

ANALYSIS OF ZMIJEWSKI METHOD TO PREDICT BANKRUPTCY IN SERVICE INDUSTRY COMPANIES (CASE STUDY IN SUB SECTOR RETAIL TRADE COMPANIES LISTED ON INDONESIA STOCK EXCHANGE PERIOD 2015-2019)

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Abstract- In the 21st century, the dynamic global and national economic conditions during 2015-2019 are a real challenge for businesses in Indonesia, especially retail companies. The weakening of world commodity prices and demand, due to the sluggish economy of China as a major supplier country, low domestic consumption accompanied by a strengthening of the dollar currency at the end of 2015 caused the global economy to experience a significant slowdown, as well as the election of President Donald J. Trump in 2016 who triggered a trade war in the following year which made the world economy even more uncertain. As a result, the national economy has been affected, as can be seen from Indonesia's stagnant economic growth of just 4%, the low purchasing power of the public has become a more real threat of bankruptcy for retail companies. The purpose of this research is based on industrial phenomena and problems that occur in Indonesia. The bankruptcy analysis model used in this study is the Zmijewski model (X-Score). The research was conducted on the retail industry listed on the IDX for the 2015-2019 period. This type of research is a descriptive research with a case study approach. The researcher limits the research into three objects which are the focus of the research, namely ROA (Return on Assets), DAR (Debt to Assets Ratio), and Current ratio which are variables of the Zmijewski X-Score formula. The results of this study show that of the 17 retail companies sampled, 24% or as many as 4 companies indicated that there were indications of potential bankruptcy and the remaining 76% or as many as 13 companies were companies that were in healthy condition for 5 consecutive years.

Keywords: Return on Asset, Debt to Asset Ratio, Current Ratio, Financial Distress.

INTRODUCTION

The conditions that developed in the era of the global and national economy 2015-2019 are a real challenge for retail business actors, both products and services. Falling prices, the level of demand for foreign products, due to the slowdown in the world economy including various countries that supply low domestic consumption together with the increase in foreign currencies in 2015, have an impact on the weakening of the world economy so that it experiences significant obstacles, in early 2016 which triggered trade war in the following year which made the world economy even less of course, there are several internal and external factors that hinder revenue growth in the retail sector.

On external factors, among others, due to changes in shopping patterns from offline to online starting in 2017, the trend of holding back shopping due to an unfavorable situation, and changing consumer behavior who prefer to spend their money on tours and opening investment savings. On internal factors, the high debt factor and the company's inability to pay its debts, as experienced by the parent company PT Trikonsel Oke Tbk and its subsidiary, PT Global Teleshop in 2015 and finally suspended in 2019. This of course affects the Company in running Its main business activities include the retail business of telecommunications equipment and the distribution of telecommunications products, and the company is highly dependent on debt. The earlier the signs of bankruptcy are known, the better it is for management because management can make improvements.

Bankruptcy according to Brigham (2012) is a failure that occurs in a company which can be interpreted as first, economic failure, which is a condition where the company loses money or the company's revenue is

unable to cover its own costs, meaning that the profit rate is smaller. of the level of capital or the present value of the company's cash flow that is smaller level of debt level. Financial failure occurs when the actual cash flow is less than the planned cash flow Financial Distressed, which is a condition of the company in which funds are struggling either in terms of funds in terms of cash or in terms of working capital. Some asset liability management plays a very important role in the arrangement to prevent financial failure. Financial failure level of debt level. Financial failure occurs when the actual cash flow is smaller than the planned cash flow, then second.

Various analyzes were developed to predict the onset of company bankruptcy. One of the analytical methods used in this study is the Zmijewski method. The Zmijewski method uses financial ratios to measure the company's performance, leverage and liquidity. Zmijewski (1984) states that this method achieves a 99% accuracy rate in determining company bankruptcy two years before the company goes bankrupt.

FRAMEWORK

Return on Asset is net profit to average assets. This ratio illustrates the company's potential profit which is used as a source of business funding. The lower the ROA, it shows that the amount of net profit generated in total assets is less and the profits earned by the company are not as expected.

Debt to Asset Ratio (DAR) is the ratio of debt to assets. When the DAR value increases, the higher the obligations that the corporation uses The high use of this debt has an impact on the high number of assets financed by debt, or in other words, the debt is used as capital by the company. Current ratio is the relationship of current assets to short-term debt. When the company's current ratio value decreases, the company's operational capability will be smaller to fulfill its short-term debt with the current assets they have. This will lead to the bankruptcy of a company.

METHODOLOGY

The population in this study are companies in the retail sector and listed on the IDX, are twenty-seven companies. The technique taken is purposive sampling technique. In this study, the number of samples was determined through three criteria, namely:

1. The company was included in the retail sector during the 2015-2019 period.
2. The company didn't occur suspend during the 2015-2019 period.
3. The company published financial statements for the 2015-2019 period.

Using the above criteria, the number of retail sector companies that were sample period were seventeen companies.

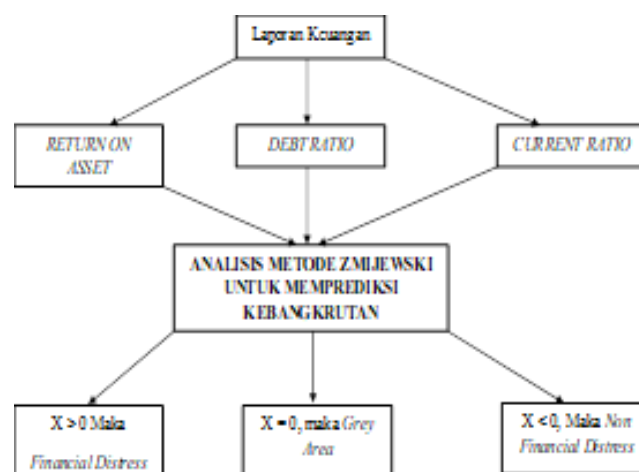


Figure 1. Framework

RESULTS AND DISCUSSION

Panel Data Regression

1. Hausman Test

Table 1. Hausman Test

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	11.036814	3	0.0115

P value 0.0115 is less than 0.05, so accept H1 which means that the best method to use is fixed effect than random effect.

Chow Test

Table 2. Chow Test

Equation: Untitled
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	2.380523	(16,65)	0.0074
Cross-section Chi-square	39.201935	16	0.0010

The chi-square cross section prob. value is 0.010 < 0.05, then the chow test chooses the fixed effect.

2. Langrange Multiplier Test

Table 3. Langrange Multiplier Test

Lagrange multiplier (LM) test for panel data
Date: 11/02/20 Time: 19:11
Sample: 2015 2019
Total panel observations: 85
Probability in ()

Null (no rand. effect) Alternative	Cross-section One-sided	Period One-sided	Both
Breusch-Pagan	2.914830 (0.0878)	0.591040 (0.4420)	3.505870 (0.0612)
Honda	1.707287 (0.0439)	0.768791 (0.2210)	1.750852 (0.0400)
King-Wu	1.707287 (0.0439)	0.768791 (0.2210)	1.451150 (0.0734)
GHM	-- --	-- --	3.505870 (0.0739)

The Breusch-Pagan P value is 0.0878 > 0.05, which means that the best estimation method is Common Effect.

Descriptive Analysis Test

Descriptive Analysis Test is a research method that provides an overview of situations and events so that this method intends to hold an accumulation of valid baseline data. Table below shows the results of descriptive statistical tests for independent variables in the study.

Table 4. Descriptive Analysis

	ROA	DAR	CR	Y
Mean	0.107811	3.116657	2.030137	12.97170
Median	0.021076	0.589066	1.237377	-1.381100
Maximum	18.02894	90.98972	14.03005	535.9354
Minimum	-10.88936	0.074243	0.021327	-84.00120
Std. Dev.	3.195743	10.85645	2.407700	66.75025

Based on Table 4, it appears that the results of data analysis obtained from testing of 17 Retail Sector companies on the Indonesia Stock Exchange period 2015-2019 namely ROA variable (X1) has the highest value of-10.88936; the lowest value is 18.02894; and standard deviation 3.195743. The variable (X2) DAR has the smallest value of 0.074243; the most important value is 90.98972 and the standard deviation is 10.85645. Current ratio variable (X3) has a minimum value of 0.021327; maximum value of 14.03005 and standard deviation of 2.407700. The Zmijewski X-score (Y) variable has a minimum value of -84.00120, the maximum value of -84.00120, a maximum value of 535.9354 and a standard deviation of 66.75025.

Classical Assumption Testing

The assumptions of classical is used in research so that the conclusions obtained do not lead to biased values. The classic assumption test in this research consists of normality test, multicollinearity test, autocorrelation test, and heteroscedasticity test.

1. Normality Test

The normality test is to test whether each dependent variable is normally distributed or not. An overview of the normality test will be shown in Figure 2.

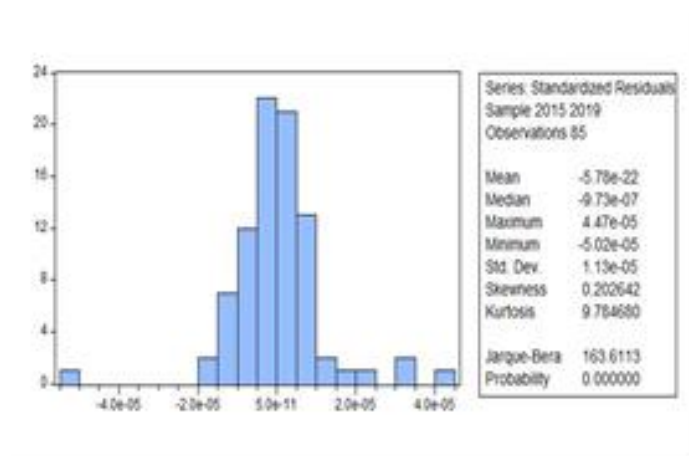


Figure 2. The normality test

In Figure 2, it can be seen that the Jarque-Bera probability value is 0.000000. where $0.000000 < 0.05$ illustrates that the data are not normally distributed, however the data can still be used for further testing, as stated by McClave (2011) expressing an opinion that is with the law of the central limit theorem states that for most samples populations with an observation size (n) > 30 are considered to be normally distributed, and the data in this study were 60 observations.

2. Autocorrelation Test

The autocorrelation test is to find out whether in the linear regression model there is no correlation between the residual variants from one study time to another. The multicollinearity test results can be seen in the following correlation table.

Dependent Variable: RESABS
Method: Panel Least Squares
Date: 11/03/20 Time: 15:39
Sample: 2015 2019
Periods included: 5
Cross-sections included: 17
Total panel (balanced) observations: 85

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.78E-06	1.68E-06	4.031611	0.0001
ROA	-6.39E-08	3.45E-07	-0.185195	0.8537
DAR	-3.32E-08	1.08E-07	-0.308390	0.7588
CR	2.46E-07	6.95E-07	0.353469	0.7249

Table 5a. Autocorrelation Test

Effects Specification			
Cross-section fixed (dummy variables)			
R-squared	1.000000	Mean dependent var	0.107811
Adjusted R-squared	1.000000	S.D. dependent var	3.195743
S.E. of regression	1.29E-05	Akaike info criterion	-19.48385
Sum squared resid	1.07E-08	Schwarz criterion	-18.90911
Log likelihood	848.0637	Hannan-Quinn criter.	-19.25267
F-statistic	2.73E+11	Durbin-Watson stat	2.190791
Prob(F-statistic)	0.000000		

Table 5b. Autocorrelation Test

Effects Specification			
Cross-section fixed (dummy variables)			
R-squared	1.000000	Mean dependent var	12.97170
Adjusted R-squared	1.000000	S.D. dependent var	68.75025
S.E. of regression	5.78E-05	Akaike info criterion	-16.47570
Sum squared resid	2.17E-07	Schwarz criterion	-15.90095
Log likelihood	720.2171	Hannan-Quinn criter.	-16.24452
F-statistic	5.89E+12	Durbin-Watson stat	2.190790
Prob(F-statistic)	0.000000		

Based on the data in Table 5 of the autocorrelation test results above, there is a Durbin Watson value of 0.717354, then the value will be compared with the DW table with the number of observations (n) = 85 and the number of independent variables (k) = 4 and a significance level of 5%, the dL value is obtained = 1.57516 and the value of dU = 1.721. With the formula $dU < dw < (4-d)$ which means there is no autocorrelation, either positive or negative, so this decision is not rejected

3. Multicollinearity Test

Meanwhile, the multicollinearity test aims to test that the regression model does not find a correlation between the independent variables, so that it is orthogonal. The multicollinearity test results can be reflected in the following table:

Table 6. Multicollinearity Test

Variance Inflation Factors
Date: 11/05/20 Time: 14:18
Sample: 2015 2019
Included observations: 85

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	1.01E-10	2.024927	NA
ROA	6.19E-12	1.249437	1.248000
DAR	4.62E-13	1.165348	1.075644
CR	1.08E-11	2.119935	1.232933

The centered of ROA value is 1.248, DAR is 1.075644 and CR is 1.232933, where the value is less than 10, it can be stated that there is no multicollinearity problem.

4. Heteroscedasticity test

Heteroscedasticity Test to find out whether in the regression model there is an unequal variance from the residuals of one observation to others. If the variance from one residual observation to another is constant, it means homoscedasticity. The table will illustrate of the heteroscedasticity test:

The results of the heteroscedasticity test showed that all probability values of the independent variables were greater than the significant level of 0.05, so it was concluded that heteroscedasticity did not occur.

Table 7. Heteroscedasticity Test

Dependent Variable: Y
Method: Panel Least Squares
Date: 11/03/20 Time: 15:42
Sample: 2015 2019
Periods included: 5
Cross-sections included: 17
Total panel (balanced) observations: 85

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-4.299978	1.24E-05	-346379.8	0.0000
ROA	-4.500001	2.55E-06	-1767328.	0.0000
DAR	5.700000	7.94E-07	7177619.	0.0000
CR	-0.003995	5.13E-06	-779.4071	0.0000

Linear Regression

Table 8. Linear Regression

Dependent Variable: Y
Method: Panel Least Squares
Date: 11/03/20 Time: 15:42
Sample: 2015 2019
Periods included: 5
Cross-sections included: 17
Total panel (balanced) observations: 85

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-4.299978	1.24E-05	-346379.8	0.0000
ROA	-4.500001	2.55E-06	-1767328.	0.0000
DAR	5.700000	7.94E-07	7177619.	0.0000
CR	-0.003995	5.13E-06	-779.4071	0.0000

Independent variables coefficient had a same number as written in the Zmijewski X-score Formula such as C is -4.3 (-4.299978), ROA rate multiple by -4.5 (-4.500001), DAR rate multiple by 5.7 and Current Ratio rate multiple by -0,004 (-0,003995). The Zmijewski X-score Formula is $Y = -4.3-4.5(ROA)+5,7(DAR)-0,004(CR)$.

Model Test

1. F test

To see whether all independent variables (ROA, DAR and CR) included in the model have a linear relationship with the dependent variable (Zmijewski X- Score). The F test is the initial stage of identifying a regression model that is estimated to be feasible (fix) or not feasible here means that the estimated model is feasible to use to explain the effect of independent variables on the dependent variable. The F test results can be explained by table as follows:

Table 9. F test

Effects Specification			
Cross-section fixed (dummyvariables)			
R-squared	1.000000	Mean dependent var	12.97170
Adjusted R-squared	1.000000	S.D. dependent var	66.75025
S.E. of regression	5.78E-05	Akaike info criterion	-16.47570
Sum squared resid	2.17E-07	Schwarz criterion	-15.90095
Log likelihood	720.2171	Hannan-Quinn criter.	-16.24452
F-statistic	5.89E+12	Durbin-Watson stat	2.190790
Prob(F-statistic)	0.000000		

Based on table of the F test above, it can be seen the significance level value of $0.000000 < 0.05$ (level of significant) which shows that the ROA, DAR and CR variables simultaneously influence Zmijewski X-Score.

Determination Coefficient Test

This coefficient is a value that shows the amount of influence of the independent variable (X) on the dependent variable (Y). This value is obtained from the percentage value of the squared.

Table 10. Determination Coefficient Test

Effects Specification			
Cross-section fixed (dummyvariables)			
R-squared	1.000000	Mean dependent var	12.97170
Adjusted R-squared	1.000000	S.D. dependent var	66.75025
S.E. of regression	5.78E-05	Akaike info criterion	-16.47570
Sum squared resid	2.17E-07	Schwarz criterion	-15.90095
Log likelihood	720.2171	Hannan-Quinn criter.	-16.24452
F-statistic	5.89E+12	Durbin-Watson stat	2.190790
Prob(F-statistic)	0.000000		

Correlation coefficient, the value ranges from 0-1 (0% - 100%) the closer it is to one, the greater the effect. The results of the coefficient of determination test can be explained by table, as follows:

From the table above it can be seen that the value of R Square is 1.000000 This shows that 100% of the dependent variable variation, namely Zmijewski X-score can be explained by variations of the three variables namely ROA, DAR and Current Ratio. While there is no other outside factor of research.

Hypothesis testing

t test

To check that there is an effect of the independent variable on the dependent variable is real, it needs to be tested by partial t-test. Based on the outputs above, it is interpreted as follows:

1) t test for ROA

Based on the results of the analysis of the t test table analysis shows that the ROA variable has a significance value of $(0.0000 < 0.05)$ which means that ROA has significant effect on Zmijewski X-Score. Besides that,

it can be that the t arithmetic is $(-346379.8 < -1.66298)$. It means that ROA has a significant effect on Zmijewski X-score.

Table 11. T test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-4.299978	1.24E-05	-346379.8	0.0001
ROA	-4.500001	2.55E-06	-1767328.	0.0001
DAR	5.700000	7.94E-07	7177619.	0.0001
CR	-0.003995	5.13E-06	-779.4071	0.0001

2) t test for DAR

Considering the results of t-test table data processing shows that the DAR variable has a significance value $(0.0000 < 0.05)$ which means that DAR has a significant effect on Zmijewski X-Score. Besides that, it can be that the t arithmetic is $(7177619 > 1.66298)$. It means that DAR has a significant effect on Zmijewski X-score.

3) t test for current ratio

See the results of the t test table analysis shows that the current ratio variable has a significance value of $(0.0000 < 0.05)$ which means current ratio has significant effect on Zmijewski X-Score. Besides that, it can be that the t arithmetic is $(-779.4071 < -1.66298)$. It means that current ratio has a significant effect on Zmijewski X-score.

CONCLUSION

The results of research conducted on 17 samples of retail sector companies that are still listed on the Indonesian Stock Exchange between the 2015-2019 period, results of data analysis, there are several things that can be concluded:

1. Based on Zmijewski's analysis on service industry companies in the retail trade sub-sector companies that are also listed on the IDX during the 2015-2019 period, companies that are in a healthy condition with the most negative X-Score value is PT. Electronic City Indonesia Tbk amounting to -84,001 in 2019. While the company that is in the most bankrupt condition with the most positive X-Score value is PT. Global Teleshop Tbk, amount to 535,935 in 2019.
2. The description of the company that has the highest ROA value is PT. Electronic City Indonesia Tbk with an ROA value of 18.0289 in 2019, and the company with the lowest ROA value is PT. Trikonsel Oke Tbk amounting to -10,8893 in 2015.
3. The DAR value in retail sector companies during the 2015-2019 period fluctuated. The company with the highest DAR value is owned by PT. Global Teleshop Tbk, amounting to 90,9897 in 2019, and the company that received the lowest DAR value was PT. Electronic City Indonesia amounted to 0.0742 in 2015.
4. The value of CR in retail sector companies for the period 2015-2019 has an illustration, namely that the highest CR value was obtained by PT. Electronic City Indonesia with a value of 14,0300 in 2015, and the lowest CR value is owned by PT. Global Teleshop Tbk amounting to 0.0213 in 2019.
5. ROA has significant effect on Zmijewski method to predict bankruptcy in service industry companies sub-sector retail trade companies listed on IDX in the 2015-2019 period.
6. DAR has significant effect on Zmijewski method to predict bankruptcy in service industry companies sub-sector retail trade companies listed on IDX in the 2015-2019 period.
7. Current Ratio has significant effect on Zmijewski method to predict bankruptcy in service industry companies sub-sector retail trade companies listed on IDX in the 2015-2019 period.

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