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# Bankruptcy Prediction Analysis in Goods Sector Companies Primary Consumers Listed on the Indonesia Stock Exchange

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### ABSTRACT

*This study aims to determine there are differences in predicting the bankruptcy of primary consumer goods sector companies listed on the Indonesian stock exchange in 2016-2020 by using the Altman Zscore, Zmijewski and Springate bankruptcy prediction models in predicting corporate bankruptcy and to find out which prediction model is better. accurate in predicting corporate bankruptcy. The number of samples used in this study amounted to 18 companies with five years of observation and sampling technique using purposive sampling method. The data analysis technique used is the Kruskal-Wallis test and the level of accuracy test. The results of this study indicate that there is a significant difference from the results of the Altman Zscore, Zmijewski and Springate bankruptcy prediction models using the Kruskal-Wallis H test. with an accuracy rate of 78%.*

## 1. INTRODUCTION

The outbreak of the Covid-19 pandemic not only has an impact on the public health aspect, it is much broader than that, this pandemic has also resulted in changes in lifestyle, ways of socializing, and disrupting the economy. The disrupted economy of the community coupled with calls to limit mobility outside the home have made it difficult for many business actors, both large and small, to survive. In fact, until the second year of the pandemic, a number of major primary consumer companies in Indonesia have announced that they have experienced losses to the point that they can no longer survive. They cause a lot of outlets closed in various regions. Currently, several companies are showing signs of bankruptcy, which is indicated by the closure of some of their outlets in several places. This can be seen from several businesses in the primary consumer sector that have decided to close their businesses. Companies that have decided to close their business include PT Hero Supermarket Tbk (HERO) which has decided to close all Giant outlets in Indonesia starting at the end of July 2021. This decision was announced by the President Director of Hero Supermarket, Patrik Lindvall, at the end of May 2021.

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**Table 1. Comprehensive Income & Balance Sheet of PT Hero Supermarket Tbk**

(In Millions of Rp)

Description	2020	2019*)	2018	2017	2016
Operating revenues	8.893.785	12.181.025	12.970.389	13.033.638	13.677.931
Gross Profit	2.399.865	3.447.648	3.694.499	3.442.447	3.570.428
Income for the year	(1.214.602)	(28.216)	(1.250.189)	(191.406)	120.588
Profit/(Loss) for the Year Attributable to Owners of the Parent Entity and Non-Controlling Interests	(1.214.602)	(28.216)	(1.250.189)	(191.406)	120.588
Total Comprehensive Profit/(Loss) for the Year	(1.217.805)	(33.179)	(1.257.255)	(259.040)	243.405
Basic Profit/(Loss) per Share (Full Rupiah)	(290)	(7)	(299)	(46)	29
Total assets	4.838.417	6.054.384	6.271.858	7.363.144	7.487.033
Total Liabilities	2.983.729	2.387.822	2.330.370	2.164.401	2.029.250
Total Equity	1.854.688	3.666.562	3.941.488	5.198.743	5.457.783
Net Working Capital	(737.899)	155.338	795.255	543.264	846.299

Source: Annual Report PT. Hero Supermarket Tbk

PT Hero Supermarket Tbk (HERO) has confirmed that it will close all Giant outlets in Indonesia starting at the end of July 2021. Looking at the position of the 2020 financial statements, the company recorded a loss of Rp 1.2 trillion. The loss figure is even worse than in 2019 which was only Rp. 33.18 billion. In addition, the company's revenue with the HERO code also decreased in 2020, and for the whole of 2020 the company's total revenue was Rp. 8.89 trillion (Kompas.com 26/5/2021).

HERO's total revenue decreased compared to 2019. In 2019, HERO's total revenue was Rp 12.18 trillion. The company's cost of revenue in 2020 fell to Rp 8.89 trillion. In 2019, the company's revenue expenditure was recorded at Rp 12.18 trillion. Meanwhile, HERO's operating expenses in 2020 increased to Rp 3.55 trillion.

This figure is higher than Rp3.48 trillion in 2019. In line with that, HERO's financial burden also increased to Rp. 112 trillion in 2020. Even though in 2019 it was only Rp. 4.9 billion. Total liabilities increased from IDR 2.39 trillion at the end of 2019 to IDR 2.98 trillion at the end of 2020. Meanwhile, HERO's total assets fell to IDR 4.83 trillion in 2020. In fact, until the end of 2019, the issuer's total assets reached Rp 6 trillion. (Kompas.com 26/5/2021).

Bankruptcy analysis is carried out to provide early warning of the company's bankruptcy, and the sooner the company realizes the signs of bankruptcy, the better, because management can predict, that is, fix it so that it doesn't happen. According to Adnan (2000), the bankruptcy of a company can be observed and evaluated through the company's financial statement analysis method.

To analyze the signs of a company's bankruptcy, a ratio calculation procedure is needed through the company's financial statements. Related to this, there are several computational models that can be used to predict corporate bankruptcy, namely the Beaver (1966), Altman (1968), Springate (1978), Ohlson (1980) and Zmijewski (1983) models. Previous studies have yielded varying degrees of accuracy. According to Purnajaya & Merkusiwati (2014), the Altman, Springate, and Zmijewski model is a method that is often used to analyze corporate bankruptcy because it is easier to use and also has high accuracy in predicting the potential for bankruptcy of a company. Based on the results of the research that has been done, the results of these studies are different. Prabowo & Wibowo, (2015) show the difference in the results of the company delisting prediction test between the Altman, Zmijewski and Springate models. Then the best delisting prediction model is the Altman model which has an accuracy

value of 71%. Meanwhile, according to Haryani & Sujianto (2017), the Springate S-Score model is the most accurate model for predicting the bankruptcy of Islamic banks in Indonesia.

Research conducted by Arum & Handayani (2018) compares the role of the model Altman (Z-score), Springate (S-Score) and Zmijewski (X-Score) in predicting business bankruptcy (study of textile and apparel companies yielded Altman models, Springate and Zmijewski each have different intersection points and different ratios and coefficients. According to Aprilia (2018); Rahmawati et al., (2020) comparing the Altman Z-score, Zmijewski and Springate models to predict the bankruptcy of companies delisted on the IDX. The model with the most accurate predictions is Zmijewski. Because the Zmijewski bankruptcy prediction model has a calculation result that is close to the bankruptcy standard value.

This study is a replication of previous research by Melina and Susetyo (2021), which looked at the comparative analysis of the Altman, Springate, and Zmijewski models in predicting the bankruptcy of textile and apparel companies. Previous research is different from this study because it uses different subjects and years of research, and the researcher adds data analysis techniques from previous studies. This research started from 2016 to 2020 on primary consumer sector companies in Indonesia listed on the Indonesia Stock Exchange using the Altman Z score, Zmijewski, and Springate calculation models.

## 2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Agency theory is a contractual relationship in which one party (owner, or principal) hires the services of another party (management, agent). The agent has the responsibility to make decisions on behalf of the owner, who is considered the responsible owner. Jensen and Meckling (1976) explain that agency theory is used in corporate governance and shows that companies are legally separate from their shareholders. There are many reasons why an agent or management would not work entirely for the owner, due to conflicts of interest on both sides (Azmi et al., 2018).

### Modified Altman Model

In 1993, Altman changed his formula to calculate the risk of bankruptcy of a company because it was originally only intended for companies in the manufacturing industry. He removed the X5 variable from the formula (sales/total assets), because this ratio can vary significantly between industries with different sized assets. The revised formula has been used to calculate bankruptcy risk for all types of companies, including developing countries that issue bonds (Ramadhani and Lukviarman, 2009).

Over time, Altman made additional adjustments to his model, so that it could applied to all types of companies. Altman's revised model has a 90.9% accuracy rate in predicting bankruptcy one year before the company goes bankrupt. The following is the equation of the altman-z- score model modified by Edward I. Altman (Ramadhani and Lukviarman, 2009):

$$Z = 6,56X1 + 3,26X2 + 6,72X3 + 1,05X4$$

Information:

X1 = Working capital/Total assets

X2 = Retained earnings/Total assets

X3 = Earning before interest and taxes/ Total assets

X4 = Book value of equity/ Book value of total debt

Z = Bankruptcy Index

The category of healthy and bankrupt companies is based on the value of the Altman model, namely:

1. If the Z value <1.1, it is classified as a bankrupt company.
2. If the value of 1.1 < Z < 2.6 then it is classified as a gray area (cannot be determined whether company in good health or bankruptcy).

3. If the Z value > 2.6, it is included in the category of companies that are not bankrupt.

### Zmijewski Models

Zmijewski expands the study of predicting bankruptcy by adding financial ratios as a tool to detect corporate bankruptcy. Financial ratios were selected from previous research on financial ratios. Zmijewski (1984) uses ratio analysis in his forecasting model to measure firm performance, leverage and liquidity.

Using a sample of 75 bankrupt companies and 73 healthy companies to predict between 1972 and 1978, Zmijewski produced a forecasting model that was the result of 20 years of repeated research (Sari, 2015).

So Zmijewski conducted a study based on findings over the past 20 years, reviewing research on predicting bankruptcy. According to Zmijewski's findings, this result is 94.9% accurate (Juliana, 2012). According to Purnajaya, (2014) the Zmijewski models that have been successfully developed are:

$$Z = -4,3 - 4,5X1 + 5,7X2 - 0,004X3$$

Information:

$X1 = \text{Return On Asset}$

$X2 = \text{Debt Ratio}$

$X3 = \text{Current Ratio}$

The cut-off value specified in this model is 0, and if Z is positive it indicates that the company is likely to go bankrupt. At the same time, if a company has a negative Z value, the company is further away from bankruptcy.

### Springate Models

Gordon LV is the founder of the analysis of the bankruptcy prediction model Springate (1978) working by producing a bankruptcy prediction model which is carried out according to the Altman model procedure. Produced a bankruptcy prediction model called the Springate model, using 4 financial ratios selected based on 19 financial ratios from various studies. The model is based on Kok Yung, (2014) with the following formula:

$$S = 1,03A + 3,07B + 0,66C + 0,4D$$

Information:

$A = \text{Working Capital to Total Assets}$

$B = \text{Earnings Before Interest and Taxes to Total Asset}$

$C = \text{Earnings Before Taxes to Current Liabilities}$

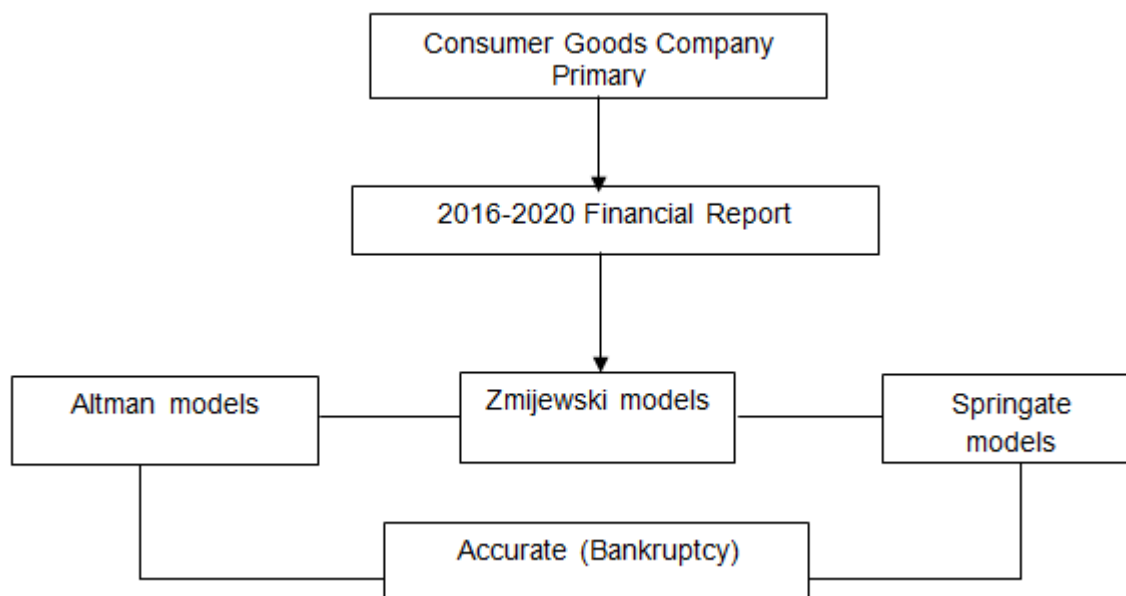
$D = \text{Total Sales to Total Assets}$

Springate produces a company bankruptcy assessment category in 3 categories, namely:

1. If the value of  $S < 0.862$ , the company is in the category of experiencing a serious threat of bankruptcy (bankruptcy).
2. If the value is  $0.862 < S < 1.062$  then the company is in the vulnerable category bankruptcy.
3. If the S value > 1.062, it indicates the company is in a healthy financial condition (not bankrupt).

### Research question

Based on the above discussion as well as empirical studies conducted by previous research, the authors create a conceptual framework as follows:



**Figure 1. Thinking Framework**

As can be seen from the conceptual framework above, the research questions that can be formulated in this study are as follows:

**H1** : There are differences between Altman Z-score, Zmijewski, and Springate models in predict bankruptcy in primary consumer goods sector companies listed on the Indonesia Stock Exchange for the 2016-2020 period.

**H2** : The Zmijewski model is the best model in predicting the bankruptcy of primary consumer sector companies listed on the IDX for the 2016-2020 period.

### 3. RESEARCH METHOD

#### Data Types and Sources

This research is a quantitative research, and is comparative or comparative. This study uses data in the form of secondary data obtained from financial statement data of primary consumer goods sector companies listed on the IDX.

#### Population and Research Sample The

Population in this study are primary consumer goods sector companies listed on the IDX. Determination of the sample in this study using purposive sampling technique, namely determining the sample based on certain criteria or considerations. The sample criteria used are:

1. Primary consumer goods sector companies listed on the IDX in the period 2016- 2020.
2. Companies in the primary consumer goods sector that publish financial reports on a regular basis consistent and has been audited during the 2016-2020 period.
3. Companies in the primary consumer goods sector that use the rupiah currency.
4. Companies in the primary consumer goods sector with a minimum loss of 2 consecutive years during the 2016-2020 period.

**Table 2. Sampling Criteria**

No	Criteria	Amount
1	Primary consumer goods sector listed on the Indonesia Stock Exchange	98
2	Companies that do not publish financial statements consistently during 2016-2020	38
3	Companies that use foreign currency	1
4	Companies that have not experienced losses for 2 consecutive years during 2016-2020	41
<b>Company Sample Quantity</b>		<b>18</b>
<b>Number of Research Observations for 5 years</b>		<b>90</b>

Source: Data processed, 2022

**Table 3. List of Company Research Sample**

No	Code	Company Name
1	ADES	Akasha Wira International Tbk.
2	AISA	FKS Food Sejahtera Tbk.
3	ALTO	Tri Banyan Tirta Tbk.
4	BWPT	Eagle High Plantations Tbk.
5	DLTA	Delta Djakarta Tbk.
6	DPUM	Dua Putra Utama Makmur Tbk.
7	GOLL	Golden Plantation Tbk.
8	GZCO	Gozco Plantations Tbk.
9	HERO	Hero Supermarket Tbk.
10	JAWA	Jaya Agra Wattie Tbk.
11	MBTO	Martina Berto Tbk.
12	MPPA	Matahari Putra Prima Tbk.
13	PSDN	Prasidha Aneka Niaga Tbk
14	SIMP	Salim Ivomas Pratama Tbk.
15	SKBM	Sekar Bumi Tbk.
16	SSMS	Sawit Sumbermas Sarana Tbk.
17	UNSP	Bakrie Sumatera Plantations Tbk
18	UNVR	Unilever Indonesia Tbk.
19	WICO	Wicaksana Overseas International Tbk.

Source: Data processed, 2022

### Data Collection Techniques

The data of this study uses data from the annual financial statements of primary consumer sector companies listed on the IDX for the 2016-2020 period. Data obtained from the website [www.idx.co.id](http://www.idx.co.id).

## 4. RESULTS

Based on the calculation of the table above, it can be obtained that during the 2016-2020 period cumulatively there are primary consumer goods sector companies that fall into

the category of potentially bankrupt, including companies that have the potential to go bankrupt during the 2016-2020 period, namely PT. Gozco Plantations Tbk, PT. Jaya Agra Wattie Tbk and PT. Prasadha Aneka Niaga Tbk. During the 2016-2020 period there were several companies that experienced the gray area category including PT. Tri Banyan Tirta Tbk, PT Eagle High Plantations Tbk, PT. Hero Supermarket Tbk, PT. Martina Berto Tbk, PT. Salim Ivomas Pratama Tbk, PT. Sekar Bumi Tbk, and finally PT Sawit Sumbermas Sarana Tbk. And there are several companies that fall into the category of healthy companies during 2016-2020 there are several companies including PT. Delta Djakarta Tbk and PT. Unilever Indonesia Tbk.

Based on the calculation of the Zmijewski model above, it can be obtained that during the 2016-2020 period using the calculation of the Zmijewski model there are several companies cumulatively included in the category of potentially bankrupt, including PT. FKS Food Sejahtera Tbk, PT Eagle High Plantations Tbk, PT. Gozco Plantations Tbk, PT. Hero Supermarket Tbk, PT. Jaya Agra Wattie Tbk, PT Matahari Putra Prima Tbk, PT Prasadha Aneka Niaga Tbk and PT. Bakrie Sumatera Plantations Tbk. As for the category of healthy companies using the Zmijewski model calculation, there are several companies including PT. PT. Akasha Wira International Tbk, PT. Tri Banyan Tirta Tbk, PT. Delta Djakarta Tbk, PT. Dua Putra Utama Makmur Tbk, PT. Martina Berto Tbk, PT. Salim Ivomas Pratama Tbk, PT. Sekar Bumi Tbk, PT. Sawit Sumbermas Nusantara Tbk, PT. Unilever Indonesia Tbk and PT Wicaksana Overseas International Tbk.

Based on the calculation of the Springate model above, it can be obtained that during the 2016-2020 period by using the calculation of the Springate model, there are several companies that cumulatively fall into the category of potentially bankrupt, including PT. Akasha Wira International Tbk, PT. FKS Food Sejahtera Tbk, PT. Tri Banyan Tirta Tbk, PT. Eagle High Plantations Tbk, PT. Gozco Plantations Tbk, PT Hero Supermarket Tbk, PT. Jaya Agra Wattie Tbk, PT. Martina Berto Tbk, PT. Matahari Putra Prima Tbk, PT. Prasadha Aneka Niaga Tbk, PT. Salim Ivomas Pratama Tbk, PT. Sekar Bumi Tbk, Pt. Sawit Sumbermas Sarana Tbk and PT. Bakrie Sumatera Plantations Tbk. while for the category of healthy companies during the 2016-2020 period using the Springate model, namely the company PT. Unilever Indonesia Tbk and PT. Wicaksana Overseas International Tbk.

Hypothesis testing was conducted to determine whether there was a significant difference in the calculation of bankruptcy in the Altman, Zmijewski, and Springate models of companies. The first hypothesis test uses the Kruskal-Wallis H test. This test is carried out as an alternative to the One Way Anova test when the assumption of normality is not met.

Based on the calculation results of the Kruskal-Wallis H test table above, it is known that the Asymp value. Sig. Zscore, Zmijewski and Springate models are  $0.000 < 0.05$ . Thus, it can be concluded that  $H_0$  is rejected, which means that there is a significant difference between the Altman Z-Score, Zmijewski, and Springate calculation models in predicting the bankruptcy of primary consumer goods sector companies listed on the Indonesia Stock Exchange for the 2016-2020 period.

To determine the level of accuracy can be obtained from the calculation of companies that are not bankrupt. Because in reality the company is still listed on the IDX. Based on the results of research conducted so far, the accuracy of the Altman Zscore model is 38% and the error is 49%. 34 companies were declared healthy, 12 companies were declared bankrupt prone, 44 of which were declared bankrupt potential. The Zmijewski model has 78% accuracy and 22% error and includes details of 70 companies that are declared healthy, 0 companies prone to bankruptcy, and 20 companies declared potentially bankrupt. The Springate model has 39% accuracy and 61% error with details of 35 companies declared healthy, 0 companies prone to bankruptcy, and 55 companies declared potentially bankrupt. Of the three models for calculating the probability of a company's bankruptcy above, the one with the highest accuracy is the Zmijewski model with an accuracy of 78%.

## 5. CONCLUSION

Based on data analysis and hypothesis testing based on the Kruskal-Wallis H test, it shows that there is a significant difference in predicting the bankruptcy of primary consumer goods companies between the Altman Z-Score, Zmijewski and Springate models. From the results of the accuracy test that compares the number of samples studied with the actual status of the company, it was found that the most accurate calculation model is the Zmijewski model with an accuracy of 78%.

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