

DETERMINANT OF FINANCIAL DISTRESS AND BANKRUPTCY IN MISCELLANEOUS INDUSTRY

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Abstract

The purpose of this study is to predict the determinant of financial distress and bankruptcy which consists of seven financial ratios such as net working capital to total assets, current asset to sales, current liabilities to total assets, market value of stock to book value of total debt, sales to total assets, retained earning to total assets and earning before interest and tax to total assets. Population of this study is all of miscellaneous industry which listed in Indonesian Stock Exchange (IDX) in the period of 2004 to 2012. Based on purposive sampling, 162 companies-years observations were selected. Sample is classified into distress company group and non distress company group. The logistic regression is used to answer the research question. The result of this study showed that the financial ratio which selected as determinant of financial distress and bankruptcy were sales to total assets and earning before interest and tax to total assets with the level of accuracy of prediction at 85,2%.

Keywords : financial ratio, financial distress, bankruptcy, logistic regression

1. Introduction

In mid of 1997, monetary crisis has occurred in the world. This crisis extended to be economic crisis, which gave the impact on almost all of countries including Indonesia. It is indicated by depreciation of Rupiah to US Dollar which gave significant impact on Indonesian economic (Usahawan, 1997).

According to Samuelson (1999), economic crisis is a condition which depreciation of real Gross National product (GNP), high unemployment rate, low output and investment rate and also the failure of industry. Almost every company was effected by economic crisis, particularly listed company in the capital market.. This condition can be identified through company difficulties in running of business because operational expenses and financial expenses were very costly. Based on these evidence many company was going to bankrupt, many employees were fired, high inflation rate cause depreciation of value of Rupiah resulted in increase value of foreign deb (Usahawan, 2000).

Makaliwe (2000) also explained that. The great depreciation of Rupiah resulted in increasing amount of interest and principal of foreign debt. This condition causes financial distress in company. Further more, profit, working capital and investment will decrease. All of them resulted in decrease volume of production. The value of import product and component of production will increase significantly because of depreciation of Rupiah.

Based on explanation above, it can be concluded that the economic crisis caused the increasing amount of foreign debt payment and foreign financing. It gave the impact on business particularly to listed companies in Indonesia Stock Exchange (IDX), especially miscellaneous industry. It is necessary for miscellaneous industry to have capital goods, raw material import and foreign financing. When value of Rupiah is decrease, it would increase the price of raw material import and

value of foreign debt. It cause a serious problem in miscellaneous industry. This condition as known as financial distress. Financial distress is a situation where a compani’s operating cash flow are not sufficient to satisfy current liabilities (such as account payable or interest expenses) so that the company is forced to make decission in order to solve the problem (Wruck, 1990).

Based on data from financial statement in Indonesian Capital Market Directory (ICMD), many company in miscellaneous industry have a negative operating cash flow. It is indicated by there was financial distress in this sector. If financial distress could not be mitigated so that it probably caused bankruptcy. To avoid bankruptcy, predictive analysis of financial distress is necessary to be executed as an early warning system in company. It is better for company to identify financial distress immediately in order to take corrective action.

To overcome financial distress, company has tool and technique to control the condition of financial company. One of technique is financial ratios analysis such as liquidity, leverage, activity and profitability ratios.

2. Literature Review

Financial Distress and Bankruptcy Concept

Wruck (1990) explained that financial distress is a situation where a compani’s operating cash flow are not sufficient to satisfy current liabilities (such as account payable or interest expenses) so that the company is forced to make decission in order to solve the problem (Wruck, 1990). Financial Distress begins when company has liquidity problem in the short term. This condition usually for temporary time, but if the company don’t anticipate it, this condition will be worse. It will bring company to bankruptcy. Bankruptcy is a situation where company has a worst financial distress as a result company can’t running business (Haryadi, 2006).

Altman Z Score Concept

In 1973, Altman has formulated a discriminant model based on his research. This model is useful to detect bankruptcy which as known as Z Score Analysis. In 2000, Altman reformulated his model especially for non manufacturing company. This model consist of three formulas :

1. For manufacturing company

$$Z = 1.2(X_1) + 1.4(X_2) + 3.3(X_3) + 0,6(X_4) + 0,999(X_5)$$
 2. For listed company

$$Z = 0.717(X_1) + 0.847(X_2) + 3.107(X_3) + 0.420(X_4) + 0.998(X_5)$$
 3. For non manufacturing company

$$Z = 6.65(X_1) + 3.26(X_2) + 6.72(X_3) + 1.05(X_4)$$
- where :
 X_1 = Net Working Capital/Total Assets
 X_2 = Retained Earning/Total Assets
 X_3 = EBIT/Total Assets
 X_4 = Market Value of Equity/Book Value of Debt
 X_5 = Sales/Total Assets

Each Altman’s Z Score Model above has cutt off point as described by following Table.

Table 1: Z Score Value

Prediction	Company		
	Manufacturing	Listed	Non Manufacturing
<i>Bankruptcy</i>	<1.81	<1.23	<1.1
<i>Zone of Ignorance</i>	1.81 to 2.99	1.23 to 2.90	1.1 to 2.6
<i>Non bankruptcy</i>	>2.99	>2.90	>2.6

Previous Studies

Beaver (1966) is the first researcher who had researched to predict of financial distress. In his research, Beaver used 29 financial ratios. Beaver found that cash flow to total liabilities is the best predictor to determine financial distress in a company.

Altman also had researched in 1968. In his research, Altman used 22 financial ratios and found that five of them can be predictor to differentiate bankruptcy company group and non bankruptcy company group. Five predictors are net working capital to total assets, retained earning to total assets, earning before interest and tax to total assets, equity to total debt and sales to total debt. Altman also found a form of formula to detect bankruptcy as known as Z Score Analysis. Z Score Analysis is used to calculate total score from multiplication of financial ratios which show the probability of bankruptcy. Based on the result of his research, Altman concluded that if a company has value of Z Score is lower than 2,675, it has a greater potential bankruptcy. Otherwise, if a company has value of Z Score is higher than 2,675, it has a smaller potential bankruptcy.

Kaveri (1980) used 520 companies as sample in his research in India. In his research, Kaveri used 22 financial ratios and as a result five financial ratios were selected as predictor of financial distress and bankruptcy. The predictor are current ratio, stock/ cost of goods sold, current asset/ net sales, net profit/ total capital employed dan net worth/ total outside liabilities.

Wah et al (2001) had researched by using 11 financial ratios in Malaysia. This research showed the best predictor in financial distress were sales to current asset, current asset to current liabilities, percentage of changes in earning after tax. The rate of predictive accuracy in this research at 82,4%.

Muhamad (2006) also held reserched in Malaysia. This research used data from listed company in 1997 to 2000. The result of this research showed the best predictor in financial distress were Total Liabilities to Total Assets, Asset Turnover, Inventory to Total Assets, Sales to Total Assets dan Cash to Total Assets with the rate of predictive accuracy at 88%.

4. Research Methodology

Sample and data collection method

Population in this study is all listed companies in Indonesian Stock Exchange (IDX) in period of 2004 to 2012. Based on purposive sampling, 162 companies-years were selected and once outlier test were conducted. Data is collected from Indonesian Capital Market Directory (ICMD) and audited financial report.

Measurement of variables

This study used dependent variable and independent variable.

- a. Dependent variable is a condition of company in miscellaneous industry which simbol as 0 for distress company and 1 for non distress company.
- b. Independent variable is determinant of financial distress and bankruptcy consists of seven financial ratios. Table 2 described the measurement of financial ratios.

Table 2: Measures of financial ratios

Variable	Definition	Measurement	Scale
1. Liquidity Ratio (X ₁ and X ₂)	Financial ratio is used to measure ability of company to pay short term liabilities	<p>Net Working Capital to Total Assets</p> $\frac{\text{Current Asset} - \text{Current Liabilities}}{\text{Total Assets}}$ <p>(Altman,1973)</p> <p>Current Asset to Sales</p> $\frac{\text{Current Asset}}{\text{Sales}}$ <p>(Kaveri, 1980)</p>	<p>Ratio in percentage (%)</p> <p>Ratio in percentage (%)</p>
2. Leverage Ratio (X ₃ and (X ₄)	Financial Ratio is used to measure the ability of company to pay long term financial liabilities	<p>Current Liabilities to Total Asset</p> $\frac{\text{Current Liabilities}}{\text{Total Assets}}$ <p>(Altman,1973)</p> <p>Market Value of Equity to Book Value of Total Debt</p> $\frac{\text{Total Outstanding Stock} \times \text{closing price}}{\text{Total Debt}}$ <p>(Altman, 1973)</p>	<p>Ratio in percentage (%)</p> <p>Ratio in percentage (%)</p>
3. Activity Ratio (X ₅)	This ratio shows how effective the company use its resources	<p>Sales to Total Assets</p> $\frac{\text{Sales}}{\text{Total Assets}}$ <p>(Altman, 1973)</p>	Ratio in percentage (%)
4.Profitability Ratio (X ₆ and X ₇)	These ratio is measured ability of company to generate earning at a time	<p>Retained Earning to Total Assets</p> $\frac{\text{Retained Earning}}{\text{Total Assets}}$ <p>(Altman, 1973)</p> <p>Earning Before Interest and Tax EBIT</p> $\frac{\text{EBIT}}{\text{Total Assets}}$ <p>(Altman, 1973)</p>	<p>Ratio in percentage (%)</p> <p>Ratio in percentage (%)</p>

Technique of analysis

All of variables in this study will be analyzed by using logistic regression. Model in this study use binary logistic because the dependent variable (Y) is in categories (dummy).

5. Results and Discussion

Based on ICMD and supported by www.sahamok.com, there were 38 companies in miscellaneous industry which listed in IDX. Based on purposive sampling, 18 companies were selected as a sample. This study used data from 2004 to 2012, so it will generate 162 company-years observations.

All of companies-years observation is classified into distress group and non distress group based on operating cash flow (Wruk, 1990 and Wah et al, 2001). If a company has a negative operating cash flow, it will be classified into distress group (category 0), otherwise if a company has a positive operating cash flow, it will be classified into non distress group (category 1).

It is necessary to test the feasibility of logistic regression before analyze the result. The indication of a good model can be described on (*Overall Model of Fit*) value of *-2 Log Likelihood* in *Block 0* and value of *-2 Log Likelihood* in *Block 1*, value of *Chi Square Hosmer and Lemeshow Test*, *Omnibus Tests of Model Coefficients*, and value of correlation coefficient matrix.

- a. A model is feasible if value of *-2 Log Likelihood* at Block 0 is higher than value of *-2 Likelihood* at Block 1, as described on Table 3.

Table 3
Feasibility Test *-2 Log Likelihood* Logistic Regression Model

Regression Model	Iteration	Value of <i>-2 Log Likelihood</i>	Conclusion
<i>Block 0</i>	1	189.663	Feasible
	2	189.491	
	3	189.491	
	4	189.491	
<i>Block 1</i>	1	122.190	
	2	103.904	
	3	99.164	
	4	98.644	
	5	98.636	
	6	98.636	
	7	98.636	

- b. Based on *Omnibus Tests of Model Coefficients*, this model is feasible because it has significant level $0,000 < 0,05$.

Table 4
Feasibility test of *Omnibus Tests of Model Coefficients* Logistic Regression Model

Iteration	Value of <i>Chi-Square</i>	<i>df</i>	<i>Sig.</i>	Conclusion
<i>Step</i>	90.855	7	0,000	Feasible
<i>Block</i>	90.855	7	0,000	
<i>Model</i>	90.855	7	0,000	

- c. Value of *Hosmer and Lemeshow Goodness-of-Fit Test* has significant level $0,920 > 0,05$, so this model is feasible.

Table 5
Feasibility test of *Hosmer and Lemeshow Goodness-of-Fit Test*
Logistic Regression Model

Iteration	Value of <i>Chi-Square</i>	<i>df</i>	<i>Sig.</i>	Conclusion
<i>Step 1</i>	3.216	8	0.920	Feasible

- d. Value of corellation coefficient matrix of model is feasible if lower than 0,80, as described on Table 6

Table 6
Value of corellation coefficient matrix

	Constant	X1	X2	X3	X4	X5	X6	X7
Step 1								
Constant	1.000	-0.380	-0.558	-0.549	-0.024	-0.488	0.235	-0.056
X1	-0.384	1.000	-0.044	0.417	-0.072	0.222	0.466	-0.070
X2	-0.558	-0.044	1.000	-0.055	-0.162	-0.018	0.119	0.187
X3	-0.549	0.417	-0.055	1.000	0.000	0.083	0.086	-0.041
X4	-0.024	-0.072	-0.162	0.000	1.000	-0.319	0.013	0.228
X5	-0.488	0.222	-0.018	0.083	-0.319	1.000	0.084	0.162
X6	0.235	-0.466	-0.119	0.086	-0.013	-0.084	1.000	0.058
X7	-0.056	-0.007	0.187	-0.041	-0.228	0.162	0.580	1.000

The finding of this study show probability level and accuracy of the logistic regression model in predict financial distress and bankruptcy in miscellaneous industry as described on Table 7.

Table 7
Classification and The Accuracy of The Logistic Regression Model

Observation		Prediction		
		<i>Condition of Company</i>		Level of Accuracy
		<i>Distress</i>	<i>Non Distress</i>	
<i>Step 1</i>	<i>Distress</i>	27,0	17,0	61,4
<i>Condition of Company</i>	<i>Non Distress</i>	7,0	111,0	94,1
<i>(Overall Percentage)</i>				85,2

Table 7 showed that this model is more appropriate to predict non distress company with the accuracy of prediction at 94,1%. It is better than the accuracy of prediction in the distress group at 61,4%. Overall this model is feasible to predict financial distress in miscellaneous industry at 85,2%. Moreover, the performance of financial ratio in predicting financial distress can described on Table 8.

Table 8
Summary of Logistic Regression Result

Predictor Variable	Regression Coefficient (<i>B</i>)	<i>sig</i>
Constant	-1.827	0.156
X1	3.476	0.096
X2	2.653	0.149
X3	1.319	0.415
X4	-0.662	0.088
X5	2.465	0.005
X6	1.457	0.128
X7	21.890	0.000

Based on Table 8 above, the equation of logistic regression model was formed

$$Z_i = -1.827 + 3,476X_1 + 2,653X_2 + 1,319X_3 - 0,662X_4 + 2,465X_5 + 1,457X_6 + 21,890 X_7$$

$$\text{Nagelkerke } R^2 = 0,623$$

where

Z_i = condition of company, 0 = Distress and 1 = Non Distress

X_1 = Net Working Capital to Total Assets (NWC/TA)

X_2 = Current Liabilities to Sales (CL/SALES)

X_3 = Current Liabilities to Total Assets (CL/TA)

X_4 = Market Value of Equity to Book Value of Debt (MVE/BVD)

X_5 = Sales to Total Assets (SALES/ TA)

X_6 = Retained Earning to Total Assets (RE/TA)

X_7 = Earning Before Interest and Tax to Total Assets (EBIT/TA)

Value of *Nagelkerke* R^2 show that variability changes in the independent variables can explained the variability of the dependent variables changes by 62,30% and the rest is explained by other variables outside of this study was 37,80%.

Based on Table 8 above, it appears that two financial ratios were selected as the best determinant to predict of financial distress in miscellaneous industry. These ratios were sales to total assets (X_5 at significant level $0,005 < 0,05$) and earning before interest and tax to total assets (X_7 at significant level $0,000 < 0,05$). This result is consistent with the findings of Altman (2000), Nam and Jinn (2000) also Muhamad (2006). It means that distress or non distress of company is determined by the ability of company to generate cashflow from sales to total assets. It is necessary for company to always control this ratio in order to avoid bankruptcy. In this case, company must be able to increase sales. On other hand, company must be able to reduce cost by efficiency in production. In this condition, it is impossible for company to increase price because of the impact of inflation reduce the demand.

With higher cash flow from increased sales, it means that better the financial performance of the company. This condition will provide more protection against the threat of financial distress and bankruptcy. Investors can use this information as a consideration in invest their fund.

Earning before interest and tax to total assets was also selected as the best determinant of financial distress and bankruptcy in miscellaneous industry. This result is consistent to Altman (2000). This result suggested that company to identify the first symptom of financial distress. The companies which have better profitability ratios will be protected from financial distress and bankruptcy. Investors can consider this as a good signal in determining investment decisions

6. Conclusion and Future Recommendation

This study showed that the best determinant to predict financial distress and bankruptcy in miscellaneous industry were sales to total assets and earning before interest and tax to total assets with the level of accuracy of prediction at 85,2%. All of financial ratios as variable can explained condition of company at 62,3% and the rest is explained by other variables outside of this study was 37,80%. The companies are suggested to always control this ratio in order to avoid financial distress and bankruptcy. Investor and creditor can use this result as a consideration in investment decisions.

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