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Using Financial Distress Models in Indonesian F&B Companies During Multidimensional Crisis: Covid-19 Period to the Israeli-Palestinian Conflict

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ABSTRACT

This study aims to compare the effectiveness of financial distress prediction models (Altman Z-Score, Springate, Zmijewski, Taffler, Grover, and Ohlson) for food and beverage companies in Indonesia impacted by multidimensional crises: the COVID-19 pandemic, community activity restrictions (PPKM), and the boycott of pro-Israel products. The research objects include four companies listed on the Indonesia Stock Exchange (MAPI, MAPB, PZZA, FAST) that faced operational and financial pressures due to these phenomena. A quantitative method with a causal-comparative design was employed, analyzing secondary financial report data from 2020–2023 through descriptive statistics and predictive analysis. Results revealed variations in model accuracy depending on the crisis context: Springate achieved the highest overall accuracy (75%), attributed to its integration of liquidity, profitability, and leverage variables relevant during the pandemic and PPKM. Meanwhile, Ohlson excelled during the 2023 boycott period (100% accuracy) due to its sensitivity to non-financial factors like reputation and demand shifts. Conversely, Zmijewski (31%) and Grover (44%) underperformed, limited by their inability to capture external dynamics. The implications emphasize the importance of selecting context-specific models—liquidity-focused models (e.g., Taffler) for sudden economic shocks and multifactor probabilistic models (e.g., Ohlson) for geopolitical disruptions. For practitioners, product diversification and cost efficiency are key to resilience, while investors should integrate non-financial risks into decision-making. This study contributes to literature by integrating geopolitical crises into financial distress analysis, though limited by its small sample and historical data. Future research should expand sector coverage and develop hybrid models incorporating qualitative metrics.

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1. INTRODUCTION

The global crisis that has occurred in recent years has had a significant impact on the world economy. The following illustrated in Figure 1 is the timeline of the COVID-19 pandemic in Indonesia, the implementation of

PPKM, to the increasing Palestinian issue and the boycott movement that began to be busy since October 2023.

Figure 1. Phenomenon Timeline
Source: Data processed by the author (2025)

The COVID-19 pandemic, mobility restriction policies, and geopolitical conflicts such as the Israeli-Palestinian war have created economic uncertainties that have a wide-ranging impact on companies in various sectors. COVID-19, which first emerged in late 2019, caused major disruptions to global supply chains, reduced consumer demand, and financial market instability. Governments in various countries implemented social distancing and lockdown policies to reduce the spread of the virus, which in turn led to a decline in economic activity and an increase in corporate bankruptcy rates. In Indonesia, the Community Activity Restriction (PPKM) policy is the main step to control the spread of the virus, but it also has a negative impact on the business sector, especially the food and beverage industry [1].

In addition, the prolonged conflict between Israel and Palestine has had a significant impact on the global economy. As one of the longest and most complex conflicts in the world, the roots of this issue stem from conflicting territorial claims and national identities dating back to the Ottoman Empire and the British Mandate. This conflict triggered the emergence of the BDS (Boycott, Divestment, and Sanctions) Movement, a global effort to boycott companies deemed to support Israel [2]. According to [3], this issue became more complex when a number of companies showed favoritism towards Israel, either directly or indirectly, thus triggering boycotts from the public.

In Indonesia, the movement was strengthened by the Indonesian Ulema Council (MUI) Fatwa Number 83 of 2023, which states that buying products from companies supporting Israeli aggression is haram for Muslims. This fatwa has been in effect since November 8, 2023, after BDS Indonesia previously released a list of products considered pro-Israel [4].

One significant impact is the emergence of boycott movements against companies that are directly or indirectly linked to the conflict. This movement not only creates reputational challenges, but also affects the company's financial stability due to decreased revenue, loss of customers, and other operational challenges [5]. Research conducted by [1] shows that boycotting products affiliated with Israel has a significant impact on the financial performance of companies listed on the Indonesia Stock Exchange (IDX) in 2023. In terms of liquidity, the current ratio decreased on average after the boycott, which was caused by a reduction in trade receivables and other receivables, indicating a decrease in the company's ability to meet its short-term obligations. This finding indicates that non-economic issues (such as boycotts) can affect financial performance and may lead to financial distress.

This situation is reinforced by data from the Compas Market Insight Dashboard, which shows that 53% of food and beverage brands targeted by the boycott experienced a decline in sales during the period May 26 to June 8, 2024. In contrast, only 47% of brands still recorded sales growth despite being affected (compas.co.id). This finding confirms

that changes in consumer sentiment, especially those influenced by social and political issues, can have a direct impact on the sector's sales performance.

Several companies listed on the Indonesia Stock Exchange can be identified where their food and beverage products are included in the boycott list due to the Israeli and Palestinian conflicts, such as PT Mitra Adiperkasa (MAPI) and PT Map Boga Adiperkasa (MAPB) with Krispy Kreme, Subway, and Starbucks products, where MAPI the parent retail company focuses more on managing retail brands while MAPB focuses on food and beverage retail. In addition, PT Sarimelati Kencana (PZZA) with Pizza Hut products and PT Fast Food Indonesia (FAST) with Kentucky Fried Chicken products.

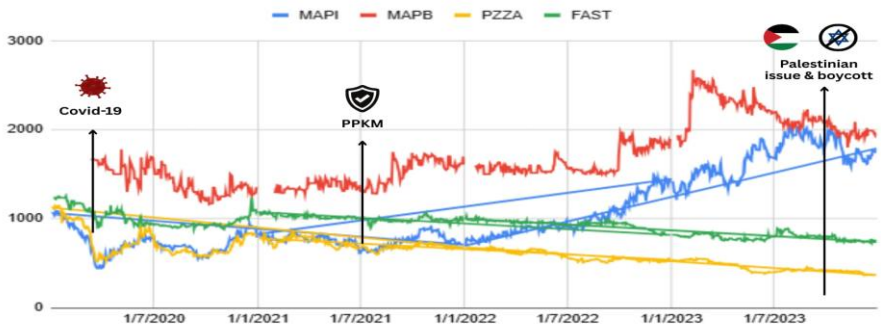

Figure 2. Stock movements of MAPI, MAPB, PZZA, and FAST
Source: Data processed by the author (2025)

Figure 2 shows the daily stock movements of MAPI, MAPB, PZZA, and FAST during 2020-2023, where MAPI and MAPB experienced a significant upward trend since 2022, while PZZA and FAST tended to decline since 2021. The increase in the share prices of MAPI and MAPB reflects the positive market perception of the companies' performance and strategy, which may be related to product diversification as these two companies do not only manage food and beverage products. Conversely, the decline in the share prices of PZZA and FAST may indicate a declining market perception of the company's performance and strategy, where these two companies have products that focus on food and beverages. Based on research by [6], company productivity and management's ability to manage company finances can reduce the risk of financial distress, so it is important for companies to have a strategy in managing finances, especially in crisis periods.

The food and beverage sector has an important contribution to the national economic structure due to its consumptive nature and is directly related to the basic needs of society. Activity in this sector is relatively stable throughout the year. However, since 2020, the sector has faced serious challenges affecting its operational and financial performance, mainly due to the COVID-19 pandemic, activity restriction policies (PPKM), and the emergence of boycott movements.

The selection of this sector as the object of study is based on a number of strategic considerations. One of them is the high dependence on international supply chains, which makes this sector easily affected by logistical disruptions, decreased purchasing power, and geopolitical turmoil. However, according to research by [7], the geopolitical events of the Russia Ukraine war did not have a significant impact on companies in the food sector. Based on data from the Ministry of Industry (2023), around 72% of F&B companies in Indonesia still depend on imported raw materials, making them highly vulnerable to global crises such as the Israeli-Palestinian conflict. In addition, according to [8], the easily replaceable nature

of products makes consumers quickly switch to other brands when sensitive issues, such as boycotts, occur. The impact of this phenomenon directly affects the company's financial performance and increases the likelihood of financial distress, especially for companies with high dependence on domestic consumers.

In this context, the ability to predict potential financial distress becomes increasingly important, especially for companies affected by boycotts. Financial distress prediction plays a crucial role in strategic decision-making, both for company management and other stakeholders [9]. However, until now, there have been challenges in selecting the most relevant prediction models, especially in conditions involving multidimensional crises such as boycotts related to geopolitical conflicts. Financial distress is the initial stage of bankruptcy in a company. Financial distress describes a situation when the company's financial condition has decreased, so that it cannot fulfill its debt obligations, both in the short and long term. If this condition is not resolved immediately and continues to worsen, the company may face the risk of bankruptcy [10].

A number of models have been developed to predict financial distress and assess the risk of corporate bankruptcy, including Altman Z-score, Springate, Zmijewski, Taffler, Ohlson, and Grover. Each model has different advantages and limitations, influenced by economic conditions, industry sectors, and assumptions used in the analysis [9]. In current research [11], various methods of analyzing financial distress have developed and are used by companies in various industrial sectors. The Altman method (1968) is one of the most widely applied, with an accuracy rate of up to 95%. In addition, there is the Zmijewski method (1984), which has an accuracy of 94.9%. The Grover (2003) method, which is a refinement of the Altman Z-Score, offers a higher accuracy rate of 97.7%. Other frequently used methods are Springate (1978), with an accuracy rate of 92.5%, and the Ohlson (1980) method, which is used to predict bankruptcy with an accuracy rate of 96.4%.

However, previous research tends to focus on the application of these models in countries or regions with relatively good economic stability, without considering the influence of geopolitical crises as a significant external factor [12]. For example, the Altman Z-Score is widely adopted to predict bankruptcy in various manufacturing sectors [13], while the Ohlson model focuses more on companies in sectors with long-term financial stress [14]. Research that tests the effectiveness of these models in the context of crises such as boycotts due to the Israeli-Palestinian conflict is still very limited, creating a research gap that needs to be filled.

This study aims to compare the Altman Z-Score, Springate, Zmijewski, Taffler, Grover, and Ohlson models in identifying financial distress in companies affected by boycotts due to the Israeli-Palestinian conflict. In particular, this study seeks to answer the question of the extent to which specific factors arising from the boycott can affect the predictions of each model. This approach not only contributes to the development of literature on financial distress prediction, but also provides practical insights for companies, investors, and policy makers in making strategic decisions.

The originality of this research lies in its unique focus on examining the effectiveness of various financial distress prediction models in the context of a geopolitical crisis that has not been widely explored. This study makes a new contribution by integrating the analysis of established prediction models into the framework of a complex situation, namely companies affected by COVID-19, PPKM and boycotts due to the dynamics of the Israeli-Palestinian conflict. As such, this research not only expands the boundaries of academic knowledge but is also practically relevant in increasingly dynamic real-world situations.

2. LITERATURE REVIEW

2.1 Global Crisis: COVID-19 and PPKM

The global crisis triggered by the COVID-19 pandemic has caused major

disruptions to supply chains, declining consumer demand and financial market instability [15], [16]. The COVID-19 pandemic exacerbated these conditions by weakening consumption, investment, and the economy [17]. In Indonesia, the Community Activity Restriction (PPKM) policy was enacted as an effort to suppress the spread of the pandemic response virus. However, it also negatively impacted the business sector, especially the food and beverage industry, which experienced operational bottlenecks, as well as a significant decline in demand and revenue, and added financial pressure on companies, increasing the risk of financial distress. [1].

The consumer goods industry is one of the industrial fields that plays an important role in a country's economy [18]. One of its subsectors, namely food and beverages, is particularly vulnerable due to its consumptive character and high dependence on global supply chains. Around 72% of F&B companies in Indonesia still rely on imported raw materials, making them more sensitive to the global crisis.

2.2 *Geopolitical Conflicts and Their Impact on Corporate Economic Stability*

The Israeli-Palestinian conflict can affect global economic stability, including the financial performance of companies that are directly or indirectly involved in the boycott movement. Geopolitical conflicts, as mentioned by [2], [3], can trigger global reactions in the form of economic boycotts of products or companies that are considered to support one of the parties. Such boycotts not only impact the company's reputation, but also pose a risk of financial distress due to lost revenue, reduced customers, and other operational issues. In this context, it is important to better understand how geopolitical conflicts can be a significant external factor affecting a company's economic stability.

2.3 *Financial Distress and the Relevance of Prediction Models*

Financial distress is a condition where the company is experiencing financial difficulties that can lead to bankruptcy if not handled immediately [10]. This can occur due to a decrease in liquidity, solvency, and company income. Financial distress prediction is crucial, especially for companies affected by boycotts due to geopolitical conflicts. Various prediction models in Table 1 such as Altman Z-Score, Zmijewski, Grover, Springate, Taffler, and Ohlson, each of which has advantages and limitations. These models are used to assess the risk of corporate bankruptcy in various sectors, as described by [11].

Table 1. Financial Distress Prediction Model

No.	Model	Variable	Financial Distress Zone
1.	Altman Z-Score	**Z-Score = 6,56 X_1 + 3,26 X_2 + 6,72 X_3 + 1,05 X_4** $X_1 = \frac{Working\ Capital}{Total\ Asset}$ $X_2 = \frac{Retained\ Earnings}{Total\ Asset}$ $X_3 = \frac{Earnings\ Before\ Interest\ and\ Taxes}{Total\ Asset}$ $X_3 = \frac{Market\ Value\ Equity}{BOOK\ Value\ of\ Total\ Debt}$	Z-Score values: **1. Z > 2.6 "Safe Zone" The** company shows good stability and is considered safe. **1,1 < Z < 2,6 "Gray Zone"** The company's financial condition shows signs of instability and requires further attention. **Z < 1.1 "Distress Zone"** The company has a strong potential for bankruptcy.
2.	Springate Model *(S-Score)*	**S-Score = 1.03 X_1 + 3.07 X_2 + 0.66 X_3 + 0.4 X_4**	S-Score: **S < 0.862 "Distress"** The company is in financial insolvency.

No.	Model	Variable	Financial Distress Zone
		$X1 = \frac{Working\ Capital}{Total\ Aset}$ $X2 = \frac{EBIT}{Total\ Asset}$ $X3 = \frac{Earnings\ Before\ Tax}{Current\ Liabilities}$ $X4 = \frac{Sales}{Total\ Asset}$	**0.862 < S < 1.062 "Gray"** If this situation is not immediately addressed and managed properly, the company may eventually go bankrupt. **S > 1.062 "Safe"** The company is in a solid financial situation, so the risk of bankruptcy is very small.
3.	Zmijewski Model *(X-Score)*	**X-Score = -4.3 -4.5 X_1 + 5.7 X_2 – 0.004 X_3** $X_1 = \frac{Net\ Income\ After\ Tax}{TotalAssets}$ $X_2 = \frac{Total\ Debt}{Total\ Assets}$ $X_3 = \frac{Current\ Assets}{Current\ Liabilities}$	**X-Score value:** **X > 0 "Bankrupt"** The company is categorized as unhealthy and potentially will experience financial distress. **X < 0 "Not Bankrupt"** The company shows strong financial performance, so it does not plan for financial distress.
4.	Grover Model *(G-Score)*	**G-Score = 1.650 X_1 + 3.404 X_2 – 0.016 X_3 + 0.057** $X_1 = \frac{Working\ Capital}{Total\ Assets}$ $X_2 = \frac{EBIT}{Total\ Assets}$ $X_3 = \frac{Net\ Income}{Total\ Assets}$	**G-Score Value:** **G ≤ -0.02 "Bankrupt"** The company is classified as unstable and has the possibility of financial distress. **G ≥ -0.01 "Not Bankrupt"** The company is stable and shows no indication of financial distress.
5.	Taffler Prediction Model	**Z Taffler = 3,20 + 12,18 X_1 + 2,50 X_2 – 10,68 X_3 + 0,0289 X_4** X1 = Earnings Before Tax to Current Liabilities X2 = Current Assets Ratio to Total Liabilities X3 = Percentage of Total Assets Comprised of Current Liabilities X4 = Net Income After Tax as a Proportion of Total Assets	**Z-Taffler Value:** **<0.2** **"Bankrupt"** the company falls into the distress zone and is at risk of bankruptcy. **>0.2 "Not Bankrupt"** The company has a solid financial performance so it is far from the risk of bankruptcy.
6.	Ohlson Model	**O = -1,32 – 0,407 X_1 + 6,03 X_2 – 1,43 X_3 + 0,0757 X_4 – 2,37 X_5 – 1,83 X_6 + 0,285 X_7 + 1,72 X_8 – 0,521 X_9** $X_1 = \text{Log}\left(\frac{Total\ Assets}{GDP}\right)$ $X_2 = \frac{Total\ Liabilities}{Total\ Assets}$ $X_3 = \frac{Working\ Capital}{Total\ Assets}$ $X_4 = \frac{Current\ Liabilities}{Current\ Assets}$ X_5 = Binary Score (1 Total Liabilities > Total Assets, 0 otherwise) $X_6 = \frac{Net\ Income}{Total\ Assets}$ $X_7 = \frac{Cash\ Flow}{Total\ Liabilities}$	**Ohlson Value:** Ohlson Value: O > 0.38 "Distress" The company is experiencing financial difficulties. O < 0.38 "Healthy" The company is in a healthy state. The company is experiencing financial difficulties. **O < 0.38 "Healthy"** The company is in a healthy state.

No.	Model	Variable	Financial Distress Zone
		X_8 = Score 1 if Total Liabilities > Total Assets, 0 otherwise $X_9 = \frac{Net\ Income_t + Net\ Income_{t-1}}{Net\ Income_t + Net\ Income_{t-1}}$	

Source: Data processed by the author (2025)

2.4 *Effectiveness of Financial Distress Prediction Model In Geopolitical Crisis*

As mentioned by [12], previous research has focused more on applying prediction models in regions with relatively good economic stability, without considering the influence of external factors such as geopolitical conflicts. The Altman Z-Score model, for example, has been widely used in the manufacturing sector [13], while the Ohlson model is more effectively used in sectors facing long-term financial stress [14]. However, in the context of geopolitical crises such as boycotts due to the Israeli-Palestinian conflict, the effectiveness of these models still needs to be further tested.

2.5 *Research Framework*

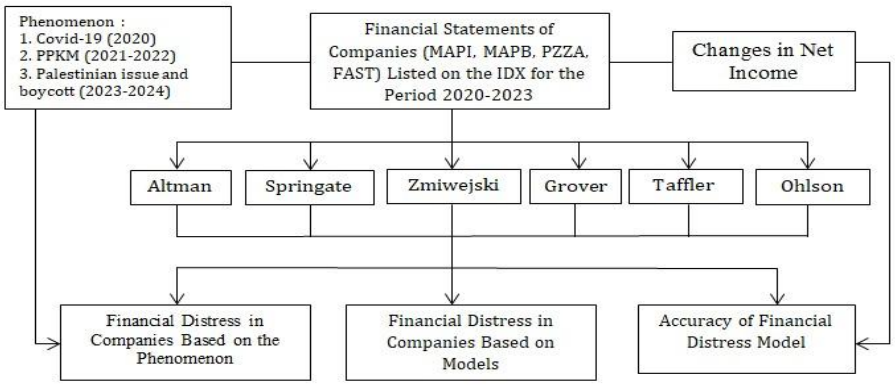

Figure 3. Research Framework

The analysis in this study begins with multidimensional crisis phenomena such as the COVID-19 pandemic, the PPKM policy, and the Palestine issue along with the boycott of pro-Israel products. This research utilizes the financial statements of four food and beverage sector companies (MAPI, MAPB, PZZA, FAST) listed on the Indonesia Stock Exchange (IDX) during the 2020–2023 period to assess the potential for financial distress using six prediction models: Altman, Springate, Zmijewski, Grover, Taffler, and Ohlson. The prediction results are compared with changes in net income to evaluate the accuracy of each model. This framework aims to identify the most appropriate model to use based on the type of crisis faced by each company.

3. RESEARCH METHODS

3.1 *Research Design*

The research method used is quantitative with a causal-comparative design, because it aims to test the effect of geopolitical factors on the accuracy of financial distress prediction models and compare the effectiveness of several different prediction models [11]. This study uses secondary data sourced from the financial statements of food and beverage sector companies affected by the boycott and those listed on the IDX. The main data sources come from financial reports, as well as information from trusted sources, namely the IDX (Indonesia Stock Exchange) and related information from journals and official publications.

3.2 *Sample Population*

The population in this study are

food and beverage companies affected by the boycott due to the Israeli-Palestinian conflict and listed on the IDX, namely: MAPI, MAPB, PZZA, and FAST. The sample selection technique uses purposive sampling, with the criteria that food and beverage companies are included in the boycott list or experience a significant impact and have complete financial reports during the study period. Data is collected through the documentation method, by collecting the necessary financial reports and calculating the financial ratios used in models to measure financial distress, such as Altman Z-Score, Springate, Zmijewski, Taffler, Grover, and Ohlson.

3.3 Data Collection Technique

Data analysis is carried out through descriptive statistics to provide an overview of the company's financial condition taken from 2020 to 2023, as well as predictive analysis with a prediction model of financial distress that has been determined. This study does not only focus on measuring the accuracy of the model, but rather on how the model projects financial distress in companies affected by the geopolitical crisis. Thus, this study provides insight for companies, investors, and policymakers in understanding the possibility of financial distress due to external factors such as boycotts that occur due to geopolitical conflicts [12].

4. RESULTS AND DISCUSSION

4.1 Application of the Financial Distress Model

1) Altman Z-Score Model

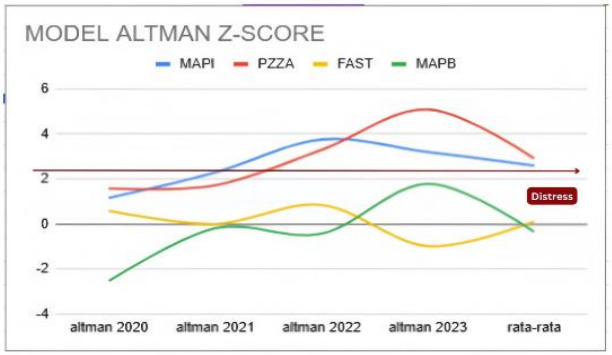

Figure 4. Comparison of Altman Z model scores of MAPI, PZZA, FAST, and MAPB companies in 2020-2023
Source: Data processed by the author (2025)

The graph in Figure 4 shows the results of the Altman Z-Score analysis of four retail companies (MAPI, PZZA, FAST, and MAPB) over the period 2020-2023, finding that MAPI and PZZA showed a significant positive trend. MAPI increased from a score of 1.16 (Grey Zone: $1.1 < Z < 2.6$) in 2020 to 3.20 (Safe Zone: $Z > 2.6$) in 2023, while PZZA went from 1.58 (Grey Zone) to 5.09 (Safe Zone), indicating an improved financial condition and a successful exit from instability to a financially secure position. In contrast, FAST has decreased from 0.59 to -0.98, which means that the company remains in the Distress Zone ($Z < 1.1$), even with worsening conditions and shows a high potential for bankruptcy. MAPB, which started from a negative value of -2.53 (Distress Zone), showed consistent improvement until it reached 1.79 (Grey Zone) in 2023, close to the safe zone threshold.

This classification shows that the Altman Z-Score can provide a picture of the level of bankruptcy risk based on the financial parameters analyzed. These differences in conditions between companies indicate variations in adaptation strategies, such as digital

innovation, cost efficiency, and risk management, which are seen more consistently in MAPI and PZZA than FAST. This finding is in line with previous research which states that the ability to adapt to post-pandemic business dynamics correlates with a relatively high Z score. On the other hand, the difference in MAPB scores indicates the need for a more in-depth study of the factors affecting its financial recovery. In general, the Altman Z-Score has potential as a predictive tool to assess the financial stability of retail companies in Indonesia, although its validity and accuracy need to be further tested through statistical analysis or comparisons with other methods.

The application of the Altman Z-Score model as a bankruptcy prediction instrument to four companies provides varying results. Based on the average value over the last four years, the companies MAPI (2.60) and PZZA (2.92) can be categorized in a healthy financial condition, with scores close to or exceeding the safe threshold of 2.99. In contrast, FAST (0.12) and MAPB (-0.34) show very low and even negative scores, reflecting the existence of high bankruptcy risk. In particular, MAPB experienced significant negative values in some years, indicating less stable financial conditions. Thus, only MAPI and PZZA are assessed to be in a consistently non-distress condition.

2) Springate Model (S-Score)

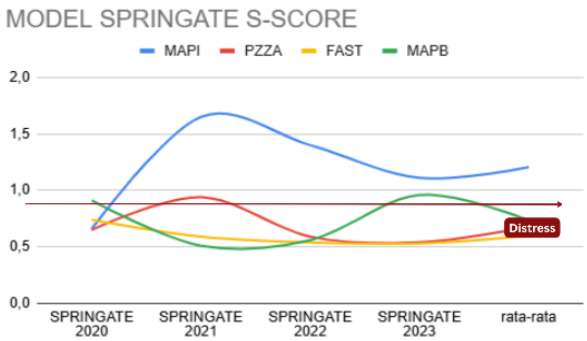

Figure 5. Comparison Springate model (S-Score) of MAPI, PZZA, FAST, and MAPB companies in 2020-2023
Source: Data processed by the author (2025)

The graph in Figure 5 illustrates that the Springate Model (S-Score) analysis from 2020-2023, that MAPI showed a significant upward trend from 2020 (around 0.6) until it peaked in 2021 (around 1.7), which put it in the "Safe" category, then experienced a slight decline but remained above the safe threshold (>1.062) until 2023. This suggests that MAPI is consistently in solid financial condition and far from bankruptcy risk. In contrast, PZZA experienced a rise to the "Grey" category in 2021, but fell back to the "Distress" zone (S < 0.862) in 2022, and has not exited the zone until 2023, signaling a potential financial crisis if not addressed immediately. FAST was consistently in the "Distress" category throughout the period, with the score stabilizing around 0.5, signaling a worrisome financial condition. MAPB fell to its lowest point in 2022 (the "Distress" zone) but rose back to the "Grey" zone in 2023, indicating improvement but not yet complete safety.

Inferentially, the differences in trends between companies indicate differences in financial

management strategies, business resilience, and adaptability to macroeconomic dynamics. When compared to similar studies such as those conducted by [19], which found that most food and retail sector companies belonged to the "Grey" and "Distress" zones during the crisis, these results are quite consistent, especially for PZZA, FAST, and MAPB. The striking difference was seen for MAPI which was able to maintain its "Safe" position, most likely due to its better business diversification strategy and operational efficiency. Hence, these results emphasize the importance of proactive financial management in maintaining a company's financial performance during times of uncertainty.

Through the application of Springate's approach in assessing the financial health of corporations, it was found that out of the four companies reviewed, only MAPI was consistently above the prescribed threshold limit with an average of (1.21), thus can be classified as a financially stable entity. Meanwhile, PZZA (0.68) and FAST (0.60) performed below the threshold during the entire observation period, indicating potential financial distress. As for MAPB, it shows a fluctuating trend, with a value that only exceeds the threshold value once, so overall it remains categorized in distress. This analysis emphasizes the need to pay attention to the dynamics of long-term financial performance to determine the level of risk inherent in each business entity.

3) Zmijewski Model (S-Score)

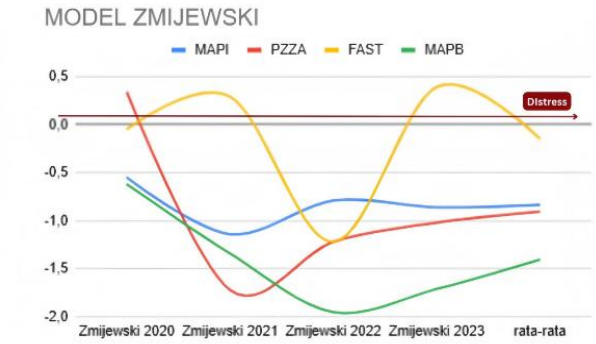

Figure 6. Comparison Zmijewski model (X-Score) of MAPI, PZZA, FAST, and MAPB companies in 2020-2023
Source: Data processed by the author (2025)

Based on the Zmijewski Model (X-Score) graph in Figure 6 which shows that the X-Score values of the four companies (MAPI, PZZA, FAST, MAPB) in the 2020-2023 period, with all companies showing a value of $X < 0$ throughout the period which means that all of them are in "Not Bankrupt" condition or not at risk of financial distress based on the Zmijewski model. However, there are variations between companies in the level of stability of their financial performance. FAST, for example, showed sharp fluctuations with the highest X-value in 2020 (around 0.4) which was close to the "Bankrupt" threshold (>0), then decreased significantly to below zero in 2022 and jumped back to a positive value in 2023 (>0), thus entering the "Bankrupt" category. This indicates that FAST is experiencing financial instability and has the potential to experience distress if not addressed. Meanwhile,

MAPB experienced significant declines in 2021 and 2022 (around -2), indicating severe stress, although it remained in the "Not Bankrupt" zone, and only showed minor improvements in 2023. PZZA also showed the worst condition in 2021 with an X value close to -2, then experienced a gradual recovery in the following years. MAPI is classified as the most stable with an X value that tends to remain constant below zero, signaling strong financial performance and not high risk.

Inferentially, these results suggest that although the companies are not in the "Bankrupt" category, the presence of values approaching or crossing the zero boundary such as FAST in 2023 indicates the importance of continuous monitoring of financial risk factors. Compared to the study by (Sari & Prabowo 2019), which found that the retail and food sectors have a large tendency towards post-pandemic financial risk fluctuations, these results are quite consistent, especially in terms of the instability of FAST and PZZA. However, the difference in results for stable MAPI suggests a possible competitive advantage in cash management, cost efficiency, and growth strategy. Thus, this interpretation using the Zmijewski model underscores the need for a preventive and adaptive approach in corporate financial management to maintain business sustainability.

Based on the evaluation using the Zmijewski approach, all companies analyzed show an average value that is below the distress risk threshold. This reflects a generally stable financial condition and no signs of bankruptcy. However, FAST (-0.15) displays fluctuating dynamics as positive scores appear in certain years, indicating the potential for temporary financial risk. Therefore, FAST needs further attention even though it is not classified as distressed on average. In contrast, MAPI (-0.84), PZZA (-0.91), and MAPB (-1.41) can be positioned in the healthy company classification based on this approach.

4) Grover Model (G-Score)

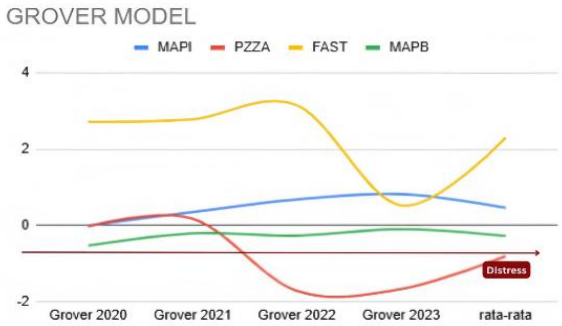

Figure 7. Comparison Grover model (G-Score) of MAPI, PZZA, FAST, and MAPB companies in 2020-2023
Source: Data processed by the author (2025)

Based on the graph depicted in Figure 7 of the Grover Model (G-Score) for the companies MAPI, PZZA, FAST, and MAPB from 2020 to 2023, it can be seen that the company FAST shows a very high G-score from 2020 to its peak in 2022 (around 3.5), which is significantly above the "Not Bankrupt" threshold (G ≥ -0.01), reflecting a very stable financial condition and away from the risk of bankruptcy. However, FAST's G

value declines sharply in 2023, although it is still within the safe zone. MAPI shows a consistently increasing trend from a value close to zero in 2020 to almost touching 1 in 2023, which also signifies a "Not Bankrupt" condition throughout the period. MAPB stabilized around positive but relatively flat values, remaining in the "Not Bankrupt" category. Meanwhile, PZZA was the only company to show a negative trend, with its G value dropping dramatically to below -1 in 2022 and remaining below the "Bankrupt" threshold (G ≤ -0.02) until 2023, signaling that it was under serious financial stress and was classified as unstable.

Inferentially, this data shows that out of the four companies reviewed, only PZZA shows a worrying financial condition according to Grover's model, and this is consistent with the results of Springate and Zmijewski's models which also show a negative trend for PZZA. When compared to other studies, such as the study by [20], which found that food retail companies tend to be more prone to distress when facing macroeconomic crisis, these results are in line especially for the case of PZZA. On the other hand, FAST performed exceptionally well in Grover's model, despite entering the "Bankrupt" zone in Zmijewski's model, indicating that methodological differences between models may result in different classifications depending on the input variables used. This shows the importance of using multiple analysis models to obtain more comprehensive and accurate financial conclusions.

Evaluation using Grover's approach shows variations in financial condition between companies. FAST (2.29) and MAPI (0.46) recorded positive and significant average scores, indicating a relatively healthy financial condition that does not indicate potential bankruptcy in the near future. In contrast, PZZA (-0.81) and MAPB (-0.28) consistently obtained negative scores over the analysis period, signaling the existence of ongoing financial stress. Therefore, based on the results of this model, PZZA and MAPB are classified as companies that are vulnerable to distress, while MAPI and FAST remain in a stable financial position.

5) Taffler Prediction Model

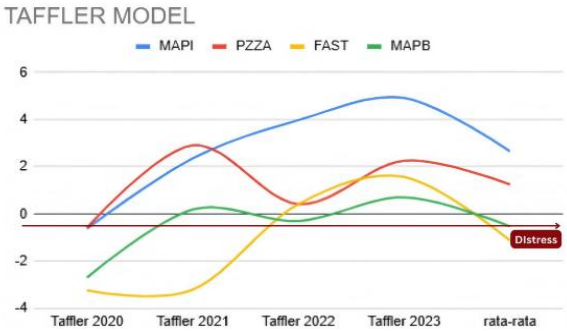

Figure 8. Comparison Taffler Prediction Model of MAPI, PZZA, FAST, and MAPB companies in 2020-2023
Source: Data processed by the author (2025)

Based on the Taffler model graph in Figure 8 which displays the scores for MAPI, PZZA, FAST, and MAPB from 2020 to 2023, we can see that the company MAPI shows stable and significant growth from a score of around 0 in 2020 to more than 4 in 2023, consistently in the "Not

Bankrupt" category (score > 0.2) which reflects very strong financial performance and away from the distress zone. PZZA experienced a sharp increase in 2021 (over 2), then experienced a decline in 2022 but remained above the safety threshold until 2023, signaling a volatile but still healthy performance. In contrast, FAST started from the "Bankrupt" zone in 2020 with a value of around -3.5, indicating a very vulnerable financial condition, but showed a gradual recovery to be just above the safe threshold (around 0.5) in 2023. This reflects a significant improvement in the financial structure. MAPB also started from the distress zone (around -2) but experienced a steady improvement trend to finally enter the safe zone (>0.2) in 2022 and 2023.

Inferentially, all companies show improvement, but with different levels of stability. This finding is consistent with some of the previous model results, especially MAPI which consistently shows superior performance in all bankruptcy prediction models. When compared to research by [21] which states that retail companies that have product diversification and digitalization strategies tend to show better financial resilience, the improved MAPI and FAST results are in line with these findings. The inconsistency between Taffler's model and Zmijewski's model for FAST companies, for example, may be explained by differences in assessment variables: Taffler emphasizes liquidity and operating efficiency, while Zmijewski assesses leverage and profitability. Therefore, the combined use of various models is essential to produce a more comprehensive and valid picture of financial risk.

The Taffler Model-based evaluation of the four companies shows a marked difference in financial condition. MAPI (2.65) and PZZA (1.24) indicate relatively solid financial performance, with average scores exceeding the safety threshold. In contrast, FAST (-1.13) and MAPB (-0.53) display consistently negative results, leading to the conclusion that both are under significant financial stress. Especially FAST, which shows extreme values in the first two years, is of major concern in the context of long-term financial resilience.

6) Ohlson Model

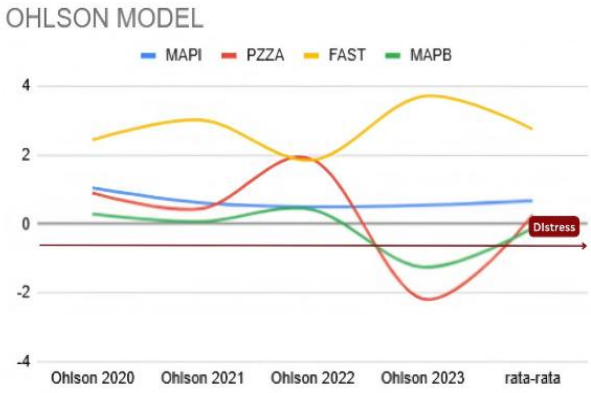

Figure 9. Comparison Ohlson Model of MAPI, PZZA, FAST, and MAPB companies in 2020-2023
Source: Data processed by the author (2025)

Based on the Ohlson model graph in Figure 9 showing the bankruptcy probability values for MAPI, PZZA, FAST, and MAPB

from 2020 to 2023, it can be analyzed that the FAST company consistently shows the highest value throughout the period, increasing from around 2.5 in 2020 to almost 4 in 2023, which is well above the 0.38 threshold, indicating that FAST falls into the "Distress" category and faces a high risk of bankruptcy even though in other models it previously looked healthier. This indicates the different focus of variables in Ohlson's model, such as leverage and operating cash flow. In contrast, MAPI and MAPB remained relatively stable below the value of 1 throughout the period, with a downward trend, but still above the 0.38 threshold in recent years, which puts them at the "Distress" threshold, although not as bad as FAST. Meanwhile, PZZA shows a spike in 2022 and a sharp decline in 2023 to reach a value of around -3, which means it is in the "Healthy" category in 2023.

Inferentially, this data provides a contrasting picture to some previous models, for example the Grover and Taffler model where FAST appears to excel, suggesting that the Ohlson model may be more sensitive to debt burden or cash flow efficiency variables. This finding is not entirely consistent with research such as that conducted by (Pratiwi & Santoso 2020), which states that companies with large assets such as FAST tend to be safe; this discrepancy could be due to non-financial factors such as expansion strategies or operational inefficiencies that are not reflected in other models. Therefore, these results point to the importance of triangulation between models for stronger validation of corporate bankruptcy risk, as well as the need for further analysis of each entity's cost structure and leverage.

Assessment using Ohlson's approach shows that FAST (2.75) and MAPI (0.68) are in the high-risk category of possible distress, as reflected by scores that consistently exceed the critical threshold. In contrast, PZZA (0.26) and MAPB (-0.12) tend to show financial stability, with average scores that are within the safe range. Therefore, based on this modeling, PZZA and MAPB can be considered as entities with low bankruptcy risk.

4.2 Distress Analysis Based on the Phenomenon

1) The Beginning of the COVID-19 Pandemic (2020)

Table 2. Distress Analysis Based on the COVID-19 Phenomenon

Condition	Altman	Springate	Zmijewski	Grover	Taffler	Ohlson	Average
Financial Distress	2 (50%)	3 (75%)	0	3 (75%)	4 (100%)	3 (75%)	63%
Non Fin. Distress	2 (50%)	1 (25%)	4 (100%)	1 (25%)	0	1 (25%)	38%

Source: Author's Data Processing

Based on data from the initial period of the Covid-19 pandemic (2020), there was an average of 63% of companies (MAPI, PZZA, FAST, and MAPB) experiencing financial distress during the beginning of the COVID-19 pandemic in 2020. This percentage is calculated as an average of several prediction models such as Altman, Springate, Taffler, and Ohlson, with the highest result reaching 100% (Taffler) and the lowest 50% (Altman). These high percentages

indicate that the majority of companies faced significant financial stress during the period. Meanwhile, only 38% of companies were categorized as non-financial distress, indicating that the pandemic had an uneven impact, but tended to worsen the financial condition of most companies. A study by [22] in the Journal of Public Affairs stated that the COVID-19 pandemic increased the financial vulnerability of companies, especially in sectors that depend on physical activity or global supply chains. This is in line with the findings of the data above, where most companies experienced financial stress during 2020. In addition, research by [23] in Finance Research Letters also confirms that market instability and decreased profitability during the pandemic contributed to the increased risk of financial distress in various economic sectors. Thus, the data and related literature reinforce that COVID-19 is a critical factor that triggers financial distress in companies, including in the case of MAPI, PZZA, FAST, and MAPB.

2) **PPKM (Enforcement of Restrictions on Community Activities) (2021-2022)**

Table 3. Distress Analysis Based on PPKM Phenomenon

Condition	Altman	Springate	Zmijewski	Grover	Taffler	Ohlson	Average
Financial Distress	4 (50%)	5 (62.5%)	0%	5 (62.5%)	3 (37.5%)	7 (87.5%)	50%
Non Fin. Distress	4 (50%)	3 (37.5%)	8 (100%)	3 (37.5%)	5 (62.5%)	1 (12.5%)	50%

Source: Author's Data Processing

Based on data from the PPKM period (2021-2022), 50% of companies (MAPI, PZZA, FAST, and MAPB) experienced financial distress, with the highest percentage reaching 87.5% (Ohlson model) and the lowest 0% (Zmijewski). This average indicates that half of the companies faced financial distress during the implementation of the PPKM policy, while the remaining 50% were classified as non-financial distress. Although the percentage is lower than in the early pandemic period (63% in 2020), it still reflects the significant impact of PPKM on companies' financial stability, especially as variations in model results indicate vulnerabilities in some sectors or aspects of operations. The phenomenon of PPKM (Enforcement of Restrictions on Community Activities) as a follow-up policy to handling COVID-19 affects financial distress through restrictions on business operations, a decrease in people's purchasing power, and uncertainty about the duration of the policy. Based on data from the PPKM period (2021-2022), 50% of companies (MAPI, PZZA, FAST, and MAPB) experienced financial distress, with the highest percentage reaching 87.5% (Ohlson model) and the lowest 0% (Zmijewski). This average indicates that half of the companies faced financial distress during the implementation of the PPKM policy, while the remaining 50% were classified as non-financial distress. Although the percentage is lower than in the early pandemic period (63% in 2020), it still reflects the significant impact of PPKM on companies' financial stability,

especially as variations in model results indicate vulnerabilities in some sectors or aspects of operations. The phenomenon of PPKM (Enforcement of Restrictions on Community Activities) as a follow-up policy to handling COVID-19 affects financial distress through restrictions on business operations, a decrease in people's purchasing power, and uncertainty about the duration of the policy.

3) Palestinian Issue and Pro-Israel Product Boycott (2023)

Table 4. Distress Analysis Based on Palestinian Issue and Pro-Israel Product Boycott

Condition	Altman	Springate	Zmijewski	Grover	Taffler	Ohlson	Average
Financial Distress	1 (25%)	2 (50%)	1 (25%)	4 (100%)	0	3 (75%)	46%
Non Fin. Distress	3 (75%)	2 (50%)	3 (75%)	0	4 (100%)	1 (25%)	54%

Source: Author's Data Processing

Based on the data for the period of the Palestine-Israel Issue and Pro-Israel Product Boycott (year 2023), 46% of companies (MAPI, PZZA, FAST, and MAPB) experienced financial distress, with the highest percentage variation reaching 100% (Grover model) and the lowest 0% (Ohlson). This average indicates that almost half of the companies faced financial distress during the geopolitical conflict period. Meanwhile, 54% of companies were classified as non-financial distress, indicating that the impact was uneven, but still significant for some companies, especially those directly related to the boycott issue or geopolitical exposure. The phenomenon of the Palestinian-Israeli Issue and the boycott of pro-Israeli products have the potential to affect financial distress through decreased consumer demand, damage to brand reputation, and supply chain disruption. The study by [24] in the Journal of International Business Studies states that political-based boycotts can reduce the revenue of companies that are considered to be associated with controversial parties, especially in the retail and technology sectors. This is in line with the data above, where some companies experienced a decrease in financial stability. In addition, research [25] in the Global Strategy Journal explains that geopolitical conflicts increase operational risks and adaptation costs, such as changes in marketing strategy or supply chain relocation, which lead to liquidity pressures. This finding is consistent with the average financial distress of 46%, suggesting that the Palestine-Israel issue contributes to corporate financial instability, although the degree depends on the sector and the company's involvement in the issue. Thus, the data and related literature confirm that conflict and pro-Israel product boycotts are external factors that exacerbate financial distress in certain companies during 2023. Based on the pattern of the average decline in financial distress in the group of companies in the sample from the Covid-19 pandemic period to the PPKM period, which managed to fall by around 13%, the company should have been able to improve its financial condition better in that year, but in fact it only fell by an average of 4%.

4.3 Model Accuracy Analysis Based on Net Income Changes

Table 5. Model Accuracy Analysis Based on Net Income Chages

Model	2020	2021	2022	2023	Average
Altman	50%	100%	50%	50%	63%
Springate	75%	100%	50%	75%	75%
Zmijewski	0%	50%	25%	50%	31%
Grover	50%	25%	75%	25%	44%
Taffler	100%	75%	25%	25%	56%
Ohlson	75%	25%	75%	100%	69%
Average	58%	63%	50%	54%	

Source: Author's Data Processing

In 2020, the Taffler model recorded the highest accuracy with an accuracy value of 100%, followed by Springate and Ohlson. Taffler's high performance may be due to its ability to assess short-term liquidity and profitability, which are critical during sudden economic shocks such as lockdowns. The COVID-19 pandemic caused a sharp drop in revenue and liquidity pressures, making models that focus on cash and debt ratios (such as Taffler) more relevant. The study [22] mentions that the pandemic increased reliance on liquidity metrics to predict bankruptcy.

Springate and Altman models are consistent with 100% (2021) and 50% (2022) accuracy during KDPM. Springate, which integrates net income and working capital, may effectively measure the impact of prolonged restrictive policies on company operations. PPKM prolongs fixed cost pressures and decreases demand, so models that consider sustainable profitability (Altman) and operational efficiency (Springale) are more adaptive. Research [26] shows that PPKM increases medium-term liquidity risk, which is in line with the performance of this model.

In 2023, during the Palestine-Israel and Boycott issues, Ohlson's model excelled with 100% correct identification, followed by Springate at 75%. Ohlson, which uses logistic regression to predict bankruptcy, may be more sensitive to reputational damage and market changes due to product boycotts. Geopolitical conflicts tend to affect market exposure and consumer loyalty, so the probability-based model (Ohlson) is better able to capture indirect risks. The study [25] confirms that geopolitical uncertainty increases the complexity of financial distress prediction, which requires a multifactor approach such as Ohlson.

Based on total accuracy (2020-2023), the Springate model is the highest (75%), followed by Ohlson (69%) and Altman (63%%). Springate's consistent performance across all years shows its superiority in integrating liquidity, profitability, and leverage variables. Critical factors during a multidimensional crisis (pandemic, restrictive policies, and geopolitics). Meanwhile, Zmijewski (31%) and Grover (44%) are less effective, possibly due to limitations in capturing non-financial external dynamics such as boycotts or reputation. External phenomena (COVID-19, PPKM, geopolitical conflicts) significantly affect the accuracy of financial distress models, depending on the model's ability to reflect the specific pressures in each period. Springate is the most accurate model overall due to its consistency in various crisis scenarios, although Ohlson is superior in 2023, which is full of geopolitical complexity.

4.4 Discussion

For researchers in finance, these findings expand insights into the

effectiveness of financial distress prediction models in the context of geopolitical crises, highlight the need for integration of external variables such as boycotts into traditional analysis, and encourage the development of more adaptive hybrid models. Researchers in other fields such as international relations or sociology can utilize these results to understand the indirect impact of geopolitical conflicts on microeconomic stability, while the general public can be more aware of how boycott movements affect corporate sustainability and national economic resilience.

Based on the application of six financial distress models (Altman Z-Score, Springate, Zmijewski, Grover, Taffler, and Ohlson) on four food and beverage sector companies (MAPI, MAPB, PZZA, FAST), there are variations in risk classification. MAPI is predicted to be non-distress by 4 models (Altman, Taffler, Grover, Zmijewski) and distress by 2 models (Springate, Ohlson), with a percentage of 67% non-distress and 33% distress. Meanwhile, FAST predicted distress by 4 models (Altman, Springate, Ohlson, Zmijewski) and non-distress by 2 models (Grover, Taffler), or 50% distress and 50% non-distress. MAPB and PZZA show a similar distribution, with an average of 58% of firms classified as distress and 42% non-distress by all models. This reflects the inconsistency of the results due to the different variables and focus of analysis of each model.

In 2020, the Taffler model recorded the highest accuracy (100%) in predicting financial distress during the COVID-19 pandemic. This performance was driven by its ability to assess short-term liquidity and profitability, which are critical during lockdowns and sudden revenue declines. [22]study states that liquidity pressures during the pandemic increase the relevance of cash/debt ratio-based models such as Taffler. In the PPKM period (2021-2022), Springate and Altman show consistency with 100% (2021) and 50% (2022) accuracy. Springate effectively measures the impact of restrictive policies through the integration of net income and working capital, while Altman is relevant in assessing sustainable profitability amid fixed cost pressures [26]. In 2023, when the Palestinian issue and pro-Israel product boycotts are rife, Ohlson's model excels with 100% accuracy due to its sensitivity to non-financial factors such as brand reputation and changes in consumer demand. Geopolitical conflicts increase the complexity of predictions, making multifactor probability-based models such as Ohlson more [25]. Overall, the selection of prediction models should be tailored to the characteristics of the liquidity crisis for sudden shocks, profitability for medium-term pressures, and probability factors for geopolitical disruptions.

Based on total accuracy (2020-2023), the Springate model is the highest (75%), followed by Ohlson (69%) and Altman (63%). Springate's consistent performance across all years shows its superiority in integrating liquidity, profitability, and leverage variables. Critical factors during a multidimensional crisis (pandemic, restrictive policies, and geopolitics). Meanwhile, Zmijewski (31%) and Grover (44%) are less effective, possibly due to limitations in capturing non-financial external dynamics such as boycotts or reputation. External phenomena (COVID-19, PPKM, geopolitical conflicts) significantly affect the accuracy of financial distress models, depending on the model's ability to reflect the specific pressures in each period. Springate is the most accurate model overall due to its consistency in various crisis scenarios, although Ohlson is superior in 2023, which is full of geopolitical complexity.

5. CONCLUSION

This study confirmed that multidimensional crisis phenomena such as the COVID-19 pandemic, PPKM, and pro-Israel product boycotts significantly affect the risk of financial distress in food and beverage sector companies in Indonesia. The Springate model recorded the highest accuracy (75%) overall, demonstrating its superiority in integrating liquidity, profitability, and leverage variables, which are critical during systemic crises such as the pandemic and PPKM [11]. Meanwhile, Ohlson's model (69%) is more effective in geopolitical contexts such as boycotts, due to its sensitivity to indirect probability and risk variables [25]. These findings provide important managerial implications: first, firms need to prioritize prediction models that match crisis characteristics e.g., liquidity-based models (Altman/Taffler) during sudden economic shocks, and multifactor models (Ohlson) when facing reputational disruption or market changes. Second, product diversification, cost efficiency, and adaptation of operational strategies such as MAPI's are key to financial resilience, especially for companies with high exposure to global supply chains or consumer sentiment. For investors and policymakers, these results emphasize the need for monitoring external dynamics (e.g., boycott movements) and integration of non-financial risk analysis in decision-making.

This study has several limitations, including a sample limited to four companies and a focus on the food-beverage sector, so generalization of findings to other sectors needs caution. In addition, the model used only relies on historical financial data, making it less able to capture qualitative factors such as brand reputation or consumer response to geopolitical issues. The research period (2020-2023) also does not include the long-term impact of boycotts or other crises that may occur. Future research should expand the sample to more companies and sectors, and develop hybrid models that combine financial metrics with non-financial indicators (e.g., social media sentiment analysis or geopolitical risk index). Longitudinal studies with longer periods are also needed to evaluate the effectiveness of the model in dealing with sustained crises. Finally, qualitative approaches such as interviews with managers can enrich the understanding of firms' adaptation strategies amid uncertainty.

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