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FINANCIAL DISTRESS PREDICTION IN INDONESIA COMPANIES: FINDING AN ALTERNATIVE MODEL

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ABSTRACT

This study aims to identify suitable financial distress prediction model for companies in Indonesia. The population and samples used in this study are listed companies with the data range from 2006 to 2015. Samples were selected in a purposive manner at some stage. The first stage of study was choosing a company with negative earnings for two consecutive periods in the study period with total assets of around IDR1 trillion to IDR5 trillion. For a comparison, the researcher chose companies with positive earnings by the same criteria. As independent variables other than using financial ratios, variable corporate governance with ownership structure and macro-economic variables were also used as representation of conditions faced by companies in Indonesia. Analysis method used in this study was Binary Logistic Regression Analysis. The research found financial distress prediction influences by: Working Capital to Total Assets; Current Ratio; Book value of equity to total liabilities; Total Debt to Total Assets; EBIT to Current Liabilities; and Institutional Ownership.

KEY WORDS

Prediction Model, Binary Logistic Regression, Financial Distress

Every company wants to sustain its business, though sometimes it's difficult to maintain it due to unsupportive condition and have to face financial distress. Financial distress is a condition where a company is facing liquidity problems and is unable to pay its financial obligations. A company under financial distress may end up in bankruptcy unless immediate action is taken. Therefore early predictions about the likelihood of financial distress will help the company in finding the best solution to cope with financial problems.

According to Hanafi and Halim (2012), financial problems can be drawn from the two extremes factors, namely short-term liquidity problems (the lightest) to insolvable (most severe). Short term and long term difficulties can disrupt the company operations and even may cause forced delisting by capital market authority for listed companies.

Many studies have been attempted to assess the causes or factors that influence the occurrence of financial distress that use financial ratio indicators. According to Prihadi (2010), the univariate model of cash flow/total liabilities ratio is the most powerful indicator for predicting bankruptcy, while in the multivariate model, the most powerful ratios are: liquidity, solvency, profitability and activity.

Dwitridinda (2007) examined the effect of corporate governance implementation to the possibility of companies experiencing financial distress. The study showed that companies size variables, the implementation of corporate governance, as well as profit have a significant association with financial distress. Meanwhile, Hanifah (2013) study examined the influence of corporate governance structure and financial indicators on financial distress condition. The result showed that the size of the board of directors, managerial ownership, institutional ownership, leverage, and operating capacity have a significant influence on financial distress. Meanwhile, Fadhilah (2013) study investigated the characteristics of corporate governance to the possibility of financial distress. The results showed that the variable of ownership concentration, managerial ownership, the proportion of independent directors, the managerial agency costs, and audit opinion, have a significant effect on the likelihood of financial distress while government ownership variable has no significant influence. Rizki (2014) research reexamined the influence of the ownership structure to the possibility of financial distress in which liquidity served as an intervening variable. The results

showed that (1) there is a significant negative influence of managerial ownership on financial distress.

Anggraini research (2015) of 42 listed companies on Kompas 100 index from 2011-2013 proved that managerial ownership has no significant influence on financial distress like that of institutional ownership has. Whereas liquidity does not moderate the influence of ownership structure to financial distress. Wardhani (2006) stated that the possibility of a company fall under the financial distress is also influenced by the company's ownership structure.

To examine more deeply about the bankruptcy prediction model in Indonesia and analyze various variables influencing the financial distress. This study is conducted to determine which financial distress prediction model appropriate for the company in Indonesia with research sample of companies listed on the Indonesia Stock Exchange within 10 years period (2006 - 2015)

In addition to financial ratio, ownership structure and macro economy are also used as independent variables, which are supposed to represent the conditions faced by companies in Indonesia.

Based on the background described, the formulation of the problem in this research is: «What is the appropriate financial distress prediction model for the company in Indonesia?».

The purpose of this study is to determine what is the appropriate the bankruptcy prediction model in Indonesia.

The results of this study are expected to improve the science in accounting and economics and can be used as a reference for further research. Moreover, the results of this study are also expected to help companies or corporations to avoid and follow up on the possibility of financial distress, for the sake of improved company's development.

LITERATURE REVIEW

Financial Distress Overview. Financial difficulties encountered by the company may vary from liquidity problems (technical insolvency), where the company is unable to meet financial obligations, until solvency issue (bankruptcy), in which financial obligations of the company have exceeded the assets (Hanafi and Hamid,2012). The company is forced to fall under liquidation if the company's outlook is deemed unable to give any prospect. Nevertheless, many companies experiencing financial distress can be rehabilitated for the benefit of bondholders, stockholders, and society. Related to the bankruptcy suffered by Lehman Brothers, Azadinamin (2013) concluded that the signs of bankruptcy can be detected from the financial statements, including:

1. «Chronic inability to generate cash from operating activities»;
2. Massive and systematic investment in working capital items and even more intensive investments in financial tools and instruments;
3. Systematic use of external financing to offset operating deficits, in the which it mainly included long-term debt;
4. Steady deterioration of cash flows over the three years leading to the crisis.

According to Ross et al. (2013), the company is facing bankruptcy when its assets values are equal that of the debts. When this happens, the equity value is equal to zero, and control the company is shifted from stockholder bondholder.

Elloumi and Gueyie (2001) in Hanifah (2013) defined a company under a financial distress when having negative net income for two consecutive years. Classens (1999) in Ward (2006) defined a company under financial distress when having interest coverage ratio of less than one. Kristijadi (2003) in Almilia (2006) stated that a company experiencing financial distress is when a company suffers from negative net operating income and is not paying dividends for one consecutive year.

Financial Distress Model. Z Score bankruptcy prediction model was first introduced by Edward Altman in 1968 (Prihadi,2010). In 1993, Altman continued his research and found the final model by omitting the industry effect with the following model (Altman 1993, in Anjum 2012):

$$Z = 6.56(X_1) + 3.26(X_2) + 6.72(X_3) + 1.05(X_4)$$

Where: X_1 = Working capital / total assets; X_2 = Retained earnings / total assets; X_3 = Earnings before interest and taxes/total assets; X_4 = N.W. / (book value) total liabilities.

Z score calculation result indicates the company's conditions as follow:

- Z-score < 1.10: high bankruptcy probability;
- Z-scores > 2.60: not bankrupt;
- Z-scores between 1.10-2.60: gray area.

The bankruptcy prediction model was also developed by Ohlson in Kumar and Kumar (2012) with the following model:

$$\begin{aligned} O \text{ Score} &= -1,32 - 0,47 (\text{Size}) + 6,03 \left(\frac{TA}{TL} \right) - 1,43 \left(\frac{WC}{TA} \right) \\ &= + 0,08 \left(\frac{CL}{TA} \right) - 0,08 \left(\frac{NI}{TA} \right) + 1,83 \left(\frac{EBITDA}{TL} \right) + 0,285 (INTWO) - 1,72 (OENEG) \\ &= -0,52 \left[\frac{NI_t - NI_{t-1}}{|NI_t| + |NI_{t-1}|} \right] \end{aligned}$$

Where: INTWO: Dummy variable, the value of N =1 if net income was negative for the last two years, 0 if otherwise; OENEG: Dummy variable, 1 if total liabilities exceeds total assets, 0 otherwise.

To obtain bankruptcy prediction decision, O-Score must be transformed into probabilities by using Logistic Transformation.

$$= \frac{e^{0-\text{score}}}{1 + e^{0-\text{score}}}$$

If $P(0\text{-Score}) > 0.50$ = Bankrupt; < 0,50 = Not bankrupt

Springate model was first introduced by Gordon LV Springate (1978), which is a development model of Altman (Husen and Pambekti, 2014). The variables used to predict financial distress in Springate model include: A = Working Capital/Total Assets; B = Net Profit Before Interest and Tax/Total Assets; C = Net Profit Before Tax/Total Current Liabilities, and D = Sales/Total Assets.

$$Z_1 = 1,3 A + 3,07 B + 0,66 C + 0.4 D$$

The output value used is 0,862. If the value of Z_1 is lower than 0,862 exhibiting, the company is expected to go bankrupt (Purnajaya & Merkusiwati, 2014).

Furthermore, Zmijewski also developed a bankruptcy prediction model (Purnajaya & Merkusiwati, 2014) with the model:

$$Z_1 = -4,3 - 4,5X_1 + 5,7 X_2 - 0,004 X_3$$

Where: X_1 = Return On Asset; X_2 = Debt Ratio; X_3 = Current Ratio.

Bankruptcy prediction model was also developed by Jeffrey S Grover in 2001 (Prihantini and Ratnasari, 2013) with the following model:

$$\text{Score} = 1,650X_1 + 3,404X_2 + 0,16 ROA + 0,057$$

Where: X_1 = Working Capital/Total Assets; X_2 = Earnings Before Interest and Taxes/Total Assets; ROA = Net Income/Total Assets.

Grover Model categorizes a company into bankrupt if having a score of less than or equal to -0.02 ($Z < -0.02$), while the company categorized as not bankrupt is when $Z > 0.01$.

In addition to the financial ratio indicators, several researchers included corporate governance represented by ownership structure and macro-economic variables as indicators

of financial distress. In this study, researchers added variable of ownership structure and macroeconomic with expectations of representing financial distress issues in Indonesia

Ownership Structure. The ownership structure is one of the corporate governance mechanisms involving the company's internal factors that affect the achievement of corporate goals. Agency problem can be reduced by the ownership structure because it can reduce conflict between management and stockholders. Ownership structure is related to managerial ownership and institutional ownership.

Macro-economic Variables. In general, bankruptcy prediction model only uses financial ratios. However, Mohmad Isa on his research in Malaysia (2004) added macroeconomic variables and found that the Gross Domestic Product (GDP) serves as a significant variable in predicting financial distress in Malaysia. Another study showing a significant influence of GDP to the financial distress GDP was done by Bunn and Redwood, 2003 and Kritzer, 1985 (Alifiah, 2014)

Previous Research. Hanifah (2013) conducted a research on «The Influence of Corporate Governance Structure and Financial Indicators on financial distress». This study failed to prove the influence of board size, independent directors, audit committee size, liquidity, and profitability on the possibility of financial distress.

Fadhilah (2013) conducted a study on «The Analysis of Corporate Governance Characteristic Influence on the Possibility of Financial Distress». The results showed that the variable of ownership concentration, managerial ownership, the proportion of independent directors, the managerial agency costs, and audit opinion, have a significant influence on the likelihood of financial distress, while government ownership variable has no significant influence.

Almilia (2006) conducted a study on «Predicting Financial Distress in Listed Companies Using Logit Multinomial Analysis». The results showed that the financial ratios from the income statement, balance sheet and cash flow statement have a significant influence in predicting financial distress.

Dwitridinda (2007) conducted a study on the «The Influence of Good Corporate Governance Implementation on the Possibility of Companies Experiencing Financial Distress». This study used logistic regression analysis techniques, while the result of the study indicated that the variables of company size, corporate governance implementation, and profit have a significant influence to financial distress.

Pranowo (2010) conducted a study on the «Determinant of Corporate Financial Distress in an Emerging Market Economy: Empirical Evidence from the Indonesia Stock Exchange 2004 - 2008». The results of the study showed that the variables of current ratio, efficiency, equity, and dummy variable of good financial condition, have a positive and significant impact on the financial distress, whereas leverage variable has a negative and significant impact on the financial distress. On the other hand, profit, retained earnings, GCG, and macro economic factors have no influence on financial distress.

Triwahyuningtiyas (2012) conducted a study on the «Influence of Ownership Structure, Board of Commissioner Size, Independent Commissioner, Liquidity and Leverage on the Occurrence of Financial Distress». The results showed that the structure of ownership, board of directors size, liquidity and leverage, have a significant influence to the possibility of companies experiencing financial distress. On the other hand, the size of the board of commissioners and independent commissioner has no influence on the possibility of companies experiencing financial distress.

A study by Rizki (2014), entitled «The Influence of Ownership Structure to the Financial Distress with Liquidity as an Intervening Variable» focused on the manufacturing companies listed on Indonesia Stock Exchange from 2011 - 2013. The results of the study showed that managerial ownership significantly influences financial distress, yet, on the other hand, institutional ownership has no significant effect on financial distress. Managerial ownership and institutional ownership have no indirect influence on financial distress through liquidity as a mediator variable.

A study by Azadinamin(2013) entitled «The Bankruptcy of Lehman Brothers: Causes of Failure & Recommendations Going Forward» concluded that the negative cash flow during the three years was the main reason for the bankruptcy of Lehman Brothers.

As for a study by Mahama (2015) entitled «Assessing the State of Financial Distress in Listed Companies in Ghana: Signs, Sources, Detection and Elimination - A Test of Altman's Z-Score» investigated the application of Altman's Z score on 10 companies listed on the Ghana Stock Exchange (GSE) to determine the level of financial distress. The data used are from year 2007 to 2013. The results showed that 6 (six) companies didn't experience financial distress, while two (2) companies experienced financial distress, while two (2) other companies were facing financial distress.

Alifiah (2013) study entitled «Prediction of Financial Distress Companies in the Trading and Services Sector in Malaysia using Macroeconomic Variables» proved that the debt ratio, total asset turnover, working capital ratio, net income to total assets and base lending rate can predict financial distress of companies in Malaysia

Lastly, a study by Anggraini (2015) entitled «Financial Distress Prediction Model for Indonesian Companies» with samples of companies listed on the Kompas 100 Index during 2011-2013 proved that managerial ownership has no significant influence like that of institutional ownership has. Liquidity as moderating variable didn't affect the influence of the ownership structure to the financial distress.

Theoretical Framework. Based on the theoretical overview and previous studies, it can be concluded that financial distress is a financial condition that occurs prior to the bankruptcy or liquidation.

According to previous models, variables affecting financial distress, among others, are working capital to total asset, retained earnings to total assets, EBIT to total assets, the current ratio and bet worth to total liability, sales to total assets, total debt to total assets, return on assets, EBIT / Current Liabilities, and net income to total assets

Researchers added the ownership structure and macroeconomic variables which are represented by the ratio of total assets to GDP as variables that are expected to reflect the condition of companies in Indonesia.

The ownership structure explains the commitment of the owner to save the company. Thus, the ownership structure can reduce the likelihood of financial distress.

The comparison of company's total asset with GDP is a relative measure of the size of a company to national income of a country. This ratio reflects the company's ability to contribute to the economic growth of a country.

RESEARCH METHODS

Research Hypothesis Based on the theoretical study and the results of previous research, logical explanations, the theoretical framework on various financial ratios, ownership structure, macroeconomic variables, and financial distress, the following hypotheses are developed:

- H₁: There is an influence of working capital to total asset on the financial distress.
- H₂: There is an influence of retained earnings to total assets on the financial distress.
- H₃: There is an influence of EBIT to total asset on the financial distress.
- H₄: There is an influence of current ratio on the financial distress.
- H₅: There is an influence of book value of equity to total liabilities on the financial distress.
- H₆: There is an influence of sales to total asset on the financial distress.
- H₇: There is an influence of total debt to total asset on the financial distress.
- H₈: There is an influence of EBIT to current liabilities on the financial distress.
- H₉: There is an influence of net income to total asset on the financial distress.
- H₁₀: There is an influence of managerial ownership on the financial distress.
- H₁₁: There is an influence of institutional ownership on the financial distress.
- H₁₂: There is an influence of total asset to GDP on the financial distress.

Research Population and Sample. Population and samples used in this study are listed companies during the study period (2006-2015). Samples were selected purposively. The

first phase was done by selecting companies with negative earnings for two consecutive periods within the study period and had total assets of around IDR1 trillion to IDR5 trillion. For a comparison, the researcher chose companies with positive earnings by the same criteria.

Data Collection Technique. The data used in this research is secondary data, in which the data has been processed by primary data collector and through literature study related with the problems analyzed.

Data Analysis Method. Descriptive statistics is used to describe the variables in this study. The analysis tool used is mean, the maximum and minimum (Ghozali,2013). This analysis tool serves to describe the study variables.

Hypothesis testing was originally planned to use the Multiple Discriminant Analysis. However, since it does not meet the requirements of normal data, the data analysis method used Binary Logistic Regression Analysis to see the influence of the independent variable on the dependent variable, each of which has two alternative - bankrupt or not.

Analysis Stages. The followings are analysis done in binary logistic regression analysis. Assessing overall fit models to data can be done with some statistical tests.

a. Nagelkerke's R²:

Assessing the variability of dependent variable that can be explained by the the variability of independent variables to see the Nagelkerke's R² value, or equal to seeing the value of determination coefficient (R²) in the multiple regression analysis. This means that the percentage of dependent variable variations can be explained by the variability of the independent variables, while the remaining percentage is that the variation of the dependent variable is explained by variables outside the model.

b. Classification Table:

This table calculates the total correct and incorrect estimated value. In the column are two predicted value of the dependent variables, bankrupt (1) and not bankrupt (0), while on the line shows actual observed values of the dependent variable bankrupt (1) and not bankrupt (0). In a model, all cases will be on the diagonal line with forecasting accuracy rate of 100%. If the logistic model has homoscedasticity, the percentage of correct value will be the same for both rows.

c. Iteration History: Iteration history is identical to the model accuracy test using ANOVA (F test), or simultaneous hypothesis test.

Parameter Estimate and Interpretation. This test was conducted to test the significance of the independent variables partially to the dependent variable. This test was conducted to test the second hypothesis by comparing the value of Wald (t) with its sig. The hypotheses and analysis are: H₀: Variable X may have no effect on variable Y; H₁: Variable X may affect the variable Y.

Meanwhile, the Hypothesis Test is described as follows:

Based on the calculation, if (X₁) has Wald (t) value with significant value at $\alpha \leq 0.05$ (strong significance) thus the test will show that H₀ is rejected and H₁ accepted. This result shows that (X₁) affects (Y).

Based on the calculation, if (X₁) has of Wald (t) with significant value at $\alpha > 0.05$, the test will show that H₀ is accepted and H₁ rejected.

DATA ANALYSIS RESULTS

The calculation resulted in Cox and Snell's R value of 0.442, while Nagelkerke R² value of 0.590. It means that the variability of the dependent variable that can be explained by the variability of the independent variable is at 59%. The remaining 41% is explained by variables beyond the observation. This value indicates that Nagelkerke R² value is greater than that of the Cox & Snell R square. It shows the independent variables are able to explain variants of financial distress.

Iteration history is identical to the model accuracy test using ANOVA (F test), or simultaneous hypothesis test.

Table 1 – Financial Distress Research Data

n/n	N	Minimum	Maximum	Mean	Std. Deviation
Working Capital Total Assets	340	-4,12297	0,99476	0,0182282	0,56347478
Retained Earning Total Assets	340	-6,33856	28,62154	0,2487869	2,25895866
EBIT Total Assets	340	-0,48919	0,57718	0,0498749	0,11844054
Current Ratio	340	0,04070	19,10017	1,8947367	2,08641556
Book value equity to Total Liabilities	340	-0,96851	30,77952	1,4194250	2,54828645
Sales Total Assets	340	0,00059	10,07927	1,0569852	1,07063772
Total Debt Total Assets	340	0,03147	8,45056	0,6699050	0,71667211
EBIT Current Liabilities	340	-4,56955	5,62374	0,3323533	0,84777220
Net Income to Total Asset	340	-0,60294	0,46239	0,0335620	0,10827028
Managerial ownership	340	0,00000	17,97000	1,4501471	3,79495586
Institutional Ownership	340	20,48000	99,38000	72,7618529	18,89914897
Total Asset to GNP	340	-50055487,1747	115029136,0025	19407853,735627	23168532,201251

Source: Data, processed.

Table 2 – Dependent Variable Encoding

Original Value	Internal Value
NOT BANKRUPT	0
BANKRUPT	1

Nagelkerke's R value is interpreted as the value of R^2 in multiple regression.

Table 3 – Model Fit Assessment with Nagelkerke's R

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	272.869 ^a	0,442	0,590

a. Estimation terminated at iteration number 8 Because parameter estimates changed by less than 0.001.

Table 4 – Model Fit Assessment with Iteration History

Iteration		-2 Log likelihood	Coefficients
			Constant
Step 0	a	471,340	0,000

Constant is included in the models.

Initial -2 Log Likelihood: 471.340.

Estimation terminated at iteration number 1 Because parameter estimates changed by less than .001.

Iteration	-2 Log likelihood	Coefficients												
		Constant	Working Capital Total Assets	Retained Earning Total Assets	EBIT Total Assets	Current Ratio	Book value of equity to Total Liabilities	Sales Total Assets	Total Debt Total Assets	EBIT Current Liabilities	Net Income to Total Asset	Kepemilikan Manajerial	Kepemilikan Institusional	Total Asset to GNP
1	360,113	-1,024	-1,290	,038	-2,085	,038	,158	-,280	-,087	-,544	,784	-,009	,019	,000
2	321,376	-1,608	-3,275	,092	-1,235	,214	,324	-,205	-,067	-,959	-,136	-,015	,022	,000
3	287,234	-2,808	-6,900	,009	-,180	,676	,567	-,103	,820	-1,930	3,137	-,039	,022	,000
4	274,807	-4,694	-8,310	,090	-1,302	,857	1,015	-,135	2,692	-2,551	5,181	-,052	,027	,000
5	272,970	-5,707	-8,857	,099	-1,066	,925	1,323	-,139	3,856	-2,790	5,126	-,061	,028	,000
6	272,869	-5,995	-8,918	,099	-,967	,932	1,420	-,143	4,238	-2,836	5,046	-,064	,027	,000
7	272,869	-6,015	-8,919	,099	-,961	,932	1,428	-,143	4,266	-2,839	5,040	-,064	,027	,000
8	272,869	-6,015	-8,919	,099	-,961	,932	1,428	-,143	4,266	-2,839	5,040	-,064	,027	,000

Constant is included in the model.

Initial -2 Log Likelihood: 471,340.

Estimation terminated at iteration number 8 because parameter estimates changed by less than 0,001.

Through both iteration history tables we can calculate the value of $-2(L_0 - L_1)$ as follows:

$$-2(L_0 - L_1) = 471,340 - 272,869 = 198,471$$

Where: $\alpha = 0,05$ and degree of freedom (df) = k = 12, where k is the predictor variable number, the $\chi^2(p)$ value from chi-square distribution table is 22,36203. Since $198,471 > 22,36203$ or $-2(L0-L1) > \chi^2(p)$, it can be concluded that all 12 predictor variables simultaneously have significant influence to financial distress variable.

Parameter Estimate and Interpretation. The following description and Table 5 are used to view the parameter estimate and interpretation.

Table 5 – Hypothesis Testing

n/n	B	SE	Wald	Sig.	Exp (B)
Working Capital Total Assets	-8,919	1,467	36,951	0,000	0,000
Retained Earnings Total Assets	0,099	0,097	1,060	0,303	1,105
EBIT Total Assets	-0,961	4,035	0,057	0,812	0,382
Current Ratio	0,932	0,243	14,708	0,000	2,538
Book value of equity to Total Liabilities	1,428	0,346	17,034	0,000	4,169
Sales Total Assets	-0,143	0,185	0,598	0,439	0,867
Total Debt Total Assets	4,266	1,551	7,570	0,006	71,269
Liabilities Current EBIT	-2,839	0,905	9,840	0,002	0,059
Net Income to Total Assets	5,040	4,633	1,184	0,277	154,511
Managerial ownership	-0,064	0,051	1,591	0,207	0,938
Institutional ownership	0,027	0,010	6,827	0,009	1,028
Total Assets to GNP	0,000	0,000	0,620	0,431	1,000
Constant	-6,015	1,379	19,017	0,000	0,002

Column B: if positive, the voter criteria is in criteria 1, otherwise, it's in criteria 0.

Column Sig: If sig is below 0.05, the independent variables have significant influence on the dependent variable.

The value of the estimated regression model coefficient, thus the logistic regression models are as follows:

$$\ln \frac{p}{1-p} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots \beta_k X_k$$

The logistic regression equation above result above cannot be directly interpreted from the coefficient value as in ordinary linear regression. The interpretation can be done by referring to Exp (B) value or exponent value from the formed regression equation coefficient.

For the predictor variables in this case, where all 13 predictor variables are metric data type, the value of Exp (B) can be interpreted as if the independent variable increase by 1, the financial distress will increase by Exp (B): If Retained Earnings to Total Assets increases by 1 unit, there will be changes in Financial Distress by 1.105. This also applies to interpretation in other predictor variables.

Still through the Variables in the Equation table, the probability value (p-value) of parameter significance can be seen in column Sig., where the p-value smaller than a predetermined level of significance (0.05) can be interpreted that the predictor variable in question has a significant influence on the response variable.

It can be concluded that partially, Working Capital to Total Assets has negative influence on Financial Distress. Retained Earnings to Total Asset has no influence on Financial Distress. EBIT to Total Asset has no influence on Financial Distress. Current Ratio has positive influence on Financial Distress. Book value of equity to Total Liabilities has positive influence on Financial Distress. Sales to Total Asset has no influence on Financial Distress. Total Debt to Total Asset has positive influence on Financial Distress. EBIT to Current Liabilities has negative influence on Financial Distress. Net Income to Total Assets has no influence on Financial Distress. Managerial Ownership has no influence on Financial Distress. Institutional Ownership has positive influence on Financial Distress. Total Assets to GDP has no influence on Financial Distress.

The following equation can find out whether a company goes bankrupt or not:

$$p = \frac{1}{1 + e^{-(-8,919X_1 + 0,932X_2 + 1,428X_3 + 4,266X_4 - 2,839X_5 + 0,027X_6)}}$$

Where: X1: Working Capital Total Assets; X2: Current Ratio; X3: Book value of equity to Total Liabilities; X4: Total Debt Total Assets; X5: Liabilities Current EBIT; X6: Institutional Ownership.

If the p value is greater than 0.5, it can be concluded that the company is likely to experience financial distress (Alifiah,2013) (Ohlson in Kumar and Kumar 2012).

CONCLUSION AND RECOMMENDATIONS

From the results of a study of all companies listed on Indonesia Stock Exchange, it resulted in a conclusion, the model that can be used to predict the financial distress of companies in Indonesia.

Based on the findings and discussion of the research, some suggestions can be made as follows.

- Listed companies can use the model to assess its financial condition, which is expected to prevent financial distress which can lead to bankruptcy.
- Further research should be conducted to test the accuracy of the model and the development of simpler model.

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REFERENCES

1. Alifiah, M.N. (2013). Prediction of financial distress companies in the trading and services sector in Malaysia using macroeconomic variables. International conference on Innovation Management and Technology Research, Malaysia 22-23 September 2013.
2. Almilia, L.S. (2006). Prediksi Kondisi Financial Distress Perusahaan Go Public dengan Menggunakan Analisis Multinomial Logit. Jurnal Ekonomi dan Bisnis, XII (2).
3. Altman, E.I. (1968). Predicting Financial Distress of Companies Revisiting The Z Score and Zeta Models.
4. Azadinamin, A. (2013). The Bankruptcy of Lehman Brothers: Causes of Failure & Recommendations Going Forward, Swiss Management Center (SMC) University,
5. Andre, O. (2013). Pengaruh Profitabilitas, Likuiditas, Leverage dalam Memprediksi Financial Distress. Diponegoro Journal of Accounting,1(1).
6. Anggraini, D. (2015). Financial Distress Model Prediction for Indonesian Companies. International Journal of Management and Administrative Sciences (IJMAS),3(4):74-84.
7. Brahmana, R. (2004). Identifying Financial Distress Condition in Indonesia Manufacture Industry. Birmingham Business School, University of Birmingham United Kingdom.
8. Dwitridinda. (2007). Pengaruh Penerapan Corporate Governance Terhadap Kemungkinan Perusahaan Mengalami Financial Distress. Jakarta: Universitas Indonesia.
9. Elloumi, F., and Gueyie, P.J. (2001). Financial Distress And Corporate Governance: An Empirical Analysis. Corporate Governance,1(1):15-23.
10. Emery, D.R., Finnerty, J.D., and Stowe, J.D. (2004). Corporate Financial Management,2nd ed. Prentice Hall.
11. Fadhilah, F.N. (2013). Analiss Pengaruh Karakteristik Corporate Governance Terhadap Kemungkinan Financial Distress. Diponegoro Journal Of Accounting,2(2).
12. Ghozali, I. (2013). Aplikasi Analisis Multivariate dengan Program IBM SPSS21 Update PLS Regresi. Semarang: Badan Penerbit Universitas Dipenogoro.

13. Hanifah, O.E. (2013). Pengaruh Struktur Corporate Governance dan Financial Indicators Terhadap Kondisi Financial Distress. *Diponegoro Journal Of Accounting*,2(2).
14. Jensen, M.C., and Meckling, W.H. (1976). Theory of the Firm: Managerial Behaviour, Agency Cost and Ownership Structure. *Journal of Financial Economics*. 3(4),305-360.
15. KNKG. (2012). Prinsip Dasar dan Pedoman Pelaksanaan Good Corporate Governance Perbankan Indonesia: Komite Nasional Kebijakan Governance.
16. Kumar, R.G. and Kumar, K. (2012). A Comparison of Bankruptcy Models. *International Journal of Marketing, Financial Services & Management Research*,1(4),2012.
17. Mahama, M. (2015). Assessing the State of Financial Distress in Listed Companies in Ghana: Signs, Sources, Detection and Elimination – A Test of Altman's Z-Score. *European Journal of Business and Management*, Volume 7 No 3,2015.
18. Maryam, K.A. and Sara, M. (2013). Comparing Logit, Probit and Multiple Discriminant Analysis Models in predicting Bankruptcy of Companies. *Asian Journal of Finance & Accounting*,1(5),2013.
19. Nur, E.D.P. (2007). Analisis Pengaruh Tata Kelola Perusahaan (Corporate Governance) Terhadap Kesulitan Keuangan Perusahaan (Financial Distress). *Jurnal Bisnis dan Akuntansi*,9 (1),99-108.
20. OECD (2004). OECD Principles of Corporate Governance.
21. Parulian, S.R. (2007). Hubungan Struktur Kepemilikan, Komisaris Independen dan Kondisi Financial Distress Perusahaan Publik. *Integrity*,1 (3): 263-274.
22. Plat, H and Plat, M.B. (2002). Predicting Corporate Financial Distress: Reflections On Choice Based Sample Bias. *Journal of Economics and Finance*,26 (2),184-199
23. Platt, M. and Platt, H.D. (2006). Financial Distress Comparison Across Three Global Regions. *Journal of Risk and Financial Management*.
24. Pranowo, K. (2010). Determinant Of Corporate Financial Distress In An Emerging Market Economy. *Eurojournal Publishing, Inc.*2010,52.
25. Prihadi, T. (2010). Analisa Laporan Keuangan, Teori dan Aplikasi, Penerbit PPM, page 333.
26. Prihantini, N.M.E.D. and Ratnasari, M.M. (2013). Prediksi kebangkrutan dengan model Grover, Altman Z-Score, Springate dan Zmijewski pada perusahaan Food and Beverage di BEI. *E-jurnal akuntansi Universitas Udayana*.
27. Purnajaya, K.D.M. et al (2014). Analisa Komparasi potensi Kebangkrutan dengan Metode Z Score Altman, Springate, dan Zmijewski pada Industri Kosmetik yang terdaftar di BEI. *E-jurnal Akuntansi Universitas Udayana*.
28. Ross, W.J. (2013). *Fundamental Of Corporate Finance*, McGraw-Hill, Irwin.
29. Wardhani, R. (2007). Mekanisme Corporate Governanace dalam Perusahaan Yang Mengalami Permasalahan Keuangan. *Jurnal Akuntansi dan Keuangan Indonesia*,4(1):95-114.
30. Zeymoglu, E. and Akarim, Y.D. (2013). Financial Failure Prediction Using Financial Ratios: An Empirical Application on Istanbul Sock Exchange. *Journal of Applied Finance and Banking*, Vol 3, No.3 ISSN: 1792-6580 (print version),1792-6599(online) Scienpress Ltd,2013.