmijewski models; Zmijewski focuses on solvency.	Study conducted during the COVID-19 pandemic using projected 2023 data.
Sari Rahayu et al.	2023	21 retail sub-sector companies listed on IDX (2019–2021)	Altman Z-score accuracy was 63%, Zmijewski 62%, and Grover 54%.	Comparative study of three financial distress prediction methods in the retail sector.

Source: Scientific Journals

This study focuses on the application of the Zmijewski model in Indonesia, particularly in the retail sector, which faces unique challenges related to its dependence on operational cash flows and high debt costs. Unlike previous studies, such as Saha (2024) and Rosihana et al. (2025), this study incorporates macroeconomic variables, including inflation, interest rates, and fiscal policy, into the Zmijewski model to provide a more comprehensive understanding of financial distress amid Indonesia's economic instability.

2.2 Zmijewski

The Zmijewski method, developed by Mark E. Zmijewski (1984) is a bankruptcy prediction approach that utilizes probit regression techniques. This model integrates three primary financial ratios Return on Assets (ROA), Debt-to-Equity Ratio (DER), and Current Ratio (CR) to generate an X-score used to assess the probability of a firm experiencing financial distress. This approach is considered statistically more appropriate for handling dichotomous dependent variables, namely bankrupt versus non-bankrupt firms. The model has been shown to predict bankruptcy up to two years prior to its occurrence with a relatively high level of accuracy (Yanti et al., 2023).

In a study conducted by Saha (2024) on Non-Bank Financial Institutions (NBFIs) listed on the Dhaka Stock Exchange, the Zmijewski model demonstrated a high prediction accuracy of 68.39%, outperforming the Altman (48%) and Springate (52%) models. These findings suggest that the Zmijewski X-Score may serve as a more reliable tool, particularly in sectors with a high bankruptcy risk. Furthermore, Rosihana et al. (2025), reported that the Zmijewski model did not indicate bankruptcy, whereas the Altman and Springate models suggested a potential bankruptcy risk in their analysis of PT Net Visi Media Tbk. This discrepancy underscores that, despite its high accuracy, the Zmijewski model's results are significantly influenced by sectoral and firm-specific characteristics. Therefore, the application of bankruptcy prediction models, such as Zmijewski, should be tailored to the specific context of each firm or industry.

Suryaningsum et al. (2024) in the property and real estate sector revealed that the Zmijewski model achieved the highest accuracy rate at 83%, surpassing the Altman and Grover models. Conversely, a study by Rahayu et al. (2023) in the retail sector reported contrasting results, where the Altman model outperformed the others with an accuracy rate of 63%, compared to 62% for Zmijewski and 54% for Grover. In bankruptcy research, Zmijewski emphasized the issue of sample selection bias and the mismatch between estimation methods and the binary nature of bankruptcy data, which is commonly referred to as classification bias. He proposed the use of probit regression as a statistically superior solution because it accounts for the dichotomous distribution of the dependent variable.

2.3 Financial Distress

An organization is considered to be experiencing a financial crisis when it cannot effectively meet its financial obligations, such as debt repayments, interest expenses, and other operating costs. In many cases, this condition represents an early stage preceding bankruptcy and is reflected by various deteriorating financial indicators, including declining net income, increasing debt burdens, cash flow imbalances, and reductions in liquidity and profitability (Kushermanto et al., 2024). Financial distress refers to a firm's financial decline prior to bankruptcy or liquidation. This situation is commonly characterized by a firm's inability to meet its short-term obligations, particularly liquidity-related commitments (Afifah Putri Setiawan & Permata Sari, 2025).

According to Kristianti & Herawaty (2023) financial distress is a critical financial condition that can be measured through corporate financial ratios and evaluated using the Altman Z-Score model. When a company exhibits A low Z-score indicates poor financial health and a high risk of bankruptcy. They further explain that firms experiencing financial distress tend to engage in auditor switching, either to obtain lower audit fees or to align more closely with their internal financial conditions. Musdjalifah et al. (2024) define financial distress as a condition in which a company is on a path toward a deficit prior to an actual failure or bankruptcy. In their study, financial distress was examined from an earnings management perspective. Their findings reveal that firms experiencing financial distress tend to avoid earnings management practices, preferring to disclose their actual financial conditions to investors and other stakeholders.

Abrori et al. (2023), argue that high levels of debt can exacerbate a firm's financial condition during periods of financial distress, particularly when companies face difficulties in servicing their debt or are exposed to bankruptcy risk. The use of debt becomes counterproductive when the tax benefits of leverage or tax shields are no longer sufficient to offset the costs associated with financial distress and bankruptcy. In other words, while debt may provide tax incentives, under weakening financial conditions, high-interest expenses and liquidity pressures can reduce firm value or even lead to bankruptcy.

Furthermore, declining profitability ratios (such as ROA or ROE), increasing leverage (or debt-to-equity ratios), and decreasing operating cash flows and liquidity are commonly identified as early warning signs of financial distress (Kurniawan Sofyan 2024; Santosa et al. 2020). Raharjo and Fitriani (2024), find that firms with weak corporate governance structures tend to experience financial distress more rapidly because they lack the adaptive and strategic capacity to manage internal and external pressures effectively.

Rizai et al. (2023) identified a range of internal and external factors that may trigger such financial distress. Internal factors include ineffective risk management, unhealthy capital structure, and poor financial management. In contrast, external factors encompass macroeconomic instability, global crises, changes in fiscal and monetary policies, technological disruption, and digital reputation risk (Raharjo & Fitriani, 2024). Several studies have highlighted the significant impact of the COVID-19 pandemic on corporate financial conditions. In this context, predictive analysis of financial distress has become a crucial tool in strategic decision-making. Cintyarani and Indrawati (2024) emphasize the importance of comparative analyses between the Altman and Zmijewski models during the pandemic, noting that the Zmijewski model places greater emphasis on corporate solvency. Their findings underscore the importance of early intervention before a firm's financial condition deteriorates.

Retail businesses are particularly vulnerable to financial distress owing to thin profit margins, intense competition, and heavy reliance on daily cash flows. The financial conditions of retail firms are highly sensitive to external shocks, as demonstrated during the COVID-19 pandemic. Therefore, a thorough understanding of the sources of financial stress and the ability to respond effectively to market changes are essential to ensure the sustainability and resilience of retail businesses.

2.4 Conceptual Framework

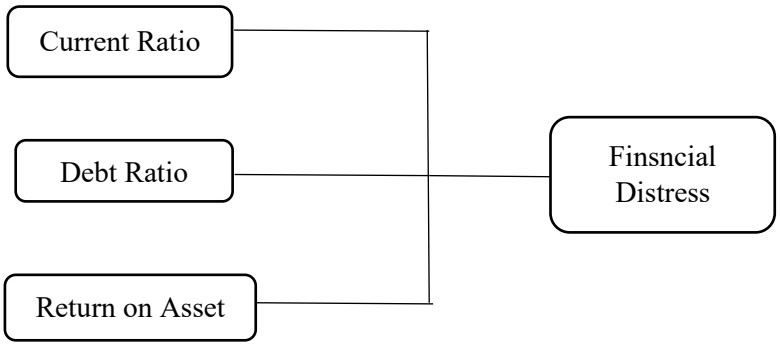

Figure 1. Conceptual Framework Scheme
Source: Zmijewski, 1984

This study adopts a descriptive quantitative approach, which aims to describe and explore the financial conditions of companies without making predictive statements intended to test hypotheses. Through a descriptive approach, this study focuses on collecting and processing existing data to provide a clearer depiction of the phenomenon under analysis, namely, the financial condition of retail companies listed on the Indonesia Stock Exchange (IDX). As stated by Hossan et al. (2023), descriptive quantitative approaches are particularly useful for portraying phenomena without the need for extensive hypothesis testing. As this research does not aim to explicitly test relationships among variables, hypotheses are not formulated because the primary objective of the study is to describe existing conditions based on available data. Consequently, this study does not focus on validating specific theories but rather on providing detailed information that reflects the actual situation or condition of the firms under study. According to Kurniawan Sofyan (2024), descriptive research prioritizes understanding the context or phenomenon being examined without being constrained by causal relationship testing among variables. This study incorporates research questions to guide the analysis direction. Although these questions do not lead to hypothesis testing, they provide an analytical focus for exploring the data.

One of the key research questions posed is: “How can the Zmijewski model be used to assess the financial distress condition of retail companies listed on the Indonesia Stock Exchange based on corporate financial ratios?” As explained by Taufik and Sugianto (2021), research questions within a descriptive approach can offer deeper insights into the problem being analyzed without requiring direct testing of the relationships between variables. Thus, the descriptive approach employed in this study enables researchers to comprehensively illustrate existing conditions and provide deeper insights into the phenomenon under investigation without experimentally testing inter-variable relationships. Santosa et al. (2020) emphasize that descriptive methods are highly effective in presenting a clear depiction of specific situations such as corporate financial conditions that do not necessarily require empirical validation of causal relationships.

3. Research Methodology

3.1 Research Design

This study aims to evaluate the level of financial distress among retail companies in Indonesia, particularly those within the food and staples retailing subsector listed on the Indonesia Stock Exchange (IDX). This study employed a descriptive quantitative approach. The objects of analysis consist of retail companies listed on the Indonesia Stock Exchange during the 2019–2023 period. The data used in this study were obtained from the official company websites and from www.idx.co.id the official platform of the Indonesia Stock Exchange. The population of this study includes retail companies listed on the IDX during the 2019–2023 period, totaling 14 firms in the sample. From this population, a sample of seven retail companies was selected using purposive sampling techniques based on predefined criteria. The Zmijewski prediction model is employed to identify potential corporate bankruptcy using three main indicators: Return on Assets (ROA) as a measure of profitability, Debt-to-Equity Ratio (DER) as an indicator of leverage, and Current Ratio (CR) as a liquidity indicator (Mark E. Zmijewski, 1984;

Afifah Putri Setiawan & Permata Sari, 2025). This study is particularly relevant to Indonesia's dynamic economic context, where digitalization, the COVID-19 pandemic, and inflation have significantly influenced businesses' financial stability (Berry, 2024; Winarto et al., 2024). Although 14 retail companies were initially identified, only seven firms met the financial statement completeness criteria and were therefore selected as the research sample.

3.2 Data Collection Procedure

The secondary data used in this study consist of the annual financial statements of retail companies. These reports were obtained from the IDX and the respective corporate websites. To calculate the ROA, DER, and CR ratios, a documentation method was applied by downloading and recording the relevant financial data. This approach is consistent with methodologies adopted in similar studies conducted in Indonesia (Bahrum et al., 2024; Arisandi et al., 2022), which emphasize the importance of historical financial data in predicting financial distress conditions.

The selection of the 2019–2023 period was intended to capture corporate financial conditions before, during, and after the COVID-19 pandemic, which significantly altered the business cost structures and revenue patterns. Microsoft Excel was used as the supporting software for data processing and analysis. The data were quantitatively analyzed using descriptive numerical analysis. The Zmijewski method was applied to compute standardized values or declines to predict bankruptcy risk.

3.3 Data Analysis Method

This study applies the Zmijewski method as the primary analytical tool to identify and predict financial distress among companies in the food and staples retail subsector listed on the Indonesia Stock Exchange (IDX). This method is used to provide a comprehensive overview of corporate financial conditions and classify firms as either financially healthy or experiencing financial distress. The analysis was conducted using the Zmijewski Model, which is formulated as follows:

$$\textbf{X-Score} = -4{,}3 - 4{,}5X1 + 5{,}7X2 - 0{,}004X3$$

Where:
X : Bangkruptcy Index
X1 : ROA (Return on Asset)
X2 : Leverage (Debt Ratio)
X3 : Liquidity (Current Ratio)

This model produces an X-score, in which companies with $X \geq 0$ are classified as experiencing financial distress, while those with $X < 0$ are considered financially healthy. The strength of this model lies in its use of a combination of three financial ratios that have been empirically validated (Saha, 2024; Rosihana et al., 2025). In the Indonesian context, the Zmijewski model has demonstrated high predictive accuracy for the retail and consumer non-cyclic sectors (Afifah Putri Setiawan & Permata Sari, 2025; Muzanni & Yuliana, 2021).

3.4 Sample Selection

A sample is a subset of the population selected for observation or research. In quantitative research, samples are used to represent the characteristics of the overall population, enabling researchers to draw generalizable conclusions without examining every member of the population (Hossan et al., 2023)

Table 2. Research Sample

No	Ticker Code	Company Name
1	DAYA	PT Duta Intidaya Tbk
2	HERO	PT Hero Supermarket Tbk.
3	MPPA	PT Matahari Putra Prima Tbk.
4	MLPL	PT Multipolar Tbk.
5	PCAR	PT Prima Cakrawala Abadi Tbk.

6	RANC	PT Supra Boga Lestari Tbk.
7	WICO	PT Wicaksana Overseas International Tbk.

Source: Secondary Data

The sample in this study consists of retail companies listed on the Indonesia Stock Exchange (IDX) that meet the following criteria: (1) the company is listed on the IDX; (2) the company has published complete financial statements on the IDX for the past five consecutive years; and (3) the company has experienced a decline in profitability across the observed periods. Appropriate sample selection is essential to ensure the quality and validity of research findings, enabling an accurate representation of corporate financial conditions and providing relevant predictions of financial distress.

4. Results and Discussion

4.*1 Results of Return on Assets (ROA) Calculation*

Table 3. Results of ROA Calculation

No	Company Name	Year	Net Profit / (Loss)	Total Assets	ROA
1	PT Duta Intidaya Tbk	2019	18.539.711	730.500.000	0,025
		2020	(48.816.999)	708.530.000	-0,069
		2021	(51.708.764)	689.124.704	-0,075
		2022	(40.023.559)	687.503.074	-0,058
		2023	(16.188.988)	689.740.000	-0,023
2	PT Hero Supermarket Tbk.	2019	70.636	6.054.384	0,012
		2020	(1.214.602)	4.838.417	-0,251
		2021	(963.526)	6.273.516	-0,154
		2022	59.111	6.910.567	0,009
		2023	(132.165)	5.766.226	-0,023
3	PT Matahari Putra Prima Tbk.	2019	(552.674)	3.820.809	-0,145
		2020	(405.307)	4.510.511	-0,090
		2021	(337.548)	4.650.488	-0,073
		2022	(429.634)	3.784.871	-0,114
		2023	(255.350)	3.641.458	-0,070
4	PT Multipolar Tbk.	2019	(1.041.543)	15.283.901	-0,068
		2020	(989.536)	15.682.406	-0,063
		2021	25.990	14.760.983	0,002
		2022	(60.666)	13.082.641	-0,005
		2023	34.647	13.089.217	0,003
5	PT Prima Cakrawala Abadi Tbk	2019	(10.257.599.104)	124.735.506.556	-0,082
		2020	(15.957.991.606)	103.351.122.210	-0,154
		2021	1.278.943.527	108.995.625.626	0,012
		2022	4.932.754.628	102.809.758.188	0,048
		2023	9.204.103.933	104.552.819.861	0,088
6	PT Supra Boga Lestari Tbk	2019	55.464.434.251	952.496.300.846	0,058
		2020	76.002.689.458	1.319.134.443.995	0,058
		2021	9.838.767.784	1.512.036.014.160	0,007
		2022	(83.668.235)	1.354.418.637	-0,062
		2023	(121.047.971)	1.247.187.872	-0,097
7	PT Wicaksana Overseas International Tbk.	2019	(30.149.426.425)	695.853.450.844	-0,043
		2020	(38.864.383.290)	677.619.067.915	0,058
		2021	(115.089.844.313)	613.344.238.692	-0,188
		2022	(137.680.385.241)	436.470.822.994	-0,315
		2023	(111.615.958.335)	319.173.316.937	-0,350

Source: Processed by the authors, 2025

Based on Table 3, PT Duta Intidaya Tbk recorded an ROA of 0.025 in 2019 but experienced significant losses in 2020 with an ROA of -0.069, which remained negative until 2023. PT Hero Supermarket Tbk also showed a sharp decline from an ROA of 0.012 in 2019 to -0.251 in 2020 and returned to the negative territory in 2023. PT Matahari Putra Prima Tbk recorded an ROA of -0.145 in 2019, which declined further to -0.090 in 2020 and remained negative until 2023. PT Multipolar Tbk was relatively more stable, showing a negative ROA in 2019 and 2020, slightly turning positive in 2021, declining again in 2022, and returning to positive territory in 2023.

PT Prima Cakrawala Abadi Tbk successfully improved its performance from an ROA of -0.082 in 2019 to 0.088 in 2023. PT Supra Boga Lestari Tbk showed stable ROA values of 0.058 in 2019 and 2020 but recorded negative ROA in 2022 and 2023. PT Wicaksana Overseas International Tbk experienced substantial fluctuations, with an ROA of -0.043 in 2019, which increased to 0.058 in 2020, but returned to negative values in 2022 and 2023.

4.1 Results of Debt Ratio Calculation

Table 4. Results of Debt Ratio Calculation

No	Company Name	Year	Total Debt	Total Equity	Debt Ratio
1	PT Duta Intidaya Tbk	2019	560.812.496	169.685.456	3,305
		2020	588.386.520	120.143.572	4,897
		2021	617.180.992	71.943.712	8,579
		2022	653.464.291	34.038.783	19,198
		2023	672.135.240	17.608.015	0,229
2	PT Hero Supermarket Tbk.	2019	2.164.333	3.890.051	0,556
		2020	4.907.915	1.854.688	2,646
		2021	5.399.696	873.820	6,179
		2022	5.972.429	938.138	6,366
		2023	4.346.104	1.420.122	3,060
3	PT Matahari Putra Prima Tbk.	2019	3.290.128	530.681	6,200
		2020	4.325.777	184.734	23,416
		2021	4.066.083	584.405	6,958
		2022	3.618.854	166.017	21,798
		2023	3.382.303	259.155	13,051
4	PT Multipolar Tbk.	2019	9.665.922	5.617.979	1,721
		2020	11.719.043	3.963.363	2,957
		2021	10.232.542	4.528.441	2,260
		2022	8.488.639	4.594.002	1,848
		2023	8.390.166	4.699.051	1,786
5	PT Prima Cakrawala Abadi Tbk	2019	40.503.414.153	84.232.092.403	0,481
		2020	39.680.888.888	63.670.233.322	0,623
		2021	43.973.622.627	65.022.002.999	0,676
		2022	41.631.404.260	61.178.353.928	0,680
		2023	37.720.639.233	66.832.180.628	0,564
6	PT Supra Boga Lestari Tbk	2019	404.693.066.101	547.803.234.745	0,739
		2020	774.629.825.055	544.504.618.940	1,423
		2021	1.004.972.007.389	507.064.006.771	1,982
		2022	928.180.973	426.237.664	2,178
		2023	947.996.997	299.190.875	4,904
7	PT Wicaksana Overseas International Tbk.	2019	448.318.588.707	247.534.862.137	1,811
		2020	468.948.589.068	208.670.478.847	2,247
		2021	519.763.604.158	93.580.634.534	5,554
		2022	419.393.878.641	17.076.944.353	24,559
		2023	313.471.732.819	5.701.584.118	3,169

Source: Processed by the authors, 2025

Based on Table 4, PT Duta Intidaya Tbk experienced fluctuations, with a debt ratio of 3.305 in 2019, which increased sharply to 19.198 in 2022, before declining to 0.229 in 2023, indicating improvement. PT Hero Supermarket Tbk increased from 0.556 in 2019 to 6.179 in 2021 and then declined to 3.060 in 2023, reflecting a high dependence on debt. PT Matahari Putra Prima Tbk recorded high debt ratios, reaching 6.200 in 2019 and 23.416 in 2020, before decreasing to 13.051 in 2023. PT Multipolar Tbk remained relatively stable, increasing from 1.721 in 2019 to 2.957 in 2020 and declining to 1.786 in 2023. PT Prima Cakrawala Abadi Tbk maintained a relatively low debt ratio, starting at 0.481 in 2019 and slightly increasing to 0.676 in 2021. PT Supra Boga Lestari Tbk showed an increase from 0.739 in 2019 to 4.904 in 2023, indicating a greater reliance on debt. PT Wicaksana Overseas International Tbk experienced notable fluctuations, rising from 1.811 in 2019 to 5.554 in 2021, before declining to 3.169 in 2023.

4.2 Results of Current Ratio (CR) Calculation

Table 5. Results of Current Ratio Calculation

No	Company Name	Year	Current Assets	Current Liabilities	CR
1	PT Duta Intidaya Tbk	2019	321.475.087	411.740.929	0,781
		2020	314.742.151	460.174.368	0,684
		2021	342.889.066	510.578.397	0,672
		2022	406.127.403	574.583.535	0,707
		2023	433.142.341	593.176.688	0,730
2	PT Hero Supermarket Tbk.	2019	2.417.001	2.038.174	1,186
		2020	1.1540.143	2.278.042	0,676
		2021	2.513.352	3.251.857	0,773
		2022	2.859.570	3.785.951	0,755
		2023	1.629.628	3.395.415	0,480
3	PT Matahari Putra Prima Tbk.	2019	1.904.047	2.618.390	0,727
		2020	1.535.266	2.763.099	0,556
		2021	2.063.277	2.442.484	0,845
		2022	1.543.309	2.298.872	0,671
		2023	1.626.520	2.171.529	0,749
4	PT Multipolar Tbk.	2019	5.701.372	5.505.982	1,035
		2020	4.808.584	5.815.645	0,827
		2021	5.852.668	5.165.883	1,133
		2022	4.932.608	4.737.302	1,041
		2023	4.859.606	4.859.364	1,000
5	PT Prima Cakrawala Abadi Tbk	2019	81.197.082.570	33.133.870.056	2,451
		2020	64.192.318.245	21.624.939.963	2,968
		2021	64.337.480.157	28.202.878.644	2,281
		2022	55.296.068.186	23.290.157.438	2,374
		2023	70.846.464.279	15.846.869.617	4,471
6	PT Supra Boga Lestari Tbk	2019	572.605.079.834	351.034.023.260	1,631
		2020	627.495.880.938	518.612.611.502	1,210
		2021	570.901.473.128	633.150.936.994	0,902
		2022	627.495.880.938	622.105.282	1,631
		2023	519.333.038	663.440.550	0,783
7	PT Wicaksana Overseas International Tbk.	2019	643.568.004.520	421.129.759.476	1,528
		2020	594.790.929.582	446.454.025.409	1,332
		2021	528.831.600.136	502.058.732.263	1,053
		2022	361.931.943.285	409.753.998.155	0,883
		2023	237.214.805.098	307.344.288.318	0,772

Source: Processed by the authors, 2025

Based on Table 5, PT Duta Intidaya Tbk shows fluctuations in its current ratio, starting at 0.781 in 2019, declining to 0.672 in 2021, and increasing again to 0.730 in 2023, reflecting the efforts to improve liquidity. PT Hero Supermarket Tbk experienced a significant decline from 1.186 in 2019 to 0.480 in 2023, indicating difficulties in meeting its short-term obligations. PT Matahari Putra Prima Tbk shows a varied trend, with a ratio of 0.727 in 2019, decreasing to 0.556 in 2020, recovering to 0.845 in 2021, and eventually declining to 0.749 in 2023.

PT Multipolar Tbk remained relatively stable, with a ratio of 1.035 in 2019, decreasing to 0.827 in 2020, and increasing again to 1.000 in 2023, indicating its ability to meet short-term liabilities. PT Prima Cakrawala Abadi Tbk shows a positive trend, with the ratio increasing from 2.451 in 2019 to 4.471 in 2023, reflecting a strong liquidity position. PT Supra Boga Lestari Tbk experienced fluctuations, declining from 1.631 in 2019 to 0.783 in 2023, indicating liquidity challenges. PT Wicaksana Overseas International Tbk shows a consistent decline from 1.528 in 2019 to 0.772 in 2023, reflecting the increasing difficulty in meeting short-term obligations.

4.3 Calculation and Results Using the Zmijewski Method

Table 6. Results of Zmijewski Method Calculation

No	Company Name	Year	ROA(X1)	Debt Ratio(X2)	CR(X3)	X-Score	Average	Category
1	PT Duta Intidaya Tbk	2019	0,025	3,305	0,781	14,421		*Distress*
		2020	-0,069	4,897	0,684	23,922		*Distress*
		2021	-0,075	8,579	0,672	44,933		*Distress*
		2022	-0,058	19,198	0,707	105,386		*Distress*
		2023	-0,023	0,229	0,730	-2,892		*Non-distress*
2	PT Hero Supermarket Tbk.	2019	0,012	0,556	1,186	-1,186		*Non-distress*
		2020	-0,251	2,646	0,676	11,910		*Distress*
		2021	-0,154	6,179	0,773	31,611		*Distress*
		2022	0,009	6,366	0,755	31,946		*Distress*
		2023	-0,023	3,060	0,480	13,245		*Distress*
3	PT Matahari Putra Prima Tbk.	2019	-0,145	6,200	0,727	31,687		*Distress*
		2020	-0,090	23,416	0,556	129,575		*Distress*
		2021	-0,073	6,958	0,845	35,682		*Distress*
		2022	-0,114	21,798	0,671	120,457		*Distress*
		2023	-0,070	13,051	0,749	70,405		*Distress*
4	PT Multipolar Tbk.	2019	-0,068	1,721	0,727	5,811		*Distress*
		2020	-0,063	2,957	0,827	12,835		*Distress*
		2021	0,002	2,260	1,133	8,567		*Distress*
		2022	-0,005	1,848	1,041	6,249		*Distress*
		2023	0,003	1,786	1,000	5,861		*Distress*
5	PT Prima Cakrawala Abadi Tbk	2019	-0,082	0,481	2,451	-1,199		*Non-distress*
		2020	-0,154	0,623	2,968	-0,065		*Non-distress*
		2021	0,012	0,676	2,281	-0,507		*Non-distress*
		2022	0,048	0,680	2,374	-0,647		*Non-distress*
		2023	0,088	0,564	4,471	-1,497		*Non-distress*
6	PT Supra Boga Lestari Tbk	2019	0,058	0,739	1,631	-0,358		*Non-distress*
		2020	0,058	1,423	1,210	3,545		*Distress*
		2021	0,007	1,982	0,902	6,964		*Distress*
		2022	-0,062	2,178	1,631	8,384		*Distress*
		2023	-0,097	4,904	0,783	24,08		*Distress*
7	PT Wicaksana Overseas	2019	-0,043	1,811	1,528	6,212		*Distress*
		2020	0,058	2,247	1,332	8,245		*Distress*
		2021	-0,188	5,554	1,053	28,199		*Distress*
		2022	-0,315	24,56	0,883	137,103		*Distress*

	International Tbk.	2023	-0,350	3,169	0,772	15,331		*Distress*

Source: Processed by the authors, 2025

Based on Table 6, the companies classified as non-distress include PT Duta Intidaya Tbk in 2023, PT Hero Supermarket Tbk in 2019, PT Prima Cakrawala Abadi Tbk across all periods from 2019 to 2023, and PT Supra Boga Lestari Tbk in 2019.

Table 7. Average Results of the Zmijewski Method

No	Company	2019	2020	2021	2022	2023	Average	Prediction
1.	DAYA	14,421	23,922	44,933	105,386	-2,892	37,154	B
2.	HERO	-1,186	11,910	31,611	31,946	13,245	17,505	B
3.	MPPA	31,687	129,575	35,682	120,457	70,405	77,561	B
4.	MLPL	5,811	12,835	8,567	6,249	5,861	7,865	B
5.	PCAR	1,199	0,065	0,507	0,647	1,497	-0,783	TB
6.	RANC	0,358	3,545	6,964	8,384	24,088	8,525	B
7.	WICO	6,212	8,245	28,199	137,103	15,331	39,018	B

Source: Processed by the authors, 2025

Notes:
TB : Non-bankrupt
B : Bankrupt

The application of the Zmijewski method in this study proves to be a highly significant analytical tool for assessing the financial health of retail companies listed on the Indonesia Stock Exchange during 2019–2023. Developed by Mark E. Zmijewski in 1984, this model applies regression-based techniques to estimate bankruptcy probability using financial indicators such as profitability, liquidity, and leverage (Mark E. Zmijewski, 1984). Through Table 2 in this study, the financial performance of each analyzed company can be examined in greater depth. One of the most notable cases is that of DAYA. In 2019, DAYA's financial distress score reached 14.421, indicating early signs of financial distress. This score increased dramatically in 2022 to 105.386, reinforcing the indications of serious problems in the company's financial management. However, in 2023, the score declined sharply to –2.892, suggesting a significant recovery. Nevertheless, the five-year average score of 37.154 still leads to bankruptcy prediction. The sharp increase in 2022 reflects the potential for a crisis with long-term implications (Bahrum et al., 2024).

Financial distress refers to a condition in which a company experiences difficulty in meeting its financial obligations, which may ultimately lead to bankruptcy. As explained by Andari and Rahyuda (2021), this condition is related not only to the inability to repay debts but also to operational disruptions caused by such financial pressures. Siti Dini (2021) further adds that financial distress is often caused by internal weaknesses, such as poor managerial decision-making, ineffective liquidity management, and an unbalanced capital structure relative to the firm's risk level. External factors, such as global economic uncertainty, may exacerbate this condition.

HERO exhibited a more unstable financial trend. HERO's financial distress score in 2019 was –1.186, indicating relatively healthy financial conditions. However, by 2023, this figure surged to 31.946, signaling increasing uncertainty in the company's financial performance. The average score over the observation period was 13.245, which still places the company at risk of bankruptcy. This sharp change serves as a warning signal for investors regarding potential financial risks in the future (Santosa et al., 2020).

Meanwhile, the MLPL shows financial distress scores that tend to be stable and not highly volatile, ranging from 5.811 to 12.835, with an average score of 7.865. Despite this stability, the company remains classified as being at risk of bankruptcy. This finding indicates that stability does not

necessarily imply financial health, particularly when the scores remain consistently weak over time. In line with Liu et al. (2021) persistently weak financial performance even without major fluctuations can increase long-term distress risk.

PCAR demonstrates a relatively strong financial performance, with an average financial distress score of –0.783, indicating no bankruptcy risk. This suggests that the company maintains healthy liquidity and can meet its short-term obligations. Such performance reflects effective financial management and the presence of a solid managerial framework. As noted by Abrori et al. (2023), strong management combined with adequate external support enables firms to remain resilient despite the financial challenges.

In contrast, WICO recorded a significant spike in 2022, with a financial distress score of 137.103. However, this score does not reflect the consistency of a company's financial performance in previous years. The average score over the analysis period was 39.018, and despite occasional improvements, WICO is predicted to face bankruptcy. These extreme fluctuations indicate that short-term improvements in financial conditions cannot be used as benchmarks for achieving long-term success. Without sustainable management strategies, the risk of financial distress is high.

The application of the Zmijewski method in this context has proven effective in providing deeper insights into the financial positions of retail companies in Indonesia. According to Muzanni and Yuliana (2021), this method demonstrates high accuracy in detecting bankruptcy risk, particularly in the retail sector, which is characterized by rapid cash flow and intense competition. Nevertheless, this approach still has limitations, especially in responding to external dynamics, such as policy changes, market fluctuations, and global economic conditions.

Therefore, although the Zmijewski model is useful as an early prediction tool, adjustments through the integration of macroeconomic variables and managerial factors are necessary to produce more comprehensive predictive results. This study also highlights the importance of sector-specific approaches, as indicators applicable to one sector may not be equally relevant to others. Consequently, future studies should develop models that are more responsive to changes in the business environment and combine quantitative and qualitative analyses.

5. Conclusion

This study aims to evaluate the effectiveness of the Zmijewski Model in predicting financial distress among retail companies listed on the Indonesia Stock Exchange during 2019–2023. Based on the analysis of seven retail companies, the findings indicate that the Zmijewski model can be effectively used to detect bankruptcy risk or financial distress using financial ratios such as Return on Assets, Debt Ratio, and Current Ratio. The results show that most of the analyzed companies exhibit high financial risk, except for PT Prima Cakrawala Abadi Tbk, which demonstrates a more stable and financially healthy performance. From a theoretical perspective, this study confirms that the Zmijewski method remains relevant for corporate financial analysis in Indonesia, particularly in the retail sector, which is influenced by several external factors. However, the model has limitations, especially its inability to account for external factors such as macroeconomic conditions, fiscal policy, and political uncertainty, all of which may affect corporate financial stability.

From a practical standpoint, the findings provide valuable insights for retail managers and investors to make more informed decisions regarding corporate financial health. A deeper understanding of the indicators used in the Zmijewski model can help companies implement strategic improvements, manage financial risks, and anticipate potential financial crises. Investors may use the results of this analysis to assess investment risk and make more appropriate portfolio management decisions. Nevertheless, to obtain more accurate results, companies should combine the Zmijewski model analysis with external factors such as inflation, interest rates, and other macroeconomic variables. This integration is expected to provide a more holistic and relevant perspective on corporate financial conditions in the face of market dynamics.

Based on the findings of this study, future research should develop more comprehensive prediction models by incorporating macroeconomic variables and more in-depth managerial indicators. Future studies should examine the application of advanced technologies in real-time financial distress detection using big data analytics and artificial intelligence. Such approaches may help create more efficient and responsive early warning systems capable of adapting to both external and internal changes in the environment. In conclusion, although the Zmijewski model is highly useful for analyzing potential financial distress, its application in Indonesia's retail sector requires further adjustment by incorporating critical external factors that play an important role in maintaining corporate financial stability. Therefore, the model should be used as an initial analytical tool rather than as the sole reference for strategic decision making.

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