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## Potencial Bankruptcy: Before and During Covid-19 Pandemic

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### Abstrak

*Penelitian ini bertujuan untuk menganalisis teori Altman Z-Score, Springate, dan Zmijewski dalam menilai tingkat kesehatan keuangan dan mengantisipasi permasalahan potensi kebangkrutan pada sektor makanan dan minuman sebelum Covid-19 pada 2019 dan saat Covid berlangsung pada 2020. Penelitian ini dilakukan pada 10 perusahaan makanan dan minuman dengan metode analisis skor rasio keuangan perusahaan terhadap kinerja keuangan. Metode Altman Z-Score, Springate, dan Zmijewski menggunakan laba, total aset, total hutang, laba sebelum bunga dan pajak, modal, dan penjualan. penurunan keuangan pada tahun 2020 adalah perusahaan bakery, sedangkan perusahaan yang mengalami peningkatan signifikan pada tahun 2020 adalah MYOR. Berdasarkan skor Zmijewski, seluruh perusahaan yang menjadi objek penelitian berada pada kategori sehat dengan skor <0. Penelitian ini dapat membantu perusahaan mengetahui kekuatan dan kelemahan mereka, sehingga mereka dapat mengambil tindakan yang tepat untuk memperbaiki kinerja keuangan mereka.*

**Kata kunci:** kebangkrutan; altman z-score; springate; zmijewski

### Abstract

*This study aims to analyze the theory of Altman Z-Score, Springate, and Zmijewski in assessing the level of financial soundness and anticipating potential bankruptcy problems in the food and beverage sector before Covid-19 in 2019 and when Covid took place in 2020. This research was conducted on 10 food companies and beverages with the method of analyzing the company's financial ratio score to financial performance. The Altman Z-Score, Springate, and Zmijewski methods use profit, total assets, total debt, earnings before interest and taxes, capital, and sales. the financial decline in 2020 was a bakery company, while the company that experienced a significant increase in 2020 was MYOR. Based on Zmijewski's score, all companies that are the object of research are in the healthy category with a score <0. This research can help companies know their strengths and weaknesses, so they can take appropriate actions to improve their financial performance.*

**Keywords:** bankruptcy; altman z-score; springate; zmijewski

## 1. Introduction

The main objective of the company is to generate profits and prosperity for shareholders. The level of profit can reflect the health of the company. Analysis of financial statements can provide information for interested parties to achieve performance conditions and future improvements, this situation could minimize or avoid risks that will arise and have a long-term impact on company performance [17]. Bryan et al. [8] stated the importance of external stakeholders such as lenders or investors to pay attention to risk in making decisions so as to avoid risks that might arise from decisions made. According to Gumparathi, & Manickavasagam [21] financial difficulties referring to situations when a company faces difficulties in paying off its obligations to creditors. In the long run, the financial difficulties of the company can lead to bankruptcy. Analysis of financial health in order to avoid risks and financial difficulties that may occur, can be done using the Altman Z-Score, Springate and Zmijewski. Altman [2] and Zmijewski [20] show that accounting information can predict potential bankruptcy, so companies can take action before it actually happens. Ghosh [11] states that corporate bankruptcy is marked by a prolonged and continuous decline in the company's financial condition. According to Gamayuni [10], the causes of bankruptcy can come from internal and external factors. Adriana and Rusli [1] stated that the party who is aggrieved is the party that has an interest in the company such as investors and creditors.

Food and beverage companies are a subsector of the consumer goods industry. The food and beverage industry is concerned with food security, which is a basic need for everyone. So this sector is very important to maintain its continuity. In the third quarter of 2020, the average sector experienced a contraction of up to -3.49%, but the food and beverage industry was still able to grow at 0.66%. In the second quarter of 2020, the average sector experienced a contraction of up to -5.32%, but the food and beverage industry was still able to grow at 0.22%. And in the first quarter, the food and beverage industry still grew at 3.9% above national economic growth. This means that the growth of the food and beverage sector is still positive amid the economic shocks during the Covid-19 pandemic, although it is still far from normal in general because normally economic growth in the food and beverage sector is in the range of 7% to 9%.

## 2. Literature Review

### 2.1. Bankruptcy

Bankruptcy is the condition of a company that is no longer able to pay its debts [20], [18]. This situation can be seen earlier if the financial statements are analyzed more carefully. Financial ratios are a tool that can be used to assess financial performance and a tool to monitor early indications of an existing company's financial condition. Susanti [18] emphasizes that bankruptcy analysis is one way to avoid bankruptcy by identifying it early or as soon as possible by classifying existing ratios. The bankruptcy analysis model was introduced in the late 1960s, and is still used in recent financial research to represent financial distress and bankruptcy or the risk of default [6]. Bankruptcy analysis is the process of analyzing a company's financial condition to determine whether the company is at risk of bankruptcy or not. There are several bankruptcy analysis models used by financial analysts to determine bankruptcy risk, some of which are: Altman Z-Score Model; Springate Model; Zmijewski Model; Grover Model and Ohlson Model. The selection of the bankruptcy analysis model depends on the needs of financial analysts and the condition of the company being analyzed. However, these models can provide an overview of the risks of corporate bankruptcy and assist analysts in making decisions.

## 2.2. Altman Z-Score

Altman developed a bankruptcy model using 22 financial ratios which can be classified into 5 main groups, namely liquidity, profitability, leverage, market test ratios and activity. The Altman Z score has been used to represent many bankruptcy-related actions. This model classifies companies with a score of  $Z < 1.88$  having the potential to experience serious financial problems (bankruptcy), a score of  $1.88 > Z < 2.7$ , it is classified that the company will experience financial problems if it does not make improvements, if the score is  $2.7 > Z < 2.99$  is classified as having few financial problems and if  $Z > 2.99$ , the company is not experiencing financial problems (healthy). Financial ratios are classified from the components of Working Capital, Retained Earnings, Earning before Interest and Taxes, Book Value of Equity Sales, total assets, and total debt. The assessment of the classification of the assessed financial statements can be seen in the figure below [16]:

**Table 1. Altman's variables and symbols**

| Variables                                       | Symblos | Description  |
|---|---------|--|
| Working capital/<br>total assets                | $X_1$   | Measure the company's net liquidity  |
| Retained earnings/<br>total assets              | $X_2$   | Efficiency related to sales, general and administrative expenses, and other activities |
| EBIT/ total assets                              | $X_3$   | Measure the company's profit from the assets used                                      |
| Market<br>capitalizations/ total<br>liabilities | $X_4$   | The market value of equity to the book value of the liability                          |
| Sales/ total assets                             | $X_5$   | Describes the level of sales that results in assets owned                              |

Source: Nandi et al., (2019)

## 2.3. Springate

The Springate bankruptcy prediction model uses 4 financial ratios selected from 19 available financial ratios sourced from Working Capital, Retained Earnings, Earning before Interest and Taxes, Book Value of Equity Sales, total assets, and total debt. The value limits used to see whether a company is bankrupt are:

- If the Springate value is greater than 0.862 then the company is included in the healthy category, which is an area where the company is said to be safe and not bankrupt.
- If the value of Springate is less than 0.862, then the company is included in the bankruptcy category, which is an area where the company has the potential to experience bankruptcy.

## 2.4. Smijewski

The prediction model produced by Zmijewski in 1983 was the result of 20 years of research that was reviewed. This model produces formulas, namely ROA (Return on Asset), Leverage (Debt Ratio) and Liquidity (Current Ratio). The limit used in this model is 0, where if the value of X is positive, it means that the company has the potential to go bankrupt. Meanwhile, if the company has a negative value of X, the farther the company is from the potential for bankruptcy. So if the score obtained by a company from this bankruptcy prediction model exceeds 0, the company is predicted to have the potential to go bankrupt. Conversely, if a company has a score that is less than 0, the company is not predicted to have the potential to go bankrupt.

### 3. Research Methods

The research was conducted on 10 companies in the food and beverage sector in 2019 and 2020 which are listed on the IDX. Analysis using descriptive. According to Ghozali [14], descriptive research is research that provides an overview or description of data. The sample selection in this study used a purposive sampling technique with the following criteria:

- a) Food and beverage companies listed on the IDX.
- b) Have complete financial reports for the period 2019 and 2020 for 6 months from January 2020 to June 2020. From these criteria, research data is obtained from 10 food and beverage companies with company codes: ALTO, ADES, BTEK, BUDI, CEKA, DLTA, INDF, MLBI, MYOR, ROTI.

#### 3.1. Data Analysis Techniques

The analysis technique is used to describe the condition of the company's performance level with the size of the bankruptcy as information to evaluate the condition of the company and to analyze its impact so that bankruptcy can be avoided as early as possible. The analysis was carried out for the period before the Covi19 in 2019 and the Covid-19 period in 2020 for 6 months using the Altman Z-score model, the Springate model, and the Zmijewski model.

#### 3.2. Altman Z-Score

The technique used by Altman uses multi-discriminant analysis (MDA), which is a statistical technique for analyzing by grouping observations into several groups. This grouping is by identifying financial ratios. This ratio produces a model that can predict companies that have the potential to experience unhealthy finances and potential bankruptcy. The mathematical equation of the Altman Z-Score model [16]; [18] is:

$$Z = 1,2X1 + 1,4X2 + 3,3X3 + 0,6X4 + 1,0X5$$

Information:

X1: Working Capital to Total Asset

X2: Retained Earnings to Total Assets

X3: Earnings before Interest and Taxes to Total Assets

X4: Market Value of Equity to Book Value of debt

X5: Sales to Total Asset

**Table 2. Altman Z-Score Classification**

| Z-Score          | Interpolation  |
|------------------|--|
| $Z > 2,99$       | Healthy, the company does not experience financial problems                |
| $2,7 > Z < 2,99$ | A little financial trouble   |
| $1,88 > Z < 2,7$ | The company will experience financial problems if it does not make repairs |
| $Z < 1,88$       | The company is experiencing serious financial problems                     |

*Source: Nandi et al., (2019)*

#### 3.3. Springate

The bankruptcy prediction model, known as the Springate model, uses 4 financial ratios that are selected based on 19 financial ratios in various literatures so as to distinguish companies that are in a bankrupt or safe zone. The Springate Model [16]; [18] formulated the following:

$$Z = 1.03 A + 3.07 B + 0.66 C + 0.4 D$$

Information:

A: Working Capital/ Total Assets

B: Earnings before Interest and Taxes/ Total Assets

C: Earnings before Taxes/ Current Liabilities

D: Sales/ Total Asset

**Table 3 Springate Classification**

| Z-Score     | Exlanation |
|-------------|------------|
| $Z > 0,862$ | Healthy    |
| $Z < 0,862$ | Bankrupt   |

*Source: Nandi et al., (2019)*

### 3.4. Zmijewski

The prediction model produced by Zmijewski in 1983 was the result of 20 years of research that was reviewed. First published by Zmijewski by conducting research on companies on the American Stock Exchange. The formula used in this study [16] and Susanti, 2016):

$$X = -4,3 - 4,5X_1 + 5,7X_2 + 0,004X_3$$

Where:

X1: ROA (Return on Asset) = Earning After Tax to Total Assets

X2: Leverage (Debt Ratio) = Total Debt to Total Assets

X3: Liquidity (Current Ratio) = Current Assets to Current Liabilities

**Table. 4 Zmijewski Classification**

| Z-Score | Exlanation |
|---------|------------|
| $Z > 0$ | Healthy    |
| $Z < 0$ | Bankrupt   |

Source: Nandi et al., (2019)

## 4. Result and Discussion

### Altman Z- Score Method

Based on the data related to the Altman Z Score model assessment, the values obtained from X1 to X5 can be seen in table 5 below:

**Table 5. Altman Z-Score Methods**

| NO | KODE PT | PERIODE | X1     | X2     | X3     | X4     | X5    | Altman Z Score |
|----|---------|---------|--------|--------|--------|--------|-------|----------------|
| 1  | ALTO    | Dec-19  | -0,021 | 0, 135 | 0,005  | 1,207  | 0,312 | 1,216          |
|    |         | Jun-20  | -0,039 | 0, 146 | 0,005  | 1,169  | 0,141 | 1,017          |
| 2  | ADES    | Dec-19  | 0, 214 | 0,306  | 0, 057 | 2,458  | 0,49  | 2,839          |
|    |         | Jun-20  | 0,286  | 0,259  | 0,055  | 2,357  | 0,391 | 2,693          |
| 3  | BTEK    | Dec-19  | 0,079  | 0,01   | 0,007  | 0,817  | 0,064 | 0,686          |
|    |         | Jun-20  | 0,053  | 0,038  | 0,001  | 0,726  | 0,123 | 0,677          |
| 4  | BUDI    | Dec-19  | 0,002  | 0,127  | 0,034  | 0,27   | 0,471 | 0,927          |
|    |         | Jun-20  | 0,015  | 0,136  | 0,03   | 0,24   | 0,397 | 0,848          |
| 5  | CEKA    | Dec-19  | 0,607  | 0,624  | 0,087  | 3,659  | 1,083 | 5,165          |
|    |         | Jun-20  | 0,658  | 0,683  | 0,053  | 6,855  | 1,198 | 7,232          |
| 6  | DLTA    | Dec-19  | 0,794  | 0,824  | 0,106  | 24,877 | 0,272 | 17,653         |
|    |         | Jun-20  | 0,833  | 0,862  | 0,021  | 25,337 | 0,144 | 17,622         |
| 7  | INDF    | Dec-19  | 0,07   | 0,001  | 0,05   | 1,657  | 0,401 | 1,645          |
|    |         | Jun-20  | 0, 105 | 0, 001 | 0, 054 | 1,273  | 0,381 | 1, 451         |
| 8  | MLBI    | Dec-19  | -0,147 | 0,388  | 0,224  | 18,652 | 0,538 | 12,835         |
|    |         | Jun-20  | -0,107 | 0,341  | 0,032  | 9,395  | 0,23  | 6,322          |
| 9  | MYOR    | Dec-19  | 0,475  | 0,482  | 0,073  | 6,411  | 0,633 | 5,964          |
|    |         | Jun-20  | 0,493  | 5,949  | 0,066  | 6,747  | 0,604 | 13,792         |
| 10 | ROTI    | Dec-19  | 3,773  | 0,332  | 0,024  | 5,06   | 0,339 | 8,446          |
|    |         | Jun-20  | 0,177  | 0,341  | 0,026  | 3,627  | 0,347 | 3,298          |

Source: Data processed, 2020

**Table 6. Z-Score Intepretation**

| No | Company Code | Altman Z-Score | Intepretation |
|----|--------------|----------------|---------------|
|----|--------------|----------------|---------------|

|    |      | Dec - 19 | Jun - 20 |                     |
|----|------|----------|----------|---------------------|
| 1  | ALTO | 1,216    | 1,017    | serious problem     |
| 2  | ADES | 2,839    | 2,693    | not serious problem |
| 3  | BTEK | 0,686    | 0,677    | serious problem     |
| 4  | BUDI | 0,927    | 0,848    | serious problem     |
| 5  | CEKA | 5,165    | 7,944    | healthy             |
| 6  | DLTA | 17,653   | 17,622   | healthy             |
| 7  | INDF | 1,645    | 1,451    | serious problem     |
| 8  | MLBI | 12,835   | 6,322    | healthy             |
| 9  | MYOR | 5,964    | 13,792   | healthy             |
| 10 | ROTI | 8,446    | 3,298    | healthy             |

Source: Data processed, 2020

Based on the table above, according to Altman's model, from 2019 to 2020, companies that fall into the healthy category are CEKA, DLTA, MLBI, MYOR and ROTI. While ADES is included in the problem category but not serious.

#### 4.1. Springate Method

Based on the score results of the Springate method can be seen in table 7 below:

Table 8. Springate Method

| NO | KODE PT | PERIODE | A      | B     | C     | D     | Springate |
|----|---------|---------|--------|-------|-------|-------|-----------|
| 1  | ALTO    | Dec-19  | -0,021 | 0,005 | 0,312 | 0,055 | 0,155     |
|    |         | Jun-20  | -0,039 | 0,005 | 0,141 | 0,051 | 0,066     |
| 2  | ADES    | Dec-19  | 0,214  | 0,057 | 0,49  | 0,229 | 0,744     |
|    |         | Jun-20  | 0,286  | 0,055 | 0,391 | 0,345 | 0,849     |
| 3  | BTEK    | Dec-19  | 0,079  | 0,007 | 0,064 | 0     | 0,128     |
|    |         | Jun-20  | 0,053  | 0,001 | 0,123 | 0,179 | 0,224     |
| 4  | BUDI    | Dec-19  | 0,002  | 0,034 | 0,471 | 0,027 | 0,313     |
|    |         | Jun-20  | 0,015  | 0,03  | 0,397 | 0,018 | 0,279     |
| 5  | CEKA    | Dec-19  | 0,607  | 0,087 | 1,083 | 0,551 | 1,688     |
|    |         | Jun-20  | 0,658  | 0,053 | 1,198 | 0,664 | 1,758     |
| 6  | DLTA    | Dec-19  | 0,794  | 0,106 | 0,272 | 1,125 | 1,994     |
|    |         | Jun-20  | 0,833  | 0,021 | 0,144 | 0,393 | 1,24      |
| 7  | INDF    | Dec-19  | 0,07   | 0,05  | 0,401 | 0,172 | 0,499     |
|    |         | Jun-20  | 0,105  | 0,054 | 0,381 | 0,172 | 0,541     |
| 8  | MLBI    | Dec-19  | -0,147 | 0,224 | 0,538 | 0,412 | 1,024     |
|    |         | Jun-20  | -0,107 | 0,032 | 0,23  | 0,045 | 0,11      |
| 9  | MYOR    | Dec-19  | 0,475  | 0,073 | 0,633 | 0,293 | 1,159     |
|    |         | Jun-20  | 0,493  | 0,066 | 0,604 | 0,449 | 1,249     |
| 10 | ROTI    | Dec-19  | 3,773  | 0,024 | 0,339 | 0,293 | 4,289     |
|    |         | Jun-20  | 0,177  | 0,026 | 0,347 | 0,092 | 0,462     |

Source: Data Processed

Table 9. Springate Intepretation

| No | Company Code | Springate | Intepretation |
|----|--------------|-----------|---------------|
|----|--------------|-----------|---------------|

|    |      | Dec - 19 | Jun - 20 |                 |
|----|------|----------|----------|-----------------|
| 1  | ALTO | 0,155    | 0,066    | serious problem |
| 2  | ADES | 0,744    | 0,849    | serious problem |
| 3  | BTEK | 0,128    | 0,224    | serious problem |
| 4  | BUDI | 0,313    | 0,279    | serious problem |
| 5  | CEKA | 1,688    | 1,758    | healthy         |
| 6  | DLTA | 1,994    | 1,240    | healthy         |
| 7  | INDF | 0,499    | 0,541    | serious problem |
| 8  | MLBI | 1,024    | 0,110    | serious problem |
| 9  | MYOR | 1,159    | 1,249    | healthy         |
| 10 | ROTI | 4,289    | 0,462    | serious problem |

Source: Data processed, 2020

Based on the table above, from 2019 to 2020, of the 10 companies studied, only three companies were included in the healthy category based on the Springate method, namely CEKA, DLTA and MYOR.

#### 4.2. Zmijewski

Based on the score results of the Zmijewski method can be seen in table 10 below:

**Table 10. Zmijewski Method**

| NO | KODE PT | PERIODE | EATTA | TDTA  | CACL   | Zmijewski |
|----|---------|---------|-------|-------|--------|-----------|
| 1  | ALTO    | Dec-19  | 0,007 | 0,655 | 0,884  | -0,593    |
|    |         | Jun-20  | 0,01  | 0,662 | 0,799  | -0,569    |
| 2  | ADES    | Dec-19  | 0,037 | 0,309 | 2,004  | -2,696    |
|    |         | Jun-20  | 0,049 | 0,257 | 2,71   | -3,044    |
| 3  | BTEK    | Dec-19  | 0     | 0,569 | 1,753  | -1,048    |
|    |         | Jun-20  | 0,028 | 0,611 | 1,344  | -0,936    |
| 4  | BUDI    | Dec-19  | 0,008 | 0,572 | 1,006  | -1,074    |
|    |         | Jun-20  | 0,005 | 0,554 | 1,041  | -1,165    |
| 5  | CEKA    | Dec-19  | 0,066 | 0,188 | 4,8    | -3,507    |
|    |         | Jun-20  | 0,049 | 0,125 | 7,944  | -3,776    |
| 6  | DLTA    | Dec-19  | 0,099 | 0,149 | 8,05   | -3,865    |
|    |         | Jun-20  | 0,025 | 0,11  | 12,044 | -3,734    |
| 7  | INDF    | Dec-19  | 0,031 | 0,437 | 1,272  | -1,944    |
|    |         | Jun-20  | 0,034 | 0,445 | 1,376  | -1,906    |
| 8  | MLBI    | Dec-19  | 0,168 | 0,604 | 0,732  | -1,607    |
|    |         | Jun-20  | 0,018 | 0,652 | 0,824  | -0,661    |
| 9  | MYOR    | Dec-19  | 0,044 | 0,48  | 3,429  | -1,747    |
|    |         | Jun-20  | 0,052 | 0,408 | 4,305  | -2,193    |
| 10 | ROTI    | Dec-19  | 0,017 | 0,339 | 16,961 | -2,373    |
|    |         | Jun-20  | 0,013 | 0,42  | 1,843  | -1,953    |

Source: Data processed, 2020

**Table 11. Smijewski Intepretation**

| No | Company Code | Smijewski |          | Intepretation |
|----|--------------|-----------|----------|---------------|
|    |              | Dec - 19  | Jun - 20 |               |
| 1  | ALTO         | -0,59328  | -0,5689  | healthy       |

|    |      |          |         |         |
|----|------|----------|---------|---------|
| 2  | ADES | -2,69591 | -3,044  | healthy |
| 3  | BTEK | -1,04795 | -0,9359 | healthy |
| 4  | BUDI | -1,07442 | -1,1647 | healthy |
| 5  | CEKA | -3,50715 | -3,7763 | healthy |
| 6  | DLTA | -3,86524 | -3,7337 | healthy |
| 7  | INDF | -1,94388 | -1,9063 | healthy |
| 8  | MLBI | -1,6065  | -0,6609 | healthy |
| 9  | MYOR | -1,7474  | -2,1926 | healthy |
| 10 | ROTI | -2,37275 | -1,9531 | healthy |

Source: Data processed, 2020

Based on the results of the calculation score using the Zmjewski model, above all companies used in this study are declared in good health because the value  $Z < 0$  even though the score between 2019 and 2020 the value fluctuates.

### 4.3 Comparison of Bankruptcy Methods

This comparison is to clearly know the score of the three methods that occurred in 2019 and 2020 and see the performance of each company from the score 2 for the reporting period which can be seen in table 12 below:

**Table 11. Comparison of Altman Z-Score, Springate, and Zmijewski Methods in 2019 and 2020**

| KODE<br>PT | 2019               |           |           | 2020               |           |          |
|------------|--------------------|-----------|-----------|--------------------|-----------|----------|
|            | Altman Z-<br>Score | Springate | Zmijewski | Altman Z-<br>Score | Springate | Zmijewsk |
| ALTO       | 1,216              | 0,155     | -0,593    | 1,017              | 0,066     | -0,569   |
| ADES       | 2,839              | 0,744     | -2,695    | 2,693              | 0,849     | -3,044   |
| BTEK       | 0,686              | 0,128     | -1,048    | 0,677              | 0,224     | -0,936   |
| BUDI       | 0,927              | 0,313     | -1,074    | 0,848              | 0,279     | -1,165   |
| CEKA       | 5,165              | 1,688     | -3,507    | 7,232              | 1,758     | -3,776   |
| DLTA       | 17,653             | 1,994     | -3,865    | 17,622             | 1,24      | -3,734   |
| INDF       | 1,645              | 0,499     | -1,944    | 1,451              | 0,541     | -1,506   |
| MLBI       | 12,835             | 1,024     | -1,607    | 6,322              | 0,11      | -0,661   |
| MYOR       | 5,964              | 1,159     | -1,747    | 13,792             | 1,249     | -2,193   |
| ROTI       | 8,446              | 4,289     | -2,373    | 3,298              | 0,462     | -1,963   |

Source: Data processed, 2020

Based on comparisons between the period 2019 and 2020, companies that are experiencing a decline in financial performance which causes financial problems in 2019 and declining in 2020 are ALTO, BTEK, BUDI and INDF, both according to Altman and Springate. For ADES, according to Springate, it is stated that it is experiencing financial problems. Companies that according to both methods are experiencing financial problems are ALTO, BTEK and BUDI companies. According to Altman, Ades' company has not had serious financial problems, but according to Springate, it is experiencing serious problems.

The company that experienced a very high decline in 2020 is ROTI even though it is classified as healthy. This conclusion does not apply according to Zmiejewski's method because all the companies are in good health. Companies in good health according to Altman and Springate in 2019 are: CEKA, DELTA, MLBI, MYOR and ROTI but in 2020 only CEKA, DELTA and MYOR companies. So in 2020 the companies that will experience the impact of the 2019 pandemic are MLBI and ROTI. For companies that experienced a high increase during the Covid-19 pandemic in 2019 compared to 2020, both according to the Altman and Springate methods, is MYOR. MYOR products in the form of candies: Kopiko, Kis, Tamarin, Chocolate:



Choki-Choki, Cereal: Energen, Coffee: Peacock Chicken Coffee, Kopiko, Torabika, Instant noodles: Fancy Noodles, Glass Noodles, Candy: Kopiko, Kis, Tamarin, Beverages: Kopiko 78 ° C, Le Minerale, Biscuits: Better, Danisa, Roma Pucuk Harum, Q Guava, Biscuits, Wafers: Astor, Beng-Beng, Superstar, Zuperrr Cheese, Better, Danisa, Porridge: Super Porridge, Energen milkuat, miduo instant noodles, vitazone. This product is a product that is really needed by the community, so it is not affected by the Covid-19 pandemic

According to Zmiejewski, all companies that are experiencing financial problems are classified as healthy because  $<0$ . The results of the analysis of the three methods have significant differences in calculating the bankruptcy rate prediction using the Altman Z-Score method and the Zmiejewski method. According to Altman, Z-Score companies ALTO, BTEK and BUDI are experiencing serious financial problems because  $Z <1.88$ , but according to Zmiejewski it is declared healthy.

## 5. Conclusions, suggestions and limitations

The calculation results using the score from Altman concludes that companies that have experienced a decline in performance from 2019 to 2020 during the pandemic, both in a healthy condition, safe from bankruptcy and in conditions of financial problems are ALTO, ADES, BTEK, BUDI, INDF, MLBI and ROTI while the 2 companies that experienced a high enough increase in 2020 were MYOR from 5,964 to 13,792. CEKA companies from 5,165 to 7,944 and companies that survive are DLTA from 17,653 to 17,622. This company is classified as healthy, with the main business needs in the form of food and beverages.

The results of calculations using the score from Springate conclude that the companies that experienced a decline in performance from 2019 to 2020 during the pandemic, both in good health and safe from bankruptcy and in conditions of financial problems were ALTO, ADES, BTEK, BUDI, INDF, MLBI companies. , DLTA and ROTI while the 2 companies that experienced an increase in 2020 were MYOR from 1,159 to 1,249. CEKA companies from 1,688 to 1,758 and companies classified as healthy but experiencing a decline in 2020 are DLTA from 1,994 to 1,240. The results of calculations using the score from Zmiejewski concluded that the 10 companies sampled were declared healthy because all scores were below 0. Both in 2019 and 2020.

Companies that are predicted to experience serious or slightly problematic financial problems are expected to be able to manage their financial performance in terms of liquidity, solvency and profitability as the standard financial ratios used to classify the scores from the three methods used. With financial management in terms of liquidity, the company should maintain the availability of available working capital so as not to interfere with the company's operations and manage both short and long term debt. Companies can manage their debts with their assets as collateral for debt and it is hoped that the company can increase sales to generate maximum profit.

However, the Altman Z-Score, Springate, and Zmiejewski methods are all based on financial ratios to assess the company's financial condition. However, financial ratios can be affected by various external factors such as market conditions or government policies, so relying only on financial ratios can result in an inaccurate analysis. Besides that, the Altman Z-Score, Springate, and Zmiejewski methods rely on past financial data to assess the company's financial condition. However, past financial conditions cannot always predict future financial conditions. Therefore, this method can provide inaccurate results when used as the only tool for assessing bankruptcy risk.

Therefore, further research is expected not only to consider financial factors but also non-financial factors in predicting bankruptcy.

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