Analyzing The Potential Bankruptcy of Sharia Life Insurance Companies In Indonesia

Rosalendro Eddy Nugroho, Parwito

Abstract— The research purpose to analyze the potential bankruptcy of sharia life insurance companies in Indonesia using Altman Z-Score, Springate and Zmijewski methods. Moreover, it was conducted to find out the differences of those three methods and determine the accurate method among them. The sampling method used is purposive sampling. The population was 24 sharia life insurances industries and 19 that meet the criteria as sample in the period 2013-2017. This research used three approaches of bankruptcy method, called Altman Z-Score, Springate and Zmijewski and next the comparison test. The results of potential bankruptcy showed that the Altman predicted 4% of sharia life insurances went bankrupt, 7% were in a vulnerable category and 89% were in the healthy category. The Springate predicted the companies went bankrupt was 9% and 91% of companies were in the healthy category. However, Zmijewski's predicted that no companies potentially bankruptcy, in other words all companies were in healthy category. The results of comparison test showed that there were significant differences between Altman and Springate method, Altmand and Zmijewski method, and Springate and Zmijewski method. At last, the most accurate method in predicting sharia life insurance companies was Springate method with 9% accuracy.

Index Terms—bankruptcy method, Altman Z-Score, Springate, Zmijewski

I. INTRODUCTION

In the middle of sharia insurance industries development, a number of sharia insurance companies experiencing bankruptcy such as PT. Asuransi Syariah Mubarakah, PT. Asuransi Tafakul Umum, PT. Asuransi Bumi Asih Jaya, and PT. Asuransi Bumi Putera 1912. Based on that condition, it's important for sharia insurance companies to analyze the potential bankruptcy continuously. In order to know in advance whether the companies will experience bankruptcy or not, they take some preventive steps so that there is no bankruptcy in the future. There are three methods in predicting potential bankruptcy of companies, namely Zmijewski, Altman, and Springate method.

The objectives of this research are: 1) To predict sharia insurance companies which condition are bankrupt or not using three approaches, namely Zmijewski, Altman, and Springate method. 2) To find out the significant differences among Zmijewski, Altman, and Springate method as bankruptcy prediction. 3) To compare those three methods in finding which the most accurate method of all.

Parwito , Master of Management Program, Universitas Mercu Buana, Jakarta, Indonesia
Rosalendro Eddy Nugroho, Master of Management Program, Universitas Mercu Buana, Jakarta, Indonesia

II. LITERATUR REVIEW

According to Hanafi (2013:82), explaining the definition of bankruptcy can be seen from cash flow and stock approaches. By using stock approach, a company will go bankrupt if the total liabilities exceed the total assets. Otherwise, based on cash flow approach, a company will go bankrupt when it cannot generate sufficient cash flow. From the point of view of the stock, the company can be declared bankrupt although it may still generate sufficient cash flow, or have good prospects in the future. Hanafi and Halim (2012:79) also mentioned that the problem can lead bankruptcy is short-term financial difficulties which imply to non-solvable difficulties. That is companies have difficulties in repaying their debt due to limited assets. The non-solvable difficulties cause liquidation and reorganization for the companies. Bankruptcy prediction in this research uses three methods namely, Altman Z-Score, Springate, and Zmijewski methods.

a. *Altman Z-Score* Method

Burhanuddin (2015:75) explained the pioneer of bankruptcy methods is Beaver (1966), continued by Edward Altman with his research is about financial distress. As Beaver's suggestion, at the end of his writing, Altman made multivariate analysis. This kind of method becomes the most popular method in predicting financial distress which is known as Z-Score Method. Altman's research uses step-wise multivariate discriminant analysis method. Since this research takes sharia insurance companies as non-manufacturing companies, so the formula used is a ratio of four, as followed:

$$Z\text{-Score} = 6,56X_1 + 3,26X_2 + 6,72X_3 + 1,05X_4, \text{ Altman} (2015:6)$$

Remarks:
X_1=Working capital/total assets
X_2=Retained earnings/total assets
X_3=Earnings before interest and taxes/total assets
X_4=Market value of equity/book value of total debt
According to Altman, the criteria of bankruptcy are:
$Z_i > 2,90$: classified as healthy companies
$Z_i > 1,20$: classified as bankrupt companies
Z_i 1,20 – 2,90: classified as vulnerable bankrupt, which cannot be said as potentially bankrupt or healthy companies (Hanafi and Halim, 2012:274)

b. *Springate Method*

Burhanuddin (2010:82) stated that Springate developed this kind of prediction method in 1978. In its development, Springate used the same method of Altman, namely Multiple Discriminant Analysis. Firstly, Springate (1978) collected

popular financial ratios which can be used to predict financial distress. The initial ratio was 19 ratios, then after going through the same test as done by Altman (1968), Springate chooses 4 ratios which were believed to be able to distinguish between distress or non-distress companies. Springate took 40 companies in Canada as samples in his research. Those Springate's method (1978) is:

$S = 1,03A + 3,07B + 0,66C + 0,4D$ (Peter and Yoseph, 2011:4)

Remarks:
1. Working capital/total assets (A)
2. Earnings before interest and taxes/total assets (B)
3. Profit before tax/current liabilities (C)
4. Sales/total assets (D)

Criteria:
Cut off that applies in this method is 0,862. If the company has value less than 0,862 the company classified as potential company bankrupt. Meanwhile, if the value is more than 0,862 the company classified as healthy company.

c. *Zmijewski Method*

Zmijewski (1983) used analysis of liquidity ratio, leverage, measurement of company's performance in his prediction method. In analyzing his prediction, Zmijewski took 75 bankrupt companies and 73 healthy companies along 1972 to 1978. F-Test indicator on the ratio of the rate of return, liquidity, leverage turnover, fixed payment coverage, trends, firm size, and stock return volatility, show a significant difference between healthy and potentially bankrupt companies.

This kind of model produces formula as follows:
$Z = -4,3 - 4,5X_1 + 5,7X_2 - 0,004X_3$, (Peter and Yoseph, 2011:4)

Remarks:
1. Profit after tax/ total assets (X_1)
2. Total Debt/ total assets (X_2)
3. Current assets/ current liabilities (X_3)

Criteria:
If the score obtained is more than 0 (zero), the company is predicted to go bankrupt, but if the score obtained is less than 0 (zero), the company is predicted not to have potential bankruptcy.

d. *Framework*

Framework in this research:
1) Explains that each method calculates to obtain their values, then comparing these values based on their respective criteria according to their methods.
2) Performing Average Difference Test among these three methods (Altman Z-Score, Springate, and Zmijewski Methods)
3) Determining which is the most accurate method to predict the bankruptcy of the companies.

III. METHOD

Type of Research

Sugiyono (2014:75) stated that this research methodology is a scientific way used to obtain objective, valid, and reliable data of being able to be discovered, developed, and proven a

certain knowledge so that can be used to understand, solve, and anticipate problems. It is descriptive method used in this research which aims to describe the characteristic of situation or object of the research. This research begins with data collection, quantitative data analysis, and statistical testing (Sugiyono, 2014:207)

Operational Variable Definition

Research variables are things that shape what is defined by the researchers to be studied in order to obtain information about it (Sugiyono 2014:57)

Tabel 1. Variable Operational Definition

Variable	Method	Scale
Altman Z-Score Method (Altman, 2015:6)	X_1= Working capital/total assets X_2=Retained earnings/total assets X_3=Earnings before interest and taxes/total assets X_4=Market value of equity/book value of debt	Ratio
Springate Method (Peter and Yosep, 2011:5)	A=Working capital/total assets B=Earnings before interest and taxes/total assets C=Profit before tax/current liabilities D=Sales/total assets	Ratio
Zmijewski Method (Peter and Yosep, 2011:7)	X_1=Profit after tax/total assets X_2=Total debt/total assets X_3=Current assets/current liabilities	Ratio

Total population used in this research is 24 sharia life insurance listed on Indonesia Stock Exchange in period 2014-2017. The sampling method used is purposive sampling. In addition, 19 companies that meet the sample criteria.

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Tabel 2. The Criteria of Sample

No	Criteria	Total Data
1	Sharia life insurance companies	24
2	Company with incomplete financial statements during the 2013-2017 periods.	(5)
	Total Sampel	19
	Time of reseacrh 2013-2017	
	Total data	**95**

Data Analysis Method

a. *Bankruptcy Method*
Calculation Methods used in this research are: 1) Altman Z-Score Method, 2) Springate Method, 3) Zmijewski Method

b. Descriptive Analysis
Descriptive analysis will provide an overview of data distribution. In a research, descriptive analysis also provides an overview of the data as seen from the average value, standard deviation, maximum, and minimum.

c. Comparative Test

Difference test or comparative tes using *Independent sample t Test* is a test used to determine whether two unrelated samples have different average (Nugroho, 2016:49). The comparative t Test is done by comparing the differences between two average values with the standard error of the average difference between two samples
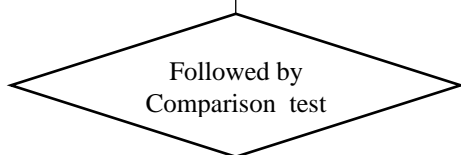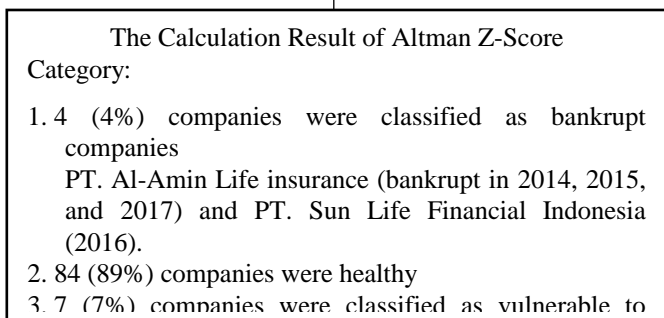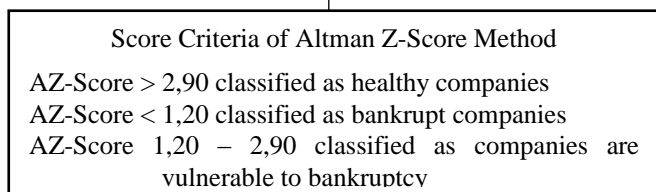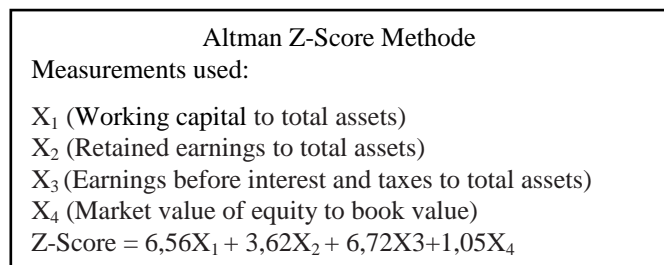
IV. RESULT AND DISCUSSION

There were 19 sharia life insurance companies in Indonesia used in this research for 2013-2017 periods. They consist of full-life sharia insurance companies and sharia units. This research used secondary data taken from those companies' financial statement.

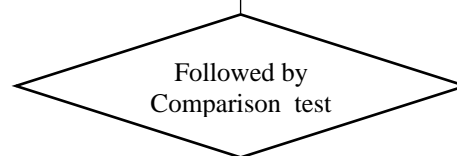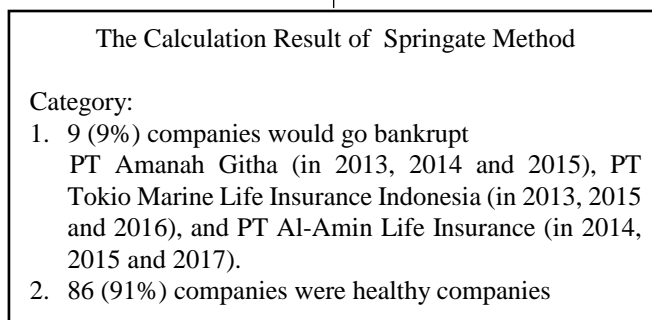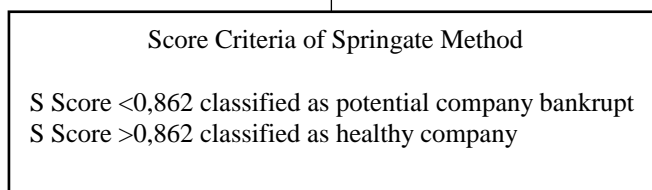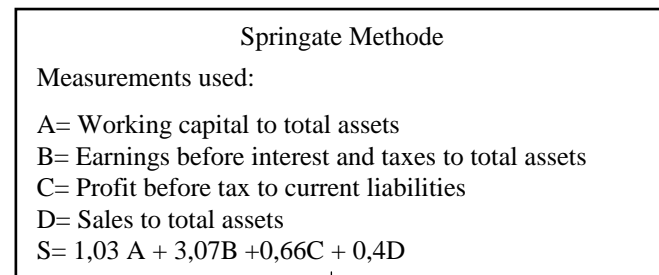a. Bankruptcy Method

1. *Altman Z-Score Method*

Based on Altman Z-Score prediction, total data was 95 companies data where 84 companies were healthy, 4 companies have value Z-score < 1,20 were classified as bankrupt, and 7 companies have Z-Score 1,20 – 2,90 were classified as vulnerable to bankruptcy. According to Altman Z-Score prediction, there are 2 companies were classified as bankrupt companies. They are PT. Al-Amin Life insurance (bankrupt in 2014, 2015, and 2017) and PT. Sun Life Financial Indonesia (bankrupt in 2016).

Altman Z-Score Methode
Measurements used:

X_1 (Working capital to total assets)
X_2 (Retained earnings to total assets)
X_3 (Earnings before interest and taxes to total assets)
X_4 (Market value of equity to book value)
Z-Score = $6,56X_1 + 3,62X_2 + 6,72X3 + 1,05X_4$

Score Criteria of Altman Z-Score Method

AZ-Score > 2,90 classified as healthy companies
AZ-Score < 1,20 classified as bankrupt companies
AZ-Score 1,20 – 2,90 classified as companies are vulnerable to bankruptcy

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The Calculation Result of Altman Z-Score
Category:

1. 4 (4%) companies were classified as bankrupt companies
   PT. Al-Amin Life insurance (bankrupt in 2014, 2015, and 2017) and PT. Sun Life Financial Indonesia (2016).
2. 84 (89%) companies were healthy
3. 7 (7%) companies were classified as vulnerable to

Followed by Comparison test

Picture 1. Altman Z-Score Calculation Results
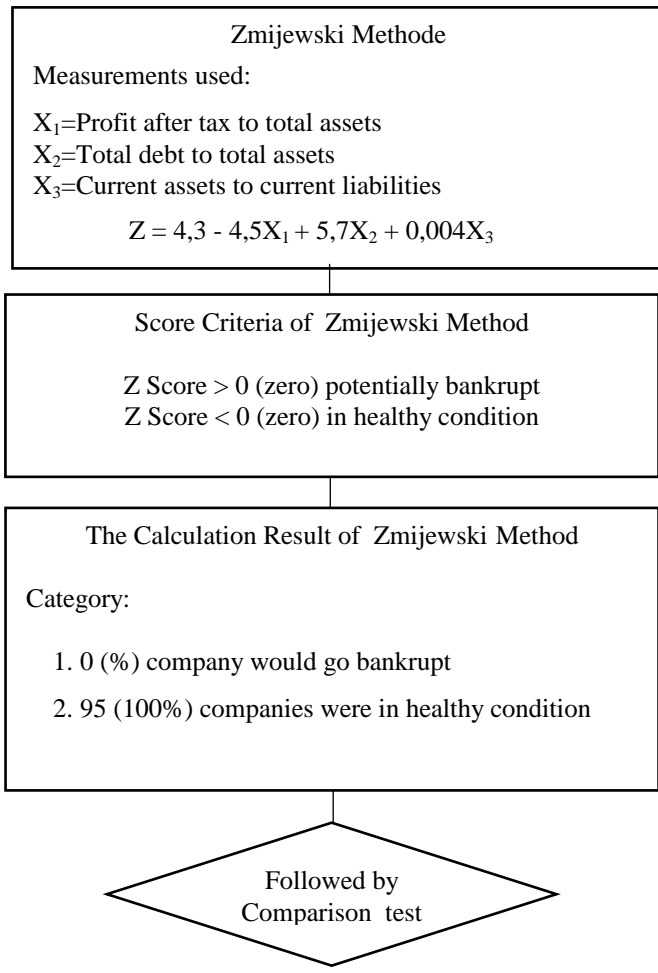Source: Data processed in 2018

2. *Springate Method*

Springate method stated that 86 companies experienced a healthy period from total 95 companies, and 9 companies were predicted to bankrupt. In this method, if the score <0,862 indicates that the company will go bankrupt. They are PT Amanah Githa (in 2013, 2014 and 2015), PT Tokio Marine Life Insurance Indonesia (in 2013, 2015 and 2016), and PT Al-Amin Life Insurance (in 2014, 2015 and 2017).

Springate Methode
Measurements used:

A= Working capital to total assets
B= Earnings before interest and taxes to total assets
C= Profit before tax to current liabilities
D= Sales to total assets
S= $1,03 A + 3,07B + 0,66C + 0,4D$

Score Criteria of Springate Method

S Score <0,862 classified as potential company bankrupt
S Score >0,862 classified as healthy company

The Calculation Result of Springate Method

Category:
1. 9 (9%) companies would go bankrupt
   PT Amanah Githa (in 2013, 2014 and 2015), PT Tokio Marine Life Insurance Indonesia (in 2013, 2015 and 2016), and PT Al-Amin Life Insurance (in 2014, 2015 and 2017).
2. 86 (91%) companies were healthy companies

Followed by Comparison test

Picture 2. Springate Calculation Results
Source: Data processed in 2018

3. *Zmijewski Method*

The calculation result of Zmijewski method used cut-off score. If the score was >0 (zero), the companies were predicted to go bankrupt. However, if the score was <0 (zero), the companies were classified as healthy companies. Based on Zmijewski prediction along these 5 years, the score of 95 data of insurance companies were under 0. It means that all companies were classified as healthy companies and no bankruptcy detected.

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Zmijewski Methode

Measurements used:

X₁=Profit after tax to total assets
X₂=Total debt to total assets
X₃=Current assets to current liabilities

        Z = 4,3 - 4,5X₁ + 5,7X₂ + 0,004X₃
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$$Z = 4,3 - 4,5X_1 + 5,7X_2 + 0,004X_3$$

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Score Criteria of Zmijewski Method

Z Score > 0 (zero) potentially bankrupt
Z Score < 0 (zero) in healthy condition
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The Calculation Result of Zmijewski Method

Category:

1. 0 (%) company would go bankrupt

2. 95 (100%) companies were in healthy condition
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Followed by Comparison test

Picture 3. Zmijewski Calculation Results
Source: Data processed in 2018

b. Results of Descriptive Analysis

1. Altman Z-Score Descriptive Analysis

The mean value for the Altman Z-Score was 39,02 with std. deviation value was 145,68. In 2017, PT Al Amin Sharia Life Insurance was in the minimum value 1,99. Meanwhile, PT Bringin Life Insurance reached the maximum value 1.037,81 in 2013.

Table 4. Altman Z-Score Descriptive Analysis

No	Name	X_1 Current assets/ total assets	X_2 Retained earnings/ total assets	X_3 Earnings before interest and taxes /total assets	X_4 Market value of common /book value	AZ -Score
1	Min	- 0,357	- 1,561	- 0,430	0,248	- 1,99
2	Max	2,469	0,742	0,579	985,860	1.037,81
3	Mean	0,667	0,141	0,077	32,063	39,02
4	Std. Deviation	0,408	0,457	0,159	138,672	145,68

Source: Data processed in 2018

2. Springate Descriptive Analysis

Based on this descriptive analysis, PT Tokio Marine Life Insurance had minimum springate value in 2013 with a value of -16,68. Moreover, the maximum value was 172,43 obtained by PT Bringin Life Insurance in 2013. It means that the mean value was 9,15 and std. deviaton was 17,77.

Tabel 5. *Springate* Descriptive Analysis

No	Name	A Working capital /total assets	B Earnings before interest and taxes/total assets	C Profit before tax/current liabilities	D Sales/ total assets	S-Score
1	Min	- 0,357	- 0,430	- 38,595	0,041	-16,68
2	Max	2,469	0,579	254,500	0,909	172,43
3	Mean	0,667	0,077	4,363	0,240	9,15
4	Std. Deviation	0,408	0,159	26,831	0,214	17,77

Source: Data processed in 2018

3. Zmijewski Descriptive Analysis

It stated that PT Bringin Life Insurance (BRI Life) had minimum value or the highest score with its value was -74,32 in 2013 and the maximum value was obtained by PT Central Asia Raya Life Insurance with the value was -0,03 in 2017. Overall, the mean value was -4,14 with std deviation 7,40.

Tabel 6. *Zmijewski* Descriptive Analysis

No	Name	X_1 Profit after tax/total assets	X_2 Total debt/total assets	X_3 Current assets/current liabilities	Z-Score
1	Min	- 0,466	0,0004	0,368	-74,32
2	Max	0,579	0,654	17.498,000	- 0,03
3	Mean	0,071	0,242	224,372	-4,14
4	Std. Deviation	0,151	0,170	1.792,772	7,40

Source: Data processed in 2018

c. Correlation Analysis

1. Altman Z-Score and Springate Methods

Based on result analysis represented by table 7 of *Levene's Test for Equality of Variances*, the result of F test 12,957 with a significance value of 0,000 (probability < 0,05). Since the probability number <0,05 so H1 is accepted and Ho is rejected. It means, there is a variant difference between Altman Z-Score and Springate methods.

That variance test shows that both of those methods have difference in their variances. Hence, the use of variance to compare the average bankruptcy method (t-test for Equality of Means) in the t-test with the basis of equal variance is not assumed. At equal variance not assumed t value is 1,986 with a probability level of 0,050. The results show that (0,050 <0,050), probability or significance <0,05, H0 is rejected which means that there are significant differences between Altman Z-Score and Springate methods.

Tabel 7. *Independent Samples Test Altman Z-Score* and *Springate Methods*

Independent Samples Test

| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | | |
| | | F | Sig. | t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidence Interval of the Difference | |
									Lower	Upper
Metode	Equal variances assumed	12,957	,000	1,986	188	,048	29,902	15,056	,202	59,602
	Equal variances not assumed			1,986	96,798	,050	29,902	15,056	,019	59,784

Data processed in 2018

2. *Altman Z-Score and Zmijewski Methods*

As shown on Table 8 below, Levene's Test for Equality of Variances have the results of F test 15,293 and a probability value of 0,000 or (0,000 <0,05). Since the probability number <0,05 so H1 is accepted and HO is rejected. It means that there is variant difference between Altman Z-Score and Zmijewski Methods.

The results of bankruptcy test shows that they have difference in their variances, so the use of variance to compare the average bankruptcy method (t-test for Equality of Means) in the t-test is the basis of equal variance is not assumed. At the results of equal variance not assumed, the researchers get t value is 2,886 with a significance level or probability of 0,050. The results show that (0,050 <0,050), probability or significance <0,05, H0 is rejected which means that there are significant differences between Altman Z-Score and Zmijewski methods.

Tabel 8. *Independent Samples Test Altman Z-Score* and *Zmijewski*

Independent Samples Test

| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | | |
| | | F | Sig. | t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidence Interval of the Difference | |
									Lower	Upper
Metode A-Z	Equal variances assumed	15,293	,000	2,886	188	,004	43,188	14,964	13,669	72,708
	Equal variances not assumed			2,886	94,485	,005	43,188	14,964	13,478	72,898

Source: Data processed in 2018

3. *Springate and Zmijewski Methods*

From Table 9, it can be seen that Levene's Test for Equality of Variances produces the results of F test 4,548 and a probability value of 0,034 or (0,034 <0,05). The results of the analysis shows that the probability number <0,05, so H1 is accepted and H0 is rejected. It means that there is variant difference between Springate and Zmijewski Methods.

Since there is difference variance found between Springate and Zmijewski Method, so the use of variance to compare the average bankruptcy method (t-test for Equality

of Means) in the t-test is the basis of equal variance is not assumed. At the results of equal variance not assumed, the researchers get t value is 128,646 with a significance level or probability of 0,050. The results show that (0,050 ≤ 0,050), probability or significance <0,05, H0 is rejected which means that there are significant differences between Springate and Zmijewski methods.

Tabel 9. *Independent Samples Test* Springate and *Zmijewski*

Independent Samples Test

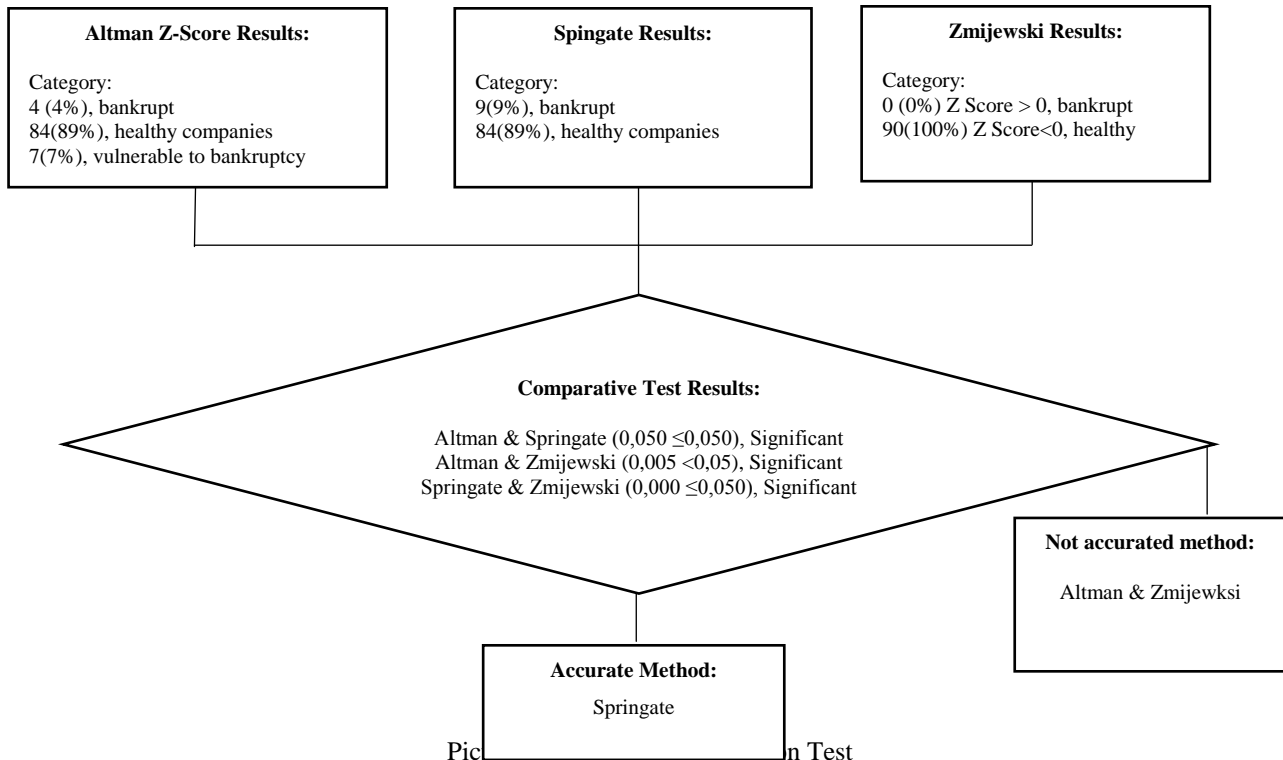| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | | |
| | | F | Sig. | t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidence Interval of the Difference | |
									Lower	Upper
Metode S-Z	Equal variances assumed	4,548	,034	6,727	188	,000	13,287	1,975	9,390	17,183
	Equal variances not assumed			6,727	125,646	,000	13,287	1,975	9,378	17,195

Source: Data processed in 2018

4. *Comparison of Bankruptcy Method Results*

The comparison results from the three methods show that there is a difference in accuracy between the results of

bankruptcy analysis with Altman Z-Score, Springate, and Zmijewski model. From this research, the researchers found the results:Altman Z-Score with 4%, Springate 9%, and

Zmijewski 0% accuracy. Thus, it can be concluded that the most accurate bankruptcy method to predict sharia life insurance in Indonesia is Sringate method with an accuracy of 9%.

Altman Z-Score Results:	Spingate Results:	Zmijewski Results:
Category: 4 (4%), bankrupt 84(89%), healthy companies 7(7%), vulnerable to bankruptcy	Category: 9(9%), bankrupt 84(89%), healthy companies	Category: 0 (0%) Z Score > 0, bankrupt 90(100%) Z Score<0, healthy

Comparative Test Results:

Altman & Springate (0,050 ≤0,050), Significant
Altman & Zmijewski (0,005 <0,05), Significant
Springate & Zmijewski (0,000 ≤0,050), Significant

Not accurated method:

Altman & Zmijewksi

Accurate Method:

Springate

Pic........................n Test
Source: Data processed in 2018

Discussion

1. *Altman Z-Score Method*

Altman bankruptcy method predicted, 84 (89%) companies were healthy, 4 (4%) companies were detected bankrupt, and 7 (7%) companies were classified as vulnerable to bankruptcy. The result of difference test between Altman Z-Score and Springate was obtained a probability < 0.00 (0,050 ≤ 0,050), which means there was significance differences of bankruptcy between them. Moreover, the difference test between Altman Z-Score and Zmijewski showed (0,005 ≤ 0,050) with probability value <0,05. It means that there was a significant difference of bankruptcy between Altman Z-Score and Zmijewski.

This research supported by Massimiliano's finding result in 2015 where he found Altman Z-Score Method worked effectively in predicting the failures of Italian companies, provided that there are several things that must be taken into account. Another researcher, Mohammed (2017) revealed SAOG Raysut Cement Company and its subsidiaries were financially safe because their Altman Z-Score was higher than the benchmark (2,99), except in few years of study. Begley (2016), the next researcher, showed Ohlson's original model performance was more accurate than Altman, which was often used in academic researches as an indicator to predict bankruptcy.

2. *Springate Method*

Using financial ratios, Springate (S-Score) bankruptcy method concluded that from total 95 data, there were 86 (91%) companies were in a healthy condition and 9 (9%) companies were predicted bankrupt. As mentioned in the previous page, there was significant difference of bankruptcy between Springate and Altman Z-Score methods. In addition, the result showed the probability <0,05 which means there was also significant difference of bankruptcy between Springate and Zmijewski.

Rahayu (2016) stated that Springate calculation result showed the companies were categorized into financial distress condition. Meanwhile, the analysis results of Yulistary and Wirakusuma (2014) in PT Fast Food Indonesia Tbk using Altman Z-Score, Springate, and Zmijewski Methods showed that it was a healthy company (2008 – 2012). Peter and Yoseph (2011) added, PT Fast Food Indonesia Tbk was classified to not potentially company bankrupt (2005-2009) based on the result of Altman Z-Score, Springate, and Zmijewski prediction.

3. *Zmijewski Method*

Based on Zmijewski prediction along these 5 years, it concluded that 95 data insurance companies had S<0. It means that all companies were classified as healthy companies and no bankruptcy detected. Probability of difference test result between Zmijewski and Altman Z-Score was <0,05, which means there is a significant difference between them. Moreover, Zmijewski and Springate's difference test showed a probability of <0.05, which means there was a significant difference between Springate and the Zmijewski bankruptcy method.

According to Muhammad and Nunung (2016), there were significant differences between the Altman Z-score model, the Springate S-Score and the Zmijewski X-Score in assessing bankruptcy in property industry companies. Besides, Tri and Arlin (2014) used Altman and Springate Methods to predict bankruptcy in mining and oil-gas sub-sector companies. They are ELSA company in 2009 and RUIS

company in 2010. Both of them were classified to healthy companies.

4. *Accurate Bankruptcy Methods*

From the comparison of three bankruptcy methods, Altman, Springate dan Zmijewski, the researchers obtained the results: Altman with 4% accuracy, Springate with 9 % accuracy, and Zmijewski with 0% accuracy. So, it can be concluded that the most accurate bankruptcy method to predict sharia life insurance companies in Indonesia is Springate method with 9% accucary.

This conclusion is supported by Diyah and Agung (2017), stating that the most appropriate method to predict Islamic bank in Indonesia is Springate method with 38,00% accuracy, then Zmijewski with 28,00% accuracy and Altman with 0,00% accuracy. Then, Sari (2014) stated that Springate is the most appropriate method for transportation companies in Indonesia, because its accuracy is high at 33,33%. Prihantini (2013) stated that Altman had same accuracy result as Springate. In the other hand, Maria (2013) declared that Grover Method has the highest accuracy compared to other prediction methods with 100% accuracy, followed by Springate with 90% accuracy, Zmijewski with 90% accuracy, and Altman Z-Score with 80% accuracy.

However, Alkhatib (2011) stated that Altman is much better in predicting company bankrupt with an average prediction capability of 93.8% from five years before liquidation, while the average Kida method was 69%.

IV. CONCLUSION

Based on the analysis and discussion in the previous chapters, we can conclude as follow:

1. According to the calculation of bankruptcy methods, Altman method predicted 4% sharia life insurance companies were bankrupt, 7% were vulnerable to bankruptcy, and 89% were healthy. Then, Springate Method predicted only 9% of sharia life insurance companies were bankrupt and 91% companies were healthy. Last, Zmijewski Method predicted 0% company was bankrupt which means all companies were healthy.

2. The difference tests show there was significant difference between Altman and Springate method, Altman and Zmijewski method, and also significant difference between Springate and Zmijewski method.

3. The most accurate bankruptcy method to predict sharia life insurance in Indonesia is Springate method with 9% accuracy.

Based on the analysis and conclusions above, the researchers suggest as below:

1. Limitations of research information are obtained based on the information contained in the financial report. There is a component of interest rate in the formula used in the bankruptcy method, whereas there is no interest rate in financial report of sharia life insurance.

2. The research is conducted in 2013-2017 period. For next research, it should add length of research period.

3. The researchers used Altman, Springate, and Zmijewski methods in analyzing the data. The next research can add other bankruptcy prediction methods, such as Grover and Fumer.

4. Further research can compare the potential bankruptcy or conduct analysis with other financial ratios. For example, the health assessment of an insurance business that has been established by the Financial Services Authority and Government Regulations, or consider from external factors such as inflation and economic trends.

5. Last, the researchers suggest the management of sharia life insurance companies to make some evaluations and controls to improve companies' performances and anticipate bankruptcy.

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Parwito: Student **of** Master Program in Post-Graduate Management from Universitas Mercu Buana Jakarta. He worked as a senior manager of the Sharia Operational Support Devision in BRI Life.

Rosalendro Eddy Nugroho is currently a fulltime senior lecturer in Master Program in Post-Graduate Management from Universitas Mercu Buana Jakarta. He holds a Bachelor of Science degree in Chemichal Engineering from Gadjah Mada University, Master of Management from Universitas Satyagama Jakarta, and PhD in Management from Bogor Agriculture University. He has taught courses in operation management, supply chain management, enterprise resource planning, and managerial economic.