Comparison of Altman

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Comparison of Altman, Springate, Zmijewski and Grover Models in Predicting Financial Distress on Companies of Jakarta Islamic Index (JII) on 2013-2017

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ABSTRACT

This study aims to determine whether there are differences in the classification between the *Altman, Springate, Zmijewski*, and *Grover* models in predicting *Financial Distress*. The sample in this study is 15 companies incorporated in the Jakarta Islamic Index (JII) with used purposive sampling method. The data analysis techniques used non-parametric statistical tests namely Kruskal Wallis test. The Result of this study is the Difference Classification of *Financial Distress* between the *Altman* Models with *Springate* Models, *Altman* Models with *Grover* Models, *Altman* Models with *Zmijewski* Models, *Springate* Models with *Grover* Models, *Springate* Models with *Zmijewski* Models and No Difference in *Financial Distress* Classification between the Grover Models and the Zmijewski Models. Those could be seen from the results of the Ha6 statistical test which showed the value of sig. 0.156 ≥ 0.05.

Keywords: Financial Distress, Prediction Model

INTRODUCTION

The progress of the economy in a country could be reflected in the level of investment made in the capital market. The existence of the capital market in a country was able to bridge between investors as owners of funds with companies that need funds. Companies can produce and sell the shares to the public to obtain capital, while investors can be an alternative to invest their capital in the capital market (Veronita et al, 2014).

The Southeast Asian region has formed an integrated economic region known as the ASEAN Economic Community (AEC), Indonesia and nine other ASEAN members have entered into very intense competition in the economic field. The emergence of Competition Risk due to the free trade of goods and services. In addition to being an exporting country, Indonesia is also a target for exporters from other countries. The existence of free trade will cause a trade balance deficit if the local industry cannot compete.

The purpose of establishing a company is to obtain profits, therefore the company could grow and survive in the future and avoid liquidity problems. On the contrary, this expectation is not as beautiful as the reality when companies already have quite long flying hours are forced to be dissolved due to financial distress that leads to bankruptcy (Rismawaty, 2012).

Until now, bankruptcy is still a frightening threat that haunts the company due to these was indiscriminately in attacking the company, even the companies that are famous and have high flying hours are not immune from the threat of financial distress like the Kodak company. Kodak is a well-known company that has been in the film, camera and printing industry for more than 125 years. The reason of this company was declared bankrupt was the poor management of the company and the lack of product updates or innovations that caused Kodak companies to lose competitiveness with other companies. Kodak actually has an innovation in the technology of making digital cameras, but Kodak prefers not to launch it first with a reason to develop the photo film roll business. But the market tastes want a digital camera, therefore a late innovation to be

launched due to a strategy error resulted in Kodak having to apply for bankruptcy protection in 2012 and Kodak was declared recovered after paying all its debts of USD 3.4 Billion.

The operational sustainability of a company is very dependent on the available funding sources. Companies that have already go public usually obtain funding by utilizing the capital market. The capital market is a picture of the performance and financial condition of a company. Good financial condition and company performance will be followed by an increase in the price of shares traded on the capital market (Edi and May Tania, 2018).

The Indonesia Stock Exchange (IDX) on January 21, 2015 stated that the shares of PT Davomas Abadi Tbk were officially issued (delisting) from the IDX. PT Davomas Abadi Tbk was officially listed as an issuer on the IDX since December 22, 1994, these means that PT Davomas Abadi Tbk has been operating for ± 20 years. These showed that indiscriminately bankruptcy could be experience by all companies no exception for companies that have long operated. From this condition, the importance of analyzing the occurrence of financial distress is important to do (Barbara, Rahardien, and Desi, 2017).

A financial statement is very vital for a company due to these contained all information about the company that could use by interested parties to notice the performance and financial condition of the company, therefore they could be predicting the financial distress in the future (Eta and Made, 2017).

The importance of bankruptcy analyzing could be a material for companies to make improvements to the company's performance in the future. In addition, investors are also required to conduct financial distress analysis considering that investors also need information from the company's financial statements to determine and make decisions on their investments.

The phenomenon of the weakening of the rupiah is increasingly feared by various parties. Those were estimated that five national banks will be collapse if the rupiah exchange rate weakens to Rp. 15,000. The poor exchange rate of the rupiah against the US dollar caused the banking industry in these country to prepare for the worst. Similar to the economic crisis that occurred in Indonesia at the end of 1998 where the rupiah exchange rate weakened to touch Rp. 18,000 per US dollar resulted in the collapse of dozens of banks. Anticipatory steps have been taken by Irwan Lubis as Deputy Commissioner for Banking Supervision of the Financial Services Authority(OJK) has called banking management regarding the reduction (www.NRMnews.com/Eka Santhika -Editor: A.Dody.R).

Research on the comparative analysis of the Altman, Springate, and Zmijewski models has also been carried out by previous researchers. Among those conducted by Edi and May Tania (2018), all measurement methods used in research have a significant effect which means that all measurement methods *(Altman, Springate, Zmijewski,* and *Grover)* can be used to predict bankruptcy. While the best measurement model in predicting bankruptcy is the Springate model because it has the highest level of accuracy based on the test results of the coefficient of determination that is equal to 69.7% then followed by the Grover, Altman, and Zmijewski models. Elvinna Wiwit Firma Meita (2015) at the Coal Mining Company for the 2012-2014 Period, the results of this study indicate that in predicting the bankruptcy of the Altman Z-Score model and the Springate model has the same high value in predicting bankruptcy with a bankruptcy prediction value of 88.888%. Zmijewski's model with a bankruptcy prediction value of 66.666%. The results of both studies above show that the Altman and Springate models have the same accuracy.

In contrast to previous studies, research on a comparative analysis of the Altman, Springate, and Zmijewski models conducted by Anggi Meiliawati (2016) on cosmetics companies listed on

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the Indonesia Stock Exchange. This study found a significant difference between the Springate model and the Altman Z Score in predicting financial distress given the differences in the ratios used in the calculation of each measurement model. Further findings suggest that the springate model is the most accurate model in predicting financial distress with an accuracy rate of 91.66% higher than the Altman model with a value of 60.41%. The use of the dominant Earning Before Taxes to Current Liabilities (EBTCL) ratio is able to reflect the condition of the company so that it makes the springate model more accurate than the Altman model.

Wahyu Nurcahyanti (2016) at a delisting company on the IDX, the findings show that: 1) Among the Altman Z-score model, the Springate Model and the Zmijewski model have significant differences in predicting bankruptcy, 2) Based on the post hoc test, Altman is the most accurate while based on the type of error, Zmijewski is the most accurate model, 3) Based on the Altman and Zmijewski models there are several companies that are predicted to go bankrupt namely PT. Argo Pantes Tbk, PT. Arpeni Pratama Ocean Line Tbk, PT. Steady Safe Tbk, PT. Bakrie Telkom Tbk and PT. Smartfren Tbk. Veronita, Emrinaldi, and Julita (2014) in their research found that the Ohlson model is the most accurate model in predicting corporate financial distress. In addition Ohlson's model predicts that there are five companies that will experience financial distress in the future.

There are still differences from some of the studies mentioned above, so this study will discuss whether there are differences between the Altman Z-score, Springate, Zmijewski and Grover methods in predicting financial distress.

Research on bankruptcy of a company has been widely carried out in Indonesia. Based on the above problems and the inconsistent results between the Altman, Springate, Zmijewski and Grover Models in analyzing the bankruptcy of companies in the Jakarta Islamic index, the researchers are interested in conducting research with the title "Comparison of the Altman, Springate, Zmijewski and Grover Models in Predicting Financial Distress in Companies in Jakarta Jakarta Islamic Index (JII) in 2013-2017 ".

METHODS

The population in this study is the companies who are listed in the Jakarta Islamic Index during the period of 2013 - 2017, amounts 46 companies. The sampling technique in this study used purposive sampling. The criteria for sample selection are follows:

a. Companies listed in the JII (Jakarta Islamic Index) in 2013-2017.
b. The companies whose has been in the JII (Jakarta Islamic Index) for three years in a row.
c. Companies whose have completed research data during the study period.
d. The financial statements are presented in Rupiah (Rp).

The data used in this research a quantitative secondary data in the form of annual financial statements of JII (Jakarta Islamic Index) companies listed on the Indonesia Stock Exchange (IDX) for the period 2013 - 2017. The data collection method in this study was obtained from the Documentation Data was taken through various internet sites that provided from the official website of the Indonesia Stock Exchange. The data collected in the form of financial statements of the JII (Jakarta Islamic Index) companies were listed on the Indonesia Stock Exchange (IDX) in 2013 - 2017.

The data analysis method in this study used descriptive statistical, normality test, and hypothesis test in the form of the *Kruskal Wallis* test with the assisst of a computer through the IBM SPSS 20 program for windows.

RESULTS AND DISCUSSION

Description of Research Sample

Secondary research data in the form of annual financial statements for the period of 2013 to 2017 from 15 companies included in the Jakarta Islamic Index (JII) which were sampled in the study. Samples were obtained by purposive sampling method based on predetermined criteria. More clearly the sample selection process can be seen in the table below:

Table 1. Research Samples

Criteria	Number
Companies listed on the JII (Jakarta Islamic Index) in 2015-2017	46
The companies which for three years in a row (2015-2017) are not included in the JII Index	(28)
Companies whose financial statements are presented in currencies other than rupiah	(3)
Companies that do not have complete data during the study period	(0)
Number of research samples	15

Based on table 4.1 above it can be seen that the study population numbered 46 companies and shrank to 18 companies and shrank back to 15 companies which were subsequently declared to be research samples. The following is a list of company names that have become research samples as presented in the table below :

Table 2 List of Companies that Become Samples

No.	Code	Company Name
1.	AKRA	PT AKR Corporindo Tbk
2.	ASII	PT Astra International Tbk
3.	BSDE	PT Bumi Serpong Damai Tbk
4.	ICBP	PT Indofood CBP Sukses Makmur Tbk
5.	INDF	PT Indofood Sukses Makmur Tbk
6.	KLBF	PT Kalbe Farma Tbk
7.	LPKR	PT Lippo Karawaci Tbk
8.	LSIP	PT Perush. Perkebunan London Sumatra Indonesia Tbk
9.	PTPP	PT PP (Persero) Tbk
10.	SMGR	PT Semen Indonesia (Persero) Tbk
11.	SMRA	PT Summarecon Agung Tbk
12.	TLKM	PT Telekomunikasi Indonesia Tbk
13.	UNTR	PT United Tractors Tbk
14.	UNVR	PT Unilever Indonesia Tbk
15.	WIKA	PT Wijaya Karya (Persero) Tbk

Source: Indonesia Stock Exchange (Processed, 2018)

Description of Research Data

The following will be presented the results of bankruptcy prediction analysis based on each measurement model as described below.

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a. *Altman* Model Measurement Results (Z-Score)

The results of calculations using the altman model (Z-Score) as shown in the following table.

Table 3. Altman Model Calculation Results (Z-Score) 2013-2017

No.	Code	Category				
		2013	2014	2015	2016	2017
1.	AKRA	Grey Area	Grey Area	Grey Area	Grey Area	Grey Area
2.	ASII	Grey Area	Grey Area	Grey Area	Grey Area	Grey Area
3.	BSDE	Bankrupt	Bankrupt	Bankrupt	Bankrupt	Bankrupt
4.	ICBP	Replete	Replete	Replete	Replete	Replete
5.	INDF	Bangkrut	Bankrupt	Bankrupt	Grey Area	Grey Area
6.	KLBF	Replete	Replete	Replete	Replete	Replete
7.	LPKR	Bankrupt	Bankrupt	Bankrupt	Bankrupt	Bankrupt
8.	LSIP	Replete	Replete	Replete	Replete	Replete
9.	PTPP	Bankrupt	Bankrupt	Bankrupt	Bankrupt	Bankrupt
10.	SMGR	Replete	Replete	Replete	Grey Area	Grey Area
11.	SMRA	Bankrupt	Bankrupt	Bankrupt	Bankrupt	Bankrupt
12.	TLKM	Grey Area	Grey Area	Grey Area	Grey Area	Grey Area
13.	UNTR	Grey Area	Grey Area	Grey Area	Grey Area	Grey Area
14.	UNVR	Replete	Replete	Replete	Replete	Replete
15.	WIKA	Grey Area	Bankrupt	Bankrupt	Bankrupt	Bankrupt

Source: Processed data, 2019

The content of the table above shows that companies in JII that were included in the healthy category during 2013-2017 were ICBP, KLBF, LSIP, and UNVR, while those included in the bankrupt category during 2013-2017 were BSDE, LPKR, PTPP and SMRA. Companies that have occupied the gray area in 2013-2017 are AKRA, ASII, TLKM, and UNTR, meanwhile INDF and WIKA in 2013-2017 have been classified as bankrupt and gray area, while SMGR in 2013-2017 has been included in the category healthy and gray area.

b. *Springate* Model (S-Score) Measurement Results

The results of calculations using the springate model (S-Score) as shown in the following table.

Table 4. Springate Model (S-Score) Calculation Results for 2013-2017

No.	Code	Category				
		2013	2014	2015	2016	2017
1.	AKRA	Replete	Replete	Replete	Bankrupt	Replete
2.	ASII	Replete	Replete	Bankrupt	Bankrupt	Bankrupt
3.	BSDE	Replete	Replete	Bankrupt	Bankrupt	Replete
4.	ICBP	Replete	Replete	Replete	Replete	Replete

5.	INDF	Bankrupt	Replete	Bankrupt	Replete	Replete
6.	KLBF	Replete	Replete	Replete	Replete	Replete
7.	LPKR	Replete	Replete	Replete	Replete	Replete
8.	LSIP	Replete	Replete	Replete	Replete	Replete
9.	PTPP	Replete	Replete	Replete	Bankrupt	Bankrupt
10.	SMGR	Replete	Replete	Replete	Replete	Bankrupt
11.	SMRA	Bankrupt	Replete	Bankrupt	Bankrupt	Bankrupt
12.	TLKM	Replete	Replete	Replete	Replete	Replete
13.	UNTR	Replete	Replete	Replete	Replete	Replete
14.	UNVR	Replete	Replete	Replete	Replete	Replete
15.	WIKA	Bankrupt	Bankrupt	Bankrupt	Bankrupt	Bankrupt

Source: Processed data, 2019

The contents of the table above shows that all companies in JII have been in the healthy category during 2013-2017 except WIKA, while companies in JII that have been in the bankrupt category during 2013-2017 are AKRA, ASII, BSDE, INDF, PTPP, SMGR, SMRA, and WIKA. For 5 years in a row there are 7 companies with healthy categories namely ICBP, KLBF, LPKR, LSIP, TLKM, UNTR, and UNVR, while companies with a bankrupt category for 5 years in a row are WIKA.

c. *Zmijewski* Model Measurement Results (X-Score)

The results of calculations using the zmijewski model (X-Score) as shown in the following table.

Table 5. Zmijewski Model (X-Score) Calculation Results for 2013-2017

No.	Code	Category				
		2013	2014	2015	2016	2017
1.	AKRA	Replete	Replete	Replete	Replete	Replete
2.	ASII	Replete	Replete	Replete	Replete	Replete
3.	BSDE	Replete	Replete	Replete	Replete	Replete
4.	ICBP	Replete	Replete	Replete	Replete	Replete
5.	INDF	Replete	Replete	Replete	Replete	Replete
6.	KLBF	Replete	Replete	Replete	Replete	Replete
7.	LPKR	Replete	Replete	Replete	Replete	Replete
8.	LSIP	Replete	Replete	Replete	Replete	Replete
9.	PTPP	Bankrupt	Bankrupt	Replete	Replete	Replete
10.	SMGR	Replete	Replete	Replete	Replete	Replete
11.	SMRA	Replete	Replete	Replete	Replete	Replete
12.	TLKM	Replete	Replete	Replete	Replete	Replete
13.	UNTR	Replete	Replete	Replete	Replete	Replete
14.	UNVR	Replete	Replete	Replete	Replete	Replete
15.	WIKA	Replete	Replete	Replete	Replete	Replete

Source: Processed data, 2019

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The contents of the table above shows that all companies in JII were in the healthy category during 2013-2017 except PTPP which had been included in the healthy category and also went bankrupt.

d. *Grover* Model Measurement Results

The results of calculations using the Grover model (G-Score) as shown in the following table.

Table 6 Results of the 2013-2017 Grover (G-Score) Model Calculation

No.	Code	Category				
		2013	2014	2015	2016	2017
1.	AKRA	Replete	Replete	Replete	Replete	Replete
2.	ASII	Replete	Replete	Replete	Replete	Replete
3.	BSDE	Replete	Replete	Replete	Replete	Replete
4.	ICBP	Replete	Replete	Replete	Replete	Replete
5.	INDF	Replete	Replete	Replete	Replete	Replete
6.	KLBF	Replete	Replete	Replete	Replete	Replete
7.	LPKR	Replete	Replete	Replete	Replete	Replete
8.	LSIP	Replete	Replete	Replete	Replete	Replete
9.	PTPP	Replete	Replete	Replete	Replete	Replete
10.	SMGR	Replete	Replete	Replete	Replete	Replete
11.	SMRA	Replete	Replete	Replete	Replete	Replete
12.	TLKM	Replete	Replete	Replete	Replete	Replete
13.	UNTR	Replete	Replete	Replete	Replete	Replete
14.	UNVR	Replete	Replete	Replete	Replete	Replete
15.	WIKA	Replete	Replete	Replete	Replete	Replete

Source: Processed data, 2019

The contents of the table above shows that all companies in JII that were sampled in this study were in the healthy category for 5 consecutive years, namely 2013-2017.

Descriptive Statistics

Descriptive statistics of this study describe the mean (maximum), maximum, minimum, and standard deviation of each variable. Descriptive statistical results of the variables of the Altman Model, the Springate Model, the Zmijewski Model, and the Grover Model as shown in the table below:

Table 7 Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Altman	75	0	1	.48	.503
Springate	75	0	1	.73	.445
Zmijewski	75	0	1	.97	.162
Grover	75	1	1	1.00	.000
Valid N (listwise)	75				

Source: test results of SPSS Ver. 20.00

The descriptive statistical results seen in Table 7 above can be explained as follows:

a. The *Altman* model has a total of 75 data with a minimum value of 0, a maximum value of 1, an average value of 0.48 and a standard deviation of 0.503.
b. The *Springate* model has a total of 75 data with a minimum value of 0, a maximum value of 1, an average value of 0.73 and a standard deviation of 0.445.
c. The *Zmijewski* model has a total of 75 data with a minimum value of 0, a maximum value of 1, an average value of 0.97 and a standard deviation of 0.162.
d. The *Grover* model has 75 data with a minimum value of 1, a maximum value of 1, an average value of 1.00 and a standard deviation of 0.000.

Data Normality

Data normality is a mandatory requirement that must be fulfilled in every parametric test. The normality test can be done using various methods, one of them using the Kolmogorov-Smirnov method. A data can be said to be normal if it has a significance value of more than 0.05 (sig.> 0.05). Conversely the data is said to be abnormal if it has a significance value of less than 0.05 (sig. <0.05).

The results of the normality test with Kolmogorov-Smirnov can be seen in the table below:

Table 8 Study results of Kolmogorov-Smirnov

Variabel	Sig.	Probabilitas	Keterangan
Altman	0,000	0,05	Tidak Normal
Springate	0,000	0,05	Tidak Normal
Zmijewski	0,000	0,05	Tidak Normal
Grover	0,000	0,05	Tidak Normal

Source: test results of SPSS ver. 20.00

Normality test results obtained from table 8 can be seen that all variable data have a significance value of less than 0.05 so that the whole can be concluded that the data distribution is not normal. Testing the hypothesis can be done using the *Kruskal Wallis* non parametric test.

Hypothesis Testing

Hypothesis testing is done by non-parametric Kruskal Wallis test. Kruskal Wallis test decision making is done with the provisions if the significance value ≤ 0.05 then H0 is rejected and Ha is accepted, otherwise if the significance value ≥ 0.05 then H0 is accepted and Ha is rejected. The following results of hypothesis testing with the Kruskal Wallis test can be seen as follows:

Table 9 Hypothesis Testing Results

Test	Hypothesis	Provisions	Decisions
Kruskal Wallis Test	Ha_1	Sig. 0,05	Ha_1 accepted
	Ha_2	Sig. 0,05	Ha_2 accepted
	Ha_3	Sig. 0,05	Ha_3 accepted
	Ha_4	Sig. 0,05	Ha_4 accepted
	Ha_5	Sig. 0,05	Ha_5 accepted
	Ha_6	Sig. 0,05	Ha_6 denied

Source: Processed test results of SPSS

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The results of testing the hypothesis using the Kruskal Wallis test in the table above can be explained as follows:

a. First Hypothesis Testing

The results of testing the first hypothesis use the *Kruskal Wallis* test as presented in the following table.

Table 10 First Hypothesis Testing Results

Test Statistics[a,b]

	value
Chi-Square	10.018
df	1
Asymp. Sig.	.002

a. Kruskal Wallis Test
b. Grouping Variable:Method

Source: Processed test results of SPSS

Hypothesis testing results indicate that Ha1 is accepted as evidenced by the value of sig. 0.002 ≤ 0.05, which means that there are differences in classification in predicting *financial distress* between the *Altman* model and the *Springate* model.

b. Second Hypothesis Testing

The results of the second hypothesis testing use the Kruskal Wallis test as presented in the following table.

Table 11 Second Hypothesis Testing Results

Test Statistics[a,b]

	value
Chi-Square	52.351
df	1
Asymp. Sig.	.000

a. Kruskal Wallis Test
b. Grouping Variable:Method

Source: Processed test results of SPSS

Hypothesis testing results show that Ha2 is accepted as evidenced by the value of sig. 0,000 ≤ 0.05, which means that there are differences in classification in predicting *financial distress* between the *Altman* model and the *Grover* model.

c. Third Hypothesis Testing

The results of testing the third hypothesis using the Kruskal Wallis test as presented in the following table.

Table 12 Third Hypothesis Testing Results

Test Statistics[a,b]

	value
Chi-Square	45.644
df	1
Asymp. Sig.	.000

a. Kruskal Wallis Test
b. Grouping Variable:Method

Source: Processed test results of SPSS

Hypothesis testing results indicate that Ha3 is accepted as evidenced by the sig value. 0,000 ≤ 0.05, which means that there are differences in classification in predicting *financial distress* between the *Altman* model and the *Zmijewski* model.

d. Fourth Hypothesis Testing

The fourth hypothesis testing results using the Kruskal Wallis test as presented in the following table.

Table 13 Fourth Hypothesis Testing Results

Test Statistics[a,b]

	value
Chi-Square	22.923
df	1
Asymp. Sig.	.000

a. Kruskal Wallis Test
b. Grouping Variable:Method

Source: Processed test results of SPSS

Hypothesis testing results indicate that Ha4 is accepted as evidenced by the value of sig. 0,000 ≤ 0.05, which means that there are differences in classification in predicting *financial distress* between the *Springate* model and the *Grover* model.

e. Fifth Hypothesis Testing

The results of testing the fifth hypothesis using the Kruskal Wallis test as presented in the following table.

Table 14 Fifth Hypothesis Testing Results

Test Statistics[a,b]

	value
Chi-Square	17.143
df	1
Asymp. Sig.	.000

a. Kruskal Wallis Test
b. Grouping Variable:Method

Source: Processed test results of SPSS

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Hypothesis testing results indicate that Ha5 is accepted as evidenced by the value of sig. 0,000 ≤ 0.05, which means that there are differences in classification in predicting *financial distress* between the *Springate* model and the *Zmijewski* model.

f. Sixth Hypothesis Testing

The results of the sixth hypothesis testing using the Kruskal Wallis test as presented in the following table.

Table 15
Sixth Hypothesis Testing Results

Test Statistics[a,b]

	value
Chi-Square	2.014
df	1
Asymp. Sig.	.156

a. Kruskal Wallis Test

b. Grouping Variable:Method

Source: Processed test results of SPSS

Hypothesis testing results show that Ha6 is accepted as evidenced by the value of sig. 0.156 ≥ 0.05, which means there is no difference in classification in predicting *financial distress* between the *Grover* model and the *Zmijewski* model.

DISCUSSION

Based on the results of testing the hypothesis using the sign test that has been described above can be explained further as follows:

1. **Differences in the *Financial Distress* Classification between the *Altman* Model and the *Springate* model**

   Based on the results of testing the first hypothesis shows the value of sig. 0.002 ≤ 0.05 which means that there are differences in classification in predicting *financial distress* between the *Altman* model and the *Springate* model.

   The results of this study are in accordance with research conducted by Hastuti (2015), Meiliawati and Isharijadi (2016), and Priambodo (2017) which states that the altman model and the springate model have significant differences in predicting financial distress. Likewise Nurcahyanti (2015) and Sujianto (2017), who stated that there are differences in the method between altman, springate and zmijewski in predicting financial distress.

2. **Differences in the *Financial Distress* Classification between the *Altman* Model and the *Grover* model**

   Based on the results of testing the second hypothesis shows the value of sig. 0,000 ≤ 0.05 which means that there are differences in classification in predicting *financial distress* between the *Altman* model and the *Grover* model.

   The results of this study are in accordance with research conducted by Prihantini and Sari (2013). Hastuti (2015), and Priambodo (2017) which states that the altman model and the grover model have different scores in predicting financial distress. Likewise Rahmah (2018) and

Mulyani, Sulindawati and Wahyuni (2019) stated that there were differences in the method between altman z-score, springate, zmijewski and grover in predicting bankruptcy.

3. **Differences in the *Financial Distress* Classification between the *Altman* Model and the *Zmijewski* Model**

   Based on the results of testing the third hypothesis shows the value of sig. 0,000 ≤ 0.05 which means that there are differences in classification in predicting *financial distress* between the *Altman* model and the *Zmijewski* model.

   The results of this study are in accordance with research conducted by Priambodo (2017) which states that the altman model and the zmijewski model have different scores in predicting financial distress for mining companies listed on the Stock Exchange. Likewise Nurcahyanti (2015) and Sujianto (2017) found a difference between the methods between altman, springate, and zmijewski in predicting bankruptcy. Besides Rahmah (2018) and Mulyani, Sulindawati and Wahyuni (2019) also found that there were significant differences between the altman, springate, zmijewski and grover methods in predicting bankruptcy.

4. **Difference in *Financial Distress* Classification between the *Springate* Model and the *Grover* Model.**

   Based on the results of testing the fourth hypothesis shows the value of sig. 0,000 ≤ 0.05 which means that there are differences in classification in predicting *financial distress* between the *springate* model and the *grover* model.

   The results of this study are in accordance with research conducted by Prihantini and Sari (2013) and Priambodo (2017) which state that the springate model and the grover model have significant differences in predicting financial distress. Likewise Rahmah (2018), Khoiriyah (2019), and Mulyani, Sulindawati and Wahyuni (2019) stated that there were differences between the altman, springate, zmijewski, and grover methods in predicting bankruptcy.

5. **Differences in the *Financial Distress* Classification between the *Springate* Model and the *Zmijewski* Model.**

   Based on the results of testing the fifth hypothesis shows the value of sig. 0,000 ≤ 0.05 which means that there are differences in classification in predicting *financial distress* between the *Springate* model and the *Zmijewski* model.

   The results of this study are consistent with research conducted by Isharijadi and Murwani (2017), Priambodo (2017), and Sitepu (2017) which state that the springate model and the zmijewski model have significant differences in predicting financial distress. Likewise Rahmah (2018) and Khoiriyah (2019) who stated the existence of differences in methods between altman, springate, zmijewski, and grover in assessing the financial health of a company.

6. **No Difference in *Financial Distress* Classification between the *Grover* Model and the *Zmijewski* Model**

   Based on the results of the sixth hypothesis testing shows the value of sig. 0.156 ≥ 0.05 which means that there are no classifications in predicting *financial distress* between the *Grover* model and the *Zmijewski* model.

   This research is consistent with the results of research conducted by Meita (2015) which provides the conclusion of the Altman Z-Score model and the springate model is a bankruptcy prediction model that gives the same high value in predicting bankruptcy in

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coal mining companies with a bankruptcy prediction value of 88.89% . However, the results of this study are not consistent with the research conducted by Hikmah and Sulestri (2014) which concluded that there were no differences in the predicted results of the Altman and Ohlson models.

CLOSING

Conclusion

The conclusions that can be drawn from this study are as follows:

1. Differences in *Financial Distress* Classification between *Altman* and *Springate* Models. This can be seen from the results of the Ha1 statistical test which shows the sig value. 0.002 ≤ 0.05.
2. Differences in the *Financial Distress* Classification between the *Altman* Model and the *Grover* Model. This can be seen from the Ha2 statistical test results that show the sig value. 0,000 ≤ 0.05.
3. Differences in the *Financial Distress* Classification between the *Altman* Model and the *Zmijewski* Model. This can be seen from the results of the Ha3 statistical test which shows the sig value. 0,000 ≤ 0.05.
4. Differences in *Financial Distress* Classification between the *Springate* Model and the *Grover* Model. This can be seen from the results of the Ha4 statistical test which shows the sig value. 0,000 ≤ 0.05.
5. Differences in *Financial Distress* Classification between the *Springate* Model and the *Zmijewski* Model. This can be seen from the results of the Ha5 statistical test which shows the sig value. 0,000 ≤ 0.05.
6. No Differences in the *Financial Distress* Classification between the *Grover* Model and the *Zmijewski* Model. This can be seen from the results of the Ha6 statistical test which shows the value of sig. 0.156 ≥ 0.05.

Limitation

Limitations in this study :

1. There is still a lack of measurement methods used in predicting financial distress, which only uses 4 methods, namely altman, springate, zmijewski, and grover.
2. The object in this study uses companies that are included in JII and every year companies that enter JII can be different, the results of this study may be an industrial bias.
3. This study is limited to comparing methods between prediction models, not creating new prediction models.

Suggestion

Suggestions that researchers can propose as well as improvements for future studies include:

1. For the next research or future research it is necessary to consider the industrial sector and should use similar industrial sectors to avoid industrial bias.
2. Adding measurement methods other than the four measurement models that have been used include Fulmer, Fuzzy, Beaver, Zavgren and others.
3. Using other research objects besides the Jakarta Islamic Index (JII) such as manufacturing, services, banking and so on.

4. Using a model other than comparison but more towards finding the right model to measure financial distress in a company.

REFERENCES

Edy dan Tania, may. (2018). *Ketepatan Model Altman, Springate, Zmijewski, Dan Grover Dalam Memprediksi Financial Distress*, Universitas Internasionsl Batam, Vol.8, No.01.

Fatmawati, mila (2012). *Penggunaan The Zmijewski Model, The Altman Model, dan The Springate Model sebagai Prediktor Delisting*. Jurnal Keuangan Dan Perbankan, Vol. 16, No. 1, Januari 2012, hlm.56-65.

Gunawan,Barbara ,Pamungkas,Rahadien dan Susilawati,Desi. (2017). *Perbandingan Prediksi Financial Distress dengan Model Altman, Grover dan Zmijewski*, Universitas Muhammadiyah Yogyakarta, Vol.8, No.01.

Hariyani, Dyah Santi dan Sujianto, Agung. (2017). *Analisis Perbandingan Model Altman, Model Springate, Dan Model Zmijewski Dalam Memprediksi Kebangkrutan Bank Syariah Di Indonesia.* INVENTORY Jurnal Akuntansi, Prodi. Akuntansi – FEB, UNIPMA, Vol. 1, No. 1

Hirawati, Heni. (2017). *Analisis Prediksi Financial Distress Berdasarkan Model Altman Dan Grover Pada Perusahaan Manufaktur Yang Terdaftar Di Bursa Efek Indonesia.* Jurnal Riset Ekonomi Manajemen, ISSN 2086-0668 (cetak) 2337-5434 (online).

Listyarini, Fitri. Aprilyani Rambe, Prima dan Kusasi, Firmansyah. (2016). *Analisis perbandingan Prediksi Kondisi Financial Distrees dengan menggunakan Model Altman,Springate dan Zmijewski pada Perusahaan Manufaktur yang terdaftar di Bursa Efek Indonesia 2011-2014.* Jurnal, Universitas Maritim Raja Ali Haji.

Mulyani, Luh, Sulindawati, Ni Luh Gede Erni dan Wahyuni, Made Arie. (2019). *Analisis Perbandingan Ketepatan Prediksi Financial Distress Perusahaan Menggunakan Metode Altman, Springate, Zmijewski, Dan Grover (Studi Pada Perusahaan Retail Yang Terdaftar Di Bursa Efek Indonesia Periode 2015-2017)*. e-Journal S1 Ak Universitas Pendidikan Ganesha Jurusan Akuntansi Program S1, (Vol: 10 No : 1 Tahun 2019).

Rahmah, Muthia. (2018). *Analisis Model Zmijewski, Springate, Altman Z-Score dan Grover Pada Financial Distress Bank Umum Syariah Di Indonesia Periode 2012-2016.Skripsi,* UIN Syarif Hidayatullah Jakarta.

Sari, Ika A. Isharijadi and Murwani, July. (2017). Comparative Analysis of the Springate and Zmijewski Methods in Assessing the Financial Health of Coal Mining Companies in Bei. The 9th FIPA: Accounting Education Scientific Forum - PGRI Madiun University Vol. 5 No. 1 page 692-702 Madiun, October 2017 e-ISSN: 2337-9723.

Nurcahyanti,wahyu. (2016, Januari).*Studi Komparatif Model Z-Score Altman, Springate Dan Zmijewski Dalam Mengindikasikan Kebangkrutan Perusahaan Yang Terdaftar Di Bei,*Universitas Negeri Padang.

Priambodo, Dimas. (2017). *Analisis Perbandingan Model Altman, Springate, Grover, Dan Zmijewski Dalam Memprediksi Financial Distress (Studi Empiris Pada Perusahaan Sektor Pertambangan Yang Terdaftar Di Bursa Efek Indonesia Periode 2012-2015). Skripsi*, Universitas Negeri Yogyakarta.

Prihantini, Ni Made Evi D dan Ratnasari, M.Maria. (2013). *Prediksi Kebangkrutan Dengan Model Grover, Altman Z-Score, Springate Dan Zmijewski Pada Perusahaan Food And Beverage Di Bursa Efek Indonesia.* E-Jurnal Akuntansi Universitas Udayana 5.2 (2013): 417-435, ISSN: 2302-8556.

p-ISSN: 2477-3328
e-ISSN: 2615-1588

Sari, Ika A. Isharijadi dan Murwani,Juli. (2017). *Analisis Perbandingan Metode Springate Dan Zmijewski Dalam Menilai Kesehatan Keuangan Perusahaan Pertambangan Batubara Di Bei*. The 9th FIPA: Forum Ilmiah Pendidikan Akuntansi - Universitas PGRI Madiun Vol. 5 No. 1 Hlmn. 692-702 Madiun, Oktober 2017 e-ISSN: 2337-9723..

Tri Hastuti, Rini. (2015). *Analisis Komparasi Model Prediksi Financial Distress Altman, Springate, Grover Dan Ohlson Pada Perusahaan Manufaktur Yang Terdaftar Di Bursa Efek Indonesia Periode 2011-2013*. Jurnal Ekonomi/Volume XX, No. 03, November 2015: 446-462.

Wulandari,Veronita. Nur DP,Emrinaldi dan Julita(2014). *Analisis Perbandingan Model Altman, Springate, Ohlson, Fulmer, CA-Score dan Zmijewski Dalam Memprediksi Financial Distress (studi empiris pada Perusahaan Food and Beverages yang Terdaftar di Bursa Efek Indonesia Periode 2010-2012),* Universitas Pekan Baru Indonesia.

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