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Financial Distress Comparative Analysis of Japanese Electronic Manufacturer after Financial Global Crisis 2008 Using Altman, Ohlson, and Zmijewski Model

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Abstract:
The aim of this study is want to know which bankruptcy prediction models is the most suitable to be used for predicting financial distress of Japanese electronic manufacture company after global financial crisis 2008. There are three different bankruptcy predictors namely The Altman Z Score Model (Multiple Discriminant Analysis), The Ohslon Y Score Model (logit analysis) and The Zmijewski X Score Model (probit analysis) that used in this study. Using financial consolidation report data from fiscal year 2009 - 2015 of Japanese electronic manufacture company which listing in Tokyo Stock Exchange in 2016 period by matched-pair sampling. To decide the best model, an analysis will be conducted based on accuracy and error type I and type II rates of that three models and using descriptive statistic of SPSS ver.23. Finally, this study shows that the Ohlson Y Score Model is the best prediction model because having superior accuracy which 62.14% while Altman Z Score only have 60.71% and Zmijewski X Score have 53.57%

Keywords: *financial distress, Altman Model, Ohlson Model, Zmijewski Model, Japanese electronic manufacture*

1. Introduction

In the middle of 2008, there was global financial crisis that shaking off the world economy situation. The global financial crisis started since August 2007, because of the failure of banks and financial institutions in the United States in accepting repayment of the mortgage loan, as consequent of providing credit to customers expansively. As a result, the interest rate to be increased $ 5.25% and led to the repayment of home loans become more expensive, so there was a delay in the payment of large amounts and becoming a threat of bad loans, known as the Subprime Mortgage. The accumulation of large funds in the housing sector has spawned stagnation that resulted in slowing US economic growth in 2007, which is estimated to grow by 2.3%. This situation is also followed by the worsening social situation with the unemployment rate amounted to 4.9%, while in 2006 amounted to 3%. Inflation in 2006 was 2.1% and in 2007 increased to 4.3%. The subprime mortgage mess up stock since middle 2007, one by one big company like Bear Stern, Morgan Stanley, Citigroup, General Motors, fell down as well as lead to a crisis of interbank money market that claimed to Europe and Japan (Sihono, 2009: 3).

Japan, as a country which has better economy than the others, also got the impact of the global economic crisis. Based on data from the Census of Manufacturing, in 2008 the majority of Japan's manufacturing sector experienced a decline, both in the growth of the industry, the amount of consumption, the amount of the distribution and number of employees. The average decline in industrial growth reached 3.5%, and from 24 industrial sectors, 20 sectors declined. The highest decrease is in the industrial sector the engine, which is 9.7%, followed by the industrial sector of information and communication technology sector by 8.4% and electronics industries by 5.8%. The average decrease in the number of distribution reach 0.4%, with the highest decline is in the furniture industry sector by 12%, the industrial sector of information and communication technologies by 9%, and the electronics industry sector amounted to 6.4%. The number of employees even decreased for the first time since the last three years, with the highest decline is in the industrial sector of information and communication technology industry by 10%, the rubber industry sector by 8%, and the electronics industry sector amounted to 4.8% The condition continues at year- the next year, especially the decline in industrial growth. In 2009, the decline occurred in the industrial sector, industrial information technology and communications and electronics industries, respectively 11.5%, 10.9% and 10.3%. In 2010, a decline in the sector of information and communication technology, furniture, and machinery respectively 7.4%, 5.5% and 4.4% in the year 2011, a decrease of 3.5% compared with the previous year. Conditions in 2012 did not change much. Although there is an increase in six industrial sectors, which is the automotive sector, but

still a decline in eleven other sectors, especially the electronics sector, with a decrease in the volume of the product liquid crystal television (LCD TV), active matrix LCD, and semi-conductor product machinery (METI, 2012).
The financial crisis experienced by Greece in 2010 which spread into Europe's financial crisis also have an impact on the Japanese economy. Orders of goods from Europe, the main consumers of Asian products, continues to decline. Economic growth in Japan became weakened in the second quarter of 2012. The strengthening of the yen is going to make the price of export goods, especially electronic goods become more expensive that reduced its competitiveness in the export market. In recent years, especially after the global financial crisis of 2008 and the national disaster earthquake and nuclear leak in 2011, the Japanese electronics corporation, especially those producing consumer electronics and personal household, had a lot of decreasing profits. (Patnistik, 2012).
The phenomenon of declining profits of Japanese electronics corporation, also caused by the weakening purchasing power in the market of the European Union, the United States, and also in Asia, especially in Indonesia. Europe and the US financial crisis had an impact on the domestic financial sector. The impact of the European financial crisis and the US financial markets to Indonesia felt in the real sector, where the volume and value of exports may decline, investment declined and incomes fell. Weakening public income caused a decline in purchasing power. (Bappenas, 2011: 8).
In the electronics sector, according to the Chairman of the Electronic Marketer Club, Agus Subiantoro, electronic manufacture company cut its sales target of 20% and a production target of 10% in the fourth quarter of 2008 (Novianti, 2010: 7). In early 2016, Panasonic and Toshiba suddenly announced to close its production lines in Indonesia. Toshiba sold washing machine production line for Skyworth, the Taiwanese company, while Panasonic close the production line of LED lighting in Pasuruan. Minister of Industry Saleh Husin, as the representative of the Government of Indonesia, even feel the need to ascertain the truth of the news, due to closing plant of Panasonic and Toshiba will result in layoffs for approximately 2500 employees. (Alvionitasari, 2016)
From the description above, it appears that since the global financial crisis of 2008, some corporations electronics manufacturing Japanese had financial distress that characterized by a decrease in profit in a row, and culminate in the acquisition, sale of assets, until the clossing of factories in Southeast Asia, such as in Indonesia. It is a negative impact not only for the company and the employees of the factory were closed, but also for the community and the government where the factory is located. Limited information about financial distress being experienced by the company, resulting in a lack of anticipation in the face of potential negative impacts to occur. So the prediction of financial distress is necessary, to prevent or minimize potential impacts caused by the problem.
There have been many studies on the comparative analysis of financial distress for companies listed in the various stock exchanges in the world by using the method of prediction of bankruptcy like Altman, Ohslon, and Zmijewski, as research conducted by Suryawardani (2015), Susandra (2015), Zakkiyah (2014), Araghi (2013), Prihantini (2013), Kumar (2012) and Lin (2009). However, there is no studies specializing in comparative analysis of the financial distress prediction of the electronics manufacturing corporation Japan, especially after the global financial crisis of 2008 with various models of bankruptcy. Therefore, the authors are interested in that themes to be researched in this study.
The purpose of this study was to determine whether the bankruptcy prediction model of Multiple Discriminant Analysis (Altman Z Score), logit (Ohlson Y Score), and probit (Zmijewski X-Score) is an exact model to predict financial distress corporations electronics manufacturing Japan, to determine whether there is a significant difference between the results of the analysis of corporate financial distress by using the Japanese electronics manufacturing three models of the bankruptcy, and to investigate the bankruptcy prediction model which is most accurate in analyzing corporate financial distress of Japanese electronics manufacturing.

2. Study Theory

According to Kordestani (2011: 278), the term refers to the stage of financial distress prior to the bankruptcy. There are three stages to the bankruptcy, as shown in the Figure below

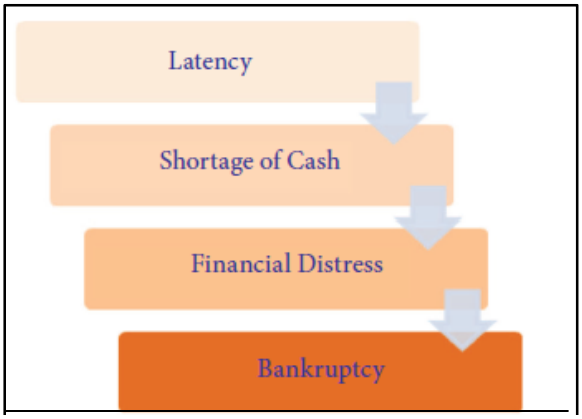

Figure 1: Stage of Bankruptcy
Source: Kordestani (2011: 278)

From the Figure above, it appears that the stage of bankruptcy is
1)Latency: Latency adalah is a condition where the expected return on assets had been steadily declining.

2) Shortage of cash flow: Shortage of cash flow is a condition in which the company experienced cash shortages, so it can not meet its financial obligations.

3) Financial distress : Financial distress is a condition where the company is experiencing financial difficulties, which if it can not be resolved then it will have conditions for bankruptcy.

Meanwhile, according to Gentry et al. (1990, in Kordestani et al., 2011: 279), financial distress occurs if the cash inflows lower than outflows. Brigham et al. (1999, in Kordestani et al., 2011: 278), defines the state of financial distress with reference to the current state of the company can not meet the obligations included in its financial statements. Fallahpour (2004, in Kordestani et al., 2011: 278), states that financial distress occurs in companies whose profitability declined. With decreasing profitability, the company's ability to repay the loan principal and interest on loans will be decreased.

From the various definitions of the above, it can be concluded that financial distress is a condition where the company is experiencing financial difficulties, due to lower cash inflows than outflows. Financial distress makes profitability declined and the company could not meet its financial obligations, that if these conditions can not be resolved, then the company will be bankrupt.

Hofer (1980, in Almilia 2003: 7) and Whitaker (1999, in Platt: 2008: 133) states characterize the current state of financial distress is the company experienced a net profit (net income) negative for several years. Lau (1987: 127-1298) and Hill (1996: 61) states when their employment termination or non-payment of dividends, to define the characteristics of financial distress. Whitaker (1999, in Platt, 2008: 133) measures the financial distress of the condition of cash flows that are smaller than the current long-term debt. John, Lang and Netter states financial distress states is occur when there's a change in equity prices. (1992: 892)

Such as bankruptcy, according to Sormunen (2012: 45-46), the process of financial distress also consists of several stages

i. Early stage

Early stage is the stage where the Indication decline in profitability in the financial statements.

ii. Late stage

Late stageis the stage where the Indication decline in profitability accompanied by a rise in leverage in the financial statements.

iii. Final stage

Final stage is the stage where the Indication decline in profitability is accompanied by the increase in leverage and the decline in liquidity in the financial statements.

From the above description, it can be concluded that the characteristics of companies that are experiencing financial distress is

1) less cash flow from long-term liabilities maturing,
2) a decrease in liquidity, profitability and fixed assets,
3) an increase in leverage and relative supplies,
4) receipt of net profit is negative for several years,
5) the release of capital investment, absence of dividend payments,
6) the change in equity prices, and
7) the termination of employment.

According to Dwijayanti (2010: 193-201), there is a variety ways that can be used to predict financial distress eg financial ratio analysis and cash flow analysis using the data presented from the financial statements, predicted by the ordinance of corporate governance (corporate governance), macroeconomic conditions , credit cycle index, artificial neural networks, the independent auditor's opinion, Rough Set Theory (RST) and Support Vector Machine (SVM). Ratio analysis of the information presented in the financial statements is the most widely used in predicting financial distress in the company.

Financial statement analysis is often conducted to determine how the financial condition or performance of firms, for example, to predict whether the company is experiencing financial distress or not. Financial statement analysis is the process of identifying the strengths and weaknesses of a company from the financial accounting data presented in the financial statements. Financial statement analysis process consists of several stages, first, connect the data presented in reports related to determining information associated with the decision taken by considering all of the information contained in the financial statements. Furthermore, sorting information to indicate a significant association of the data presented. Lastly, make interpretations and conclusions on the relationships between the data. In other words, financial statement analysis is the process for selecting and evaluating relationships of accounting data. (Idhayajothi, 2014)

3. Research Method

In this research, the author uses descriptive and verification method. Descriptive method is a method used to search for elements, characteristics, and properties of a phenomenon. whereas the verification method used to test how far the defined goals had been achieved or in accordance with the theories that already exist. Implementation verification descriptive study in this research is to describe how a comparative analysis of financial distress prediction using multiple discriminant (Altman Z Score), logit method (Ohlson Y Score), and probit method (Zmijewski X Score).

The analysis uses statistical count to test the validity of the hypothesis with the aid of a computer program Statistical Program for Social Science (SPSS) version 23. The study compared three methods of bankruptcy namely models Altman Z Score, Score Y Ohslon models, and models Zmijewski X Score. Each model has a range of variables used to measure financial distress prediction Japanese manufacturing company.

Altman Z Score Model has the following formula

→ Z = 1.2X1 + 1.4X2 + 3.3X3 + 0.6X4 + 0.999X5
→ Whereas
→ X1 = working capital/total assets
→ X2 = retained earning/total assets
→ X3 = EBIT/total assets
→ X4 = market value of equity/total liabilities
→ X5 = sales/total assets

Altman using a cut-off value of 2,675 and 1.81. This means that if the value of Z obtained more than 2,675, the company predicted no bankruptcy in the future. A company that values its Z is between 1.81 and 2.675 imply that they are in a gray area, which are companies experiencing financial distress in the financial. While companies with the Z value was under 1.81, meaning that the company was predicted bankruptcy.

Many previous studies stating that the model is Altman bankruptcy prediction method is the most accurate compared to other models, such as the research conducted by Prabowo and Wibowo (2015) on the company delisted in BEI period 2008-2013. Prabowo research results stating that Altman method which has an accuracy of 71% accuracy, while Zmijewski method only has an accuracy of 65% accuracy. Later research conducted by Nikmah and Sulestari (2014) in large and small companies listing in BEI period 2003 to 2009 states that a model predicting bankruptcy Altman is more accurate than the model Ohslon. Similar results were also expressed in Karamzadeh study (2013) that is better than Altman model Ohlson models in predicting bankruptcy of the companies listed in the Tehran Stock Exchange.

Ohlson Y ScoreModel has the following formula

Y = -1.3 - .4 X1 + 6.0 X2 - 1.4 X3 + .1 X4 -2.4 X5 - 1.8 X6 + .3X7 -1.7X8 - .5X9

Whereas

→ X1 = log (total assets/GNP price-level index)
→ X2 = total liabilities/total assets
→ X3 = working capital/ total assets
→ X4 = current liabilities/current assets
→ X5 = one if total liabilities exceed total assets, zero otherwise
→ X6 = net income/ total assets
→ X7 = cash flow of operations/total liabilities;
→ X8 = one if net income was negative for the last two years, zero otherwise
→ X9 = measure of change in net income (NIt – NIt-1) / (NIt + NIt-1)

Ohlson stated that this model has the optimal cut off point at 0:38 value. The purpose of the cut-off is that a company that has a value of Y-Score more than 0:38 means the company is predicted to experience financial distress. Conversely, if the value of the company Y-Score of less than 0:38, then the company is not experiencing financial distress predicted.

The previous study which states that the model Ohlson is a method of bankruptcy prediction most accurate compared to other models, for example, research conducted by Christianti (2015) and Wulandari (2014) which states that the model Ohlson is the best model in predicting financial distress of companies listed on the stock Indonesia stock. Later studies of Kumar (2012) in industrial corporations in India that states that are Ohlson O Score with the highest correlation level than the model of Altman Z Score and Zmijewski models. Then study Lin (2009) which states that the model is the best model Ohlson and terstabil in predicting financial distress publicly traded company in Taiwan, compared to MDA models (Altman), probit (Zmijewski).

Zmijewski X Score Model has the following formula.

X = -4.3 - 4.5X1 + 5.7X2 - 0.004X3

Whereas,

→ X1 = return on asset
→ X2 = debt ratio
→ X3 = current ratio

From the results of model calculations Zmijewski, X-Score values obtained are divided into two classes. If the X-score is negative (X-Score <0), then the company is classified in a healthy condition. Conversely, if the X-score is positive (X-Score ≥ 0) then the company can be classified under unsanitary conditions or likely to lead to financial distress.

The previous study which states that the Zmijewski model is a method of bankruptcy prediction most accurate compared to other models, for example, research by Husein and Pambekti (2014) which states that the Zmijewski model is the most appropriate model is used to predict the financial difficulties at the corporation registered in Securities List Sharia.

In addition, numerous studies have stated that there are significant differences between the three models in predicting corporate bankruptcies, such as the study of Sinarti (2015), Hastini (2015) and Purnajaya (2014) which states that there are significant differences between the models Zmijewski against Altman model the companies listed on the Stock Exchange in 2005.

The variables used in this study amounted to 15 variable which is a combination of all variables used in the measurement in all three models bankruptcy Altman Z Score, Ohlson Y Score, and Zmijewski X Score, which consists ofWC/TA, yakni *Working*

3.1. Capital//Total Assets

1. RE/TA, which is Retained Earning/Total Assets
2. EBIT/TA, which is Earning Before Interest and Tax/ /Total Assets
3. MVE/TL, which is Market Value of Equity/Total Liabilities
4. S/TA, which is Sales/Total Assets
5. LOG(TA/GNP), which is Log(Total Assets/GNP index)
6. TL/TA, which is Total Liabilities Total Assets
7. CL/CA, which is Current Liabilities/Current Assets
8. EQ;NEG (1), which is if Total Liabilities>Total Assets; (0) jika Total Liabilities<Total Assets
9. NI/TA, which is Net Income/Total Assets
10. CFO/TL, which is Cash Flow from Operation/Total Liabilities
11. NINEG, which is (1) jika Net Income < 0 selama 2 tahun terakhir;(0) jika Net Income >0
12. ΔNI, which is(Net Income t – Net income t-1)/(Net income t + Net Income t-1)
13. ROA, which is Return on Assets
14. CA/CL, which is Current Assets/ Current Liabilities

The population of this research is manufacturing companies listed on the Japanese electronics Tokyo Stock Exchange First Section Electrical Appliances component in the study period, ie in 2016. As for the calculation of financial distress prediction using the data of the consolidated financial statements of one to seven years after the global financial crisis 2008, ie financial statement data 2009-2015. Selection of research sample conducted by purposive sampling method, the sample is taken based on certain criteria in accordance with the purpose of research. The criteria set for the determination of sampling of this research there are two, namely the general criteria and specific criteria. Common Criteria is the criteria to be met all the samples, which is as follows

1) Companies listed on the First Section of Tokyo Stock Exhange Electrical Appliances sector at year study period, namely in 2016, with the beginning of the reporting period in March.

2) Data provided complete financial statements of the period of fiscal year 2009 through fiscal year 2015.

In addition, this study also used a sample divided into two groups of companies experiencing financial distress and companies who do not experience financial distress (matched pair). Thus, the number of companies experiencing financial distress and did not experience the same amount of financial distress. Specific criteria to determine the companies included in the category of companies experiencing financial distress based on research Almilia and Kristijadi (2003: 9) is

1) Having a negative net income for two consecutive years, and / or

2) For more than a year do not pay dividends,

These criteria apply to the data during the study period 2009-2015.

Furthermore, for the criteria to be met by the companies included in the category of companies that are not experiencing financial distress is

1. Do not have a negative net income for two consecutive years,
2. The dividend payments for over a year,
3. Derived from the same year in the sample category of companies experiencing financial distress,
4. Derived from the same sector in the sample category of companies experiencing financial distress,
5. Have an average total assets are relatively equal to the total assets of the sample category of companies experiencing financial distress.

These criteria apply to the data during the study period 2009-2015.

Based on the foregoing, of the overall manufacturing companies listed on the First Section of Tokyo Stock Exhange Electrical Appliances sector at year study period, ie 2016, researchers took 10 companies included in the category of distress. For the determination of the companies included in the category of healthy or non-distress conducted using matched-pair as described previously. Thus, collected 20 companies (10 companies distress and non-distress 10 companies) were used as samples.

The data used in this research is secondary data. Secondary data is data obtained by researchers indirectly from the object of research. Data obtained by researchers in the form of the consolidated financial statements of the company in the years after the global financial crisis, which is that during 2009-2015. Sources of data obtained from the official website of each company are downloaded as Adobe PDF files or Microsoft Excel.

Stages in this research data analysis technique that is

1. Collecting data in the form of consolidated financial statements period 2009-2015, from 20 Japanese electronics manufacturing company that has been defined as the study sample.
2. The calculation of the data of financial statements by using each model is a model Altman Z-score model Ohlson Y Score, and Zmijewski X Score. From each of these calculations, descriptive statistics were analyzed and determined the model predictions against the company, whether financial distress or not.
3. Comparing the results of prediction methods to its original condition.
4. Insert the calculation results of each analysis model into an application for bankruptcy SPSS version 23 for testing the hypothesis.
5. To test the hypothesis by using SPSS application, there are some tests done that

1). Classic assumption test
There are two types of classic assumption test is done, the test for normality and homogeneity test.
Normality test data is performed before the data is processed based on the models of research.
Normality test is to compare the data to be examined by the normal distribution of data based on the mean and standard deviation.
Normality test was done by Shapiro-Wilks test, the normality test for small samples up to the amount in 2000 [10]. In SPSS, if the selected level of significance α = 12:05 <sig SPSS, it can be said that the data follow a normal distribution.
While the homogeneity of variance test performed to investigate whether the observed data variance i-th and j-th same. Variance data must meet the assumptions have the same variance.
There are some homogeneity test used to do, one of which is Levene's test. In SPSS, if the selected level of significance α = 0.05 <sig SPSS, it can be said that the data follow a normal distribution.
2). Comparison test
If the assumptions of normality are met, a comparative parametric testing can be done on the condition that normal distribution of data, homogeneous, and the number of subjects in each group of the same size. Because there are three groups of data to be tested, then the different tests conducted are
1) One Way ANOVA
The type of parametric statistical tests that aimed to determine whether there is a difference between an average of more than two groups of samples.
Some of the assumptions that must be met at Anova is:
1) Samples derived from independent groups
2) Variant between groups should be homogeneous
3) The data of each group normal distribution
If these assumptions are not met, then the ANOVA test is not valid to do, so it must use a non-parametric test Kruskal Wallis example.
2). Kruskal Wallis test,
Non-parameter test used to compare three or more groups of data samples. Kruskal-Wallis test can be performed on the data were not normally distributed. Each of these data are not interdependent and significantly different from each other.
In doing Krukal-Wallis test must first determine Ho and Ha.
Ho and Ha are defined in this study is
Ho = Allegedly there is a significant difference from the analysis model bankruptcy Altman Z Score, Ohlson Y Score, and Zmijewski X Score in predicting financial distress of Japanese electronics manufacturing corporation.
Ha = Allegedly there was no significant difference in the analysis model bankruptcy Altman Z Score, Ohlson Y Score, and Zmijewski X Score in predicting financial distress Japanese manufacturing corporations

Then the data were calculated using SPSS version 23 systems.

Data calculation results are then used as the basis for decision making hypotheses made by two events:
1) The basis of the decision-making using a statistical comparison is calculated by statistical tables.
1) If the statistics count> statistics table, then Ho is accepted and Ha rejected.
2) If the statistics count <statistics table, then Ho is rejected and Ha accepted.
2) The basis for decision-making based on probability.
1) If the probability <0.05, then Ho is accepted.
2) If the probability of> 0.05, then Ho is rejected.
6) Calculate the level of accuracy and error rates on each of predictive models to assess which model is the most accurate predictor. Accuracy rate indicates what percentage of the model predicts correctly the existing overall sample.
The level of accuracy of each model is calculated as follows

$$\text{Accuracy Level} = \frac{\text{Total of accurate prediction}}{\text{Total sample}} x\ 100\%$$

Analysis of the level of error used is type I and type II.

Type I error is an error that occurs when the model predicts the sample will not experience distress when in fact experiencing distress.

In contrast, Type II error is an error that occurs when the model predicts the sample experienced distress when it is not experiencing distress. The level of error is calculated as follows

$$\text{Error type I} = \frac{\text{Total error of type I}}{\text{Total of sample type I}} x\ 100\%$$

$$\text{Error type II} = \frac{\text{Total error of type II}}{\text{Total of sample type II}} x\ 100\%$$

$$\text{Totalerror} = \frac{\text{Total eror type I \& } type\ II}{\text{Total sample}} x\ 100$$

The results of measurements of the level of accuracy and error tingkar then used to deduce which model is most accurate for predicting financial distress in the Japanese electronics manufacturer.

4. Result and Discussion

In this research, three-phase measurements, the descriptive statistical analysis to all study variables, test the classical assumption of normality test and homogeneity test, and analysis of the level of accuracy and error rates of type I and II. Then the results of all the measurements are the basis for answering the problems that the goal of this research as described previously.

Here is the calculation and descriptive statistics fifteen operational variables of the three models bankruptcy Altman, Ohlson, and Zmijewski.

Variabel	Condition	Mean
WC/TA	DISTRESS	.3059913
	NON DISTRESS	.4521582
RE/TA	DISTRESS	.2848548
	NON DISTRESS	.4409734
EBIT/TA	DISTRESS	-.0060636
	NON_DISTRESS	.0520518
MVE/TL	DISTRESS	1.1343896
	NON_DISTRESS	4.9559868
S/TA	DISTRESS	.8574277
	NON_DISTRESS	.9619309
LOG(TA/GNP)	DISTRESS	.9411945
	NON_DISTRESS	.9526521
TL/TA	DISTRESS	.4694752
	NON_DISTRESS	.3133372
CL/CA	DISTRESS	.5178646
	NON_DISTRESS	.3423276
NI/TA	DISTRESS	-.0065239
	NON_DISTRESS	.0322933
CFO/TL	DISTRESS	.1572761
	NON_DISTRESS	.3302549
ΔNI	DISTRESS	-.5769333
	NON_DISTRESS	.2417571
ROA	DISTRESS	-.0031073
	NON_DISTRESS	.4521582
CR	DISTRESS	3.0241987
	NON_DISTRESS	4.3552165

Table 1: Resume of Financial Ratio Statistic Descriptive Analysis Variables
Source: SPSS ver23 Analysis Data (2016)

From the comparison data descriptive statistics variables can be concluded that the company's non-distress have higher value on the variable that shows the liquidity and equity, such as the variable WC / TA, RE / TA, EBIT / TA, MVE / TL, S / N , NI / TA, CFO / TL, ROA, and CR, while the company distress have higher value on the variable that indicates solvency, as variabelTL / TA and CL / CA.

Variable values LOG (TA / GNP) were similar between the company distress and non-distress showed large measure the same company.

The following is a summary of the results of tests of normality and homogeneity of each model predictive calculation of financial distress

	Normality Test Shapiro-Wilk (Sig)			Homogeneity Test Levene (Sig)		
	Altman	Ohlson	Zmijewski	Altman	Ohlson	Zmijewski
DISTRESS	.000	.001	.011	.902	.022	.650
NON_DISTRESS	.000	.000	.000	.856	.335	.999

Table 2: Resume of Normality and Homogeneity Test
Source: SPSS ver23 Analysis Data (2016)

Judging from normality test results above, it appears that significant value Shapiro-Wilkins for Altman and Ohlson models both distress and non-distress sample of less than 0.05, which means that the data is not distributed calculations for the model normal.

Sedangkan Zmijewski, despite significant value Shapiro -Wilkins for distress samples greater than 0.05 which means that the data is normally distributed, but nlai significant for non-distress over kecial sample of 0.05 which means that the data is normally distributed armpits. It can be concluded, most of the data from these models are not normally distributed. Then, from the homogeneity test results above, it appears that significant value for all models is greater than 0.05, which means that the data sample calculation of each model is not homogeneous.

By the normality and homogeneity test results above, it appears that even though no data were normally distributed, but all the data are not homogeneous. Therefore, the data does not meet the assumptions of normality that parametric comparison test can be done that were normally distributed, homogeneous, and the number of subjects in each group of the same size. So different test conducted is Kruskal-Wallis test.

The following data is the result of different test Kruskal-Wallis

	Distress
Chi-Square	2,432
Df	2
Asymp. Sig.	,296

Table 3: Kruskal-Wallis Test Result of Financial Distress Prediction
Source: SPSS ver23 Analysis Data (2016)

Analysis

Ho = Allegedly there is a significant difference from the analysis model bankruptcy Altman Z Score, Ohlson Y Score, and Zmijewski X Score in predicting financial distress of Japanese electronics manufacturing corporation.

Ha = Allegedly there was no significant difference in the analysis model bankruptcy Altman Z Score, Ohlson Y Score, and Zmijewski X Score in predicting financial distress of Japanese electronics manufacturing corporation.

- Decision-making is done by the hypothesis of two events:

1) The basis of the decision-making using a statistical comparison is calculated by statistical tables.

If the statistics count> statistics table, then Ho is accepted and Ha rejected.

If the statistics count <statistics table, then Ho is rejected and Ha accepted.

From the table above shows that the output of the statistics count Kruskal Wallis (chi square) is 2,432.

- Statistical tables

Used chi square table below for comparison.

	α	0.1	0.05	0.025	0.01	0.005
db	1	2.70554	3.84146	5.02390	6.63489	7.87940
	2	4.60518	5.99148	7.37778	9.21035	10.59653
	3	6.25139	7.81472	9.34840	11.34488	12.83807
	4	7.77943	9.48773	11.14326	13.27670	14.86017
	5	9.23635	11.07048	12.83249	15.08632	16.74965
	6	10.64464	12.59158	14.44935	16.81187	18.54751
	7	12.01703	14.06713	16.01277	18.47532	20.27774
	8	13.36156	15.50731	17.53454	20.09016	21.95486
	9	14.68366	16.91896	19.02278	21.66605	23.58927
	10	15.98717	18.30703	20.48320	23.20929	25.18805
	11	17.27501	19.67515	21.92002	24.72502	26.75686
	12	18.54934	21.02606	23.33666	26.21696	28.29966
	13	19.81193	22.36203	24.73558	27.68818	29.81932
	14	21.06414	23.68478	26.11893	29.14116	31.31943
	15	22.30712	24.99580	27.48836	30.57795	32.80149
	16	23.54182	26.29622	28.84532	31.99986	34.26705
	17	24.76903	27.58710	30.19098	33.40872	35.71838
	18	25.98942	28.86932	31.52641	34.80524	37.15639
	19	27.20356	30.14351	32.85234	36.19077	38.58212
	20	28.41197	31.41042	34.16958	37.56627	39.99686
	21	29.61509	32.67056	35.47886	38.93223	41.40094
	22	30.81329	33.92446	36.78068	40.28945	42.79566
	23	32.00689	35.17246	38.07561	41.63833	44.18139
	24	33.19624	36.41503	39.36406	42.97978	45.55836
	25	34.38158	37.65249	40.64650	44.31401	46.92797
	26	35.56316	38.88513	41.92314	45.64164	48.28978
	27	36.74123	40.11327	43.19452	46.96284	49.64504
	28	37.91591	41.33715	44.46079	48.27817	50.99356
	29	39.08748	42.55695	45.72228	49.58783	52.33550
	30	40.25602	43.77295	46.97922	50.89218	53.67187

Table 4: Chi Square Table

By loking at the chi square table for df = k-1 = 3-1 = 2 and a significant level of 0.05 are obtained statistical value table 5.991

- Decision

Because statistics count <Statistical tables (2.432 <5.991), then Ho is rejected and Ha accepted

2). Basic decisions based on probability.

If the probability of <0.05, then Ho is accepted.

If the probability of> 0.05, then Ho is rejected.

- Decision

It is seen that the column Asymp Sig (2-tailed) to be tested two sides is 0,296. The importance of the probability of> 0.05, which means that Ho refused and Ha accepted.

Based on the results of the second test, the results obtained are Ho rejected and Ha accepted, which means there are no significant differences in financial distress prediction model Altman Z Score, Ohlson Y Score, and Zmijewski X Score. This contrasts with research Sinarti (2015), Hastini (2015), and Purnajaya (2014) which states that there are significant differences between the models Zmijewski Altman model.

Here are the results of recapitulation calculation accuracy level analysis and sample error rate of each model

Model	Accurate Prediction		Inaccurate prediction		Error Type I		Error Type II		Total Error	
	UNIT	%	UNIT	%	UNIT	%	UNIT	%	UNIT	%
Altman	85	60.71%	55	39.29%	41	58.57 %	13	18.57 %	54	38.57 %
Ohlson	87	62.14%	53	37.85%	7	10.00 %	19	27.14 %	26	18.57 %
Zmijewski	75	53.57%	65	46.42%	65	92.85 %	0	100 %	65	46.42 %

Table 5: Recapitulation of Accuracy Analysis, ErrorI dan II Altman, Ohlson, and Zmijewski Model
Source: SPSS ver23 Analysis Data (2016)

From the recapitulation of the data in Table 5 above shows that, Ohlson models is the model with the highest level of accuracy, because it can predict the correct number of 87 samples with a total of 140 samples or some 62.14% of the total sample. This is consistent with the results of research Christianti (2015), Wulandari (2014), Kumar (2012) and Lin (2009) which states that the model Ohlson is the model with the highest accuracy for predicting the company's financial distrees. While most models are not accurate Zmijewski models predict that only 75 samples correctly from a total of 140 samples or some 53.57% of the total sample. This contrasts with the results of research Husein (2014) which states that the model Zmijewski is the best model to predict financial distress rakurat companies.

From Table 5 above shows that the model Ohlson is a model with an error rate of only one of the lowest I predict the number 7 of a total of 70 samples of distress that a number of 61.42%. This is consistent with the results of research Christianti (2015), Wulandari (2014), Kumar (2012) and Lin (2009) which states that the model Ohlson is the model with the lowest error rate to predict a company's financial distrees. While the model Zmijewski is a model with an error rate I is highest, ie predicting one of the 65 samples from a total of 70 samples distress, the number 92.85 This is contrary to the results of research Husein (2014) which states that the model Zmijewski is the model most rakurat to predict financial distress company.

Instead, based on the results of recapitulation error rate analysis II, Zmijewski models is the model with the lowest error rate II ie no wrong prediction of a total of 70 samples of non distress. The model of Ohlson is a model with the highest level II error predict any number of 19 samples from a total of 70 samples of non distress, the number of 27.14%. However, if seen from the results of the analysis the total error rate I and II, Ohslon models is the model with the lowest error rate of only predicting one of a number of 26 samples of a total of 140 samples, or a 18:57%. Based on the results of the analysis of the level of accuracy and error level analysis I and II above, it can be concluded that the model Ohslon model is the most accurate than Altman and Zmijewski models predict corporate financial distress Japanese electronics manufacturing.

5. Conclusion and Recommendations

Based on the results of data analysis can be concluded that

1. Based on the calculation of the index of financial distress by using a model of Altman Z Score, Ohlson Y Score, and Zmijewski X Score on samples of electronics manufacturing corporation listed on the Tokyo Stock Exchange over the period of 2016 which divided the sample of firms distress and non-distress. This supports the hypothesis that a third suspect that the prediction model is the right model to predict financial distress of Japanese electronics manufacturing corporation.

2. From the analysis of the comparison between the three models of financial distress prediction Altman, Ohslon, and Zmijewski using different test Kruskal Wallis, calculate statistical results obtained are smaller than the statistical tables, and the result is less than the probability of default, so that it can be concluded that there is no significant differences between the models Altman, Zmijewski Ohslon and predict corporate financial distress Japanese electronics manufacturing. It denied the second hypothesis is suspected that there are significant differences between the models Altman, Zmijewski Ohslon and predict corporate financial distress Japanese electronics manufacturing.

3. From the analysis of the level of accuracy and analysis of error rates of type I and II, it can be concluded that the model Ohlson Y Score is the most accurate models with a low error rate in predicting financial distress of Japanese electronics manufacturing

corporation. The model of Altman Z Score is rated second and models Zmijewski X Score was rated last in the accuracy and miscalculation. It denied a third hypothesis assumed that the model of Altman Z Score model is most accurate in predicting financial distress of Japanese electronics manufacturing corporation.

From these results convey advice to writers is

1. Although the object of this study is the Japanese electronics manufacturing corporation not listed on the Indonesia Stock Exchange, but the effect on branch companies operating in Indonesia, so for investors in deciding investment, for creditors in lending and for corporate management in evaluating the performance of electronic manufacturing Japan is advised to use the financial distress prediction model Ohlson Y Score as the most accurate model.

2. The results of the analysis of financial distress prediction is not entirely accurate, but can be used by the management company of foreign capital of Japan as a base to take precautions in order to avoid financial distress as had been predicted, by investors as a basis for consideration before deciding to invest in foreign capital companies of Japan, by labor as pertimbagan before deciding to work in a foreign capital enterprise by the government of Japan and Indonesia, and other countries as a basis for memnutuskan policies related to foreign investment in Indonesia.

3. It is recommended for further research to be more focused on the research object prediction of financial distress on foreign capital corporations not only Japan but also other countries that have branches operating in Indonesia, using forecast models are different, in order to provide information and knowledge useful for internal and external parties as well as other related parties.

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