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Predicting Financial Distress of Manufacturing Sectors in Indonesia

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ABSTRACT: In this era of globalization, the manufacturing sector has developed rapidly in line with the number of customers growing, but the growth has been unmatched by an increase in operating income. Therefore, it is important to analyze the financial distress of manufacturing companies to avoid bankruptcy. This study aims to determine the effect of financial ratios to predict the probability of financial distress. Financial ratio indicators use profitability ratios and leverage ratios. The population in this study are manufacturing companies listed on the Indonesia Stock Exchange 2014-2019. Based on the purposive sampling method, the financial distress criteria in this study were measured using a negative profit balance, while the statistical analysis used logistic regression with a significance level of 5%. The result is the profitability ratio and the leverage ratio have a significant positive value for predicting financial difficulties.

KEYWORDS - Profitability, Leverage, Financial Distress, Binary Logit

I. INTRODUCTION

The capital market is currently popular because of its role as a vehicle for investment and also as a source of funding. In investing in the capital market, investors should not only expect the benefits to be obtained but also need to consider the possible risks that occur. In addition, in terms of funding, the company also needs to maintain a healthy financial condition so that its shares are still listed on the capital market. A company that has a good financial condition means that the company has succeeded in getting profits and maintaining the survival of the company. Companies are required to be able to compete with foreign companies. The experience and strength of companies influence the benefits of the widespread influence of globalization, but for companies that are just growing and still starting to develop on a national scale, it will be difficult to compete with larger foreign companies, so the impact for these companies is experiencing a financial crisis.

In Indonesia, if financial difficulties occur in a company, the risk is the company will be delisted from the Indonesia Stock Exchange (IDX). Companies can be delisted from the Indonesia Stock Exchange (IDX) because the company is in financial distress or is experiencing financial difficulties. The capital market as an intermediary institution today consists of various companies grouped into certain sectors. One of the sectors in the capital market is the manufacturing sector. The Central Statistics Agency noted the growth of large and medium-sized manufacturing industries was experiencing a slowdown in the second quarter of 2019 compared to the conditions in the last two years. This is because the performance of the metal goods industry, not its machines and equipment, has dropped dramatically. The growth of medium and large manufacturing industries was 3.62 percent. Meanwhile, the second quarter of 2018 was able to reach 4.36% and in 2017 it reached 3.89%. However, this data shows a declining growth trend. One of the causes of the slowdown was a decline in production in a number of manufacturing industries. The metal goods industry, not machinery and equipment, was the type of industry with the most significant decline in the second quarter of July, namely up to 21.46% compared to the second quarter of the previous year.

By observing the condition of this slowdown in growth, there are even some of them that have decreased, and no growth has occurred, so companies that are members of the manufacturing industry group can make decisions and take actions to survive and not experience financial distress due to a crisis that could threaten. Companies, especially those that have experienced financial distress, should be able to conduct predictive analysis and early detection before going bankrupt. This analysis can also be considered for related parties like investors, regulatory authorities, auditors, and competing companies, and the general public.

Financial distress is a stage of deteriorating financial conditions prior to bankruptcy [1]. Financial distress is a difficult condition to define. This condition can originate from the company's inability to manage the company, resulting in operating losses or net losses for the current year and/or operating cash flows that are smaller than the operating profit. If this condition cannot be recovered, it will interfere with the equity component and the company's ability to meet its long-term, even short-term obligations. Thus, financial hardship can be seen as a long-term continuum, ranging from mild to most severe [2]. Analysis of financial

distress is important, both for company management and stakeholders. The ability to indicate financial distress allows companies to anticipate through various business programs/plans to minimize the impact and even get out of the problem. For stakeholders, an indication of financial distress will help in making the right decisions related to the company to minimize risks. This is because stakeholders, especially investors and creditors, are the largest recipients of risk in cases of financial distress.

Almost all studies regarding financial difficulties, measures, and financial ratios play a dominant role in almost all the variables used as predictors. This proves the fact that the ratio makes a big contribution to understanding the company's financial performance and future financial status [3]. Research related to the prediction of financial distress and bankruptcy using financial ratios as predictors has been widely conducted. Altman (1968) conducted research using the first multivariate model which produced a Z-Score to predict financial distress. This model was further refined to produce the Modified Altman Model in 1995. The Modified Altman Model involves financial liquidity ratios, financial structure, and management efficiency to predict financial distress.

Research conducted by Yap [3] in Malaysia uses 16 financial ratios and shows that the ratios of retained earnings to total assets, cash flows to total debts, cash to current liabilities, and total debts to total asset affect the delisted companies. Terzi's research [4] in Turkey uses 27 financial ratios and shows that assets turnover, equity to total assets, retained earnings to total assets, and working capital to total assets affect the prediction of financial distress as measured by using the Altman Z-Score model. The renewal of this research is to use the Binary Logit model from many financial distress prediction models to determine the accuracy of the prediction models to predict financial distress formed from the analysis. Binary logit regression is considered a method that can be used to form a prediction model for financial distress that has high accuracy [5]. Based on the background description, the researchers are interested in conducting financial distress analysis using Binary Logit.

This study will use the Binary Logit model in predicting financial distress. Based on the Binary Logit regression, the results are expected to be able to produce a financial distress prediction model with a high degree of accuracy. In addition, the prediction model can be used by interested parties such as academics as information on scientific development, investors, companies, stakeholders, government, and so on to formulate appropriate strategies for decision making that ultimately improve the economy in Indonesia.

Various studies on financial distress have been carried out. As stated by Iskandar [6] revealed that many studies have been carried out on the topic of financial distress both in terms of data collection techniques, analysis techniques, and so on with the objective equation that is finding optimal solutions for the estimated performance formed. Some of the models that have been made include the logit model (Rowland [7], Antikasari & Juminah [8]; Vu [9]; Sun [10]; Hassan, Zainuddin, and Nordin [11]; Mraihi [12]; Waqas [13]; Dewi [14]; Kerroucha [15]; Jones [16]). Regarding the object of research, there are also various objects, like regional objects (country, region, etc.), industry classification, time span, economic conditions, and others. Several previous studies that conducted research on financial distress through various models showed different results including that conducted by Iskandar [17] showing the financial ratios in the company's financial statements consisted of Current Ratio (CR), Operating Profit Margin (OPM), Return On Asset (ROA), Return On Equity (ROE) and stock beta value (YLD) can be used to differentiate and classify companies into groups experiencing financial distress and non-financial distress. Based on the differences in the research results that have been started, the researcher will review and analyze financial distress using the binary logit model approach. The binary logit model approach has better prediction accuracy in the long run (over one and a half years) [18].

II. LITERATURE REVIEW

Financial problems will most likely arise if the company has problems with profitability and leverage. If these conditions are not taken into account and are not immediately resolved, they may result in bankruptcy [19]. Financial distress is a condition that needs immediate attention from the company so that the company can continue to survive. "Financial distress is defined as a condition in which a firm incurs more debt than its firm size, profitability and asset composition can sustain. With a declining ability to generate revenue coupled with a lack of cash flow from operations, a financially distressed firm will be trapped in serious liquidity problems, thus affecting its solvency" [20]. This definition indicates that when there is financial distress. This means that the company has a lot of debt compared to the value of the company, as well as a low level of profitability and even loss. This needs to be a concern for the company, so that the company must be able to predict the occurrence of financial distress in order to take preventive action.

Companies experiencing financial distress may be identified or determined by a number of factors, namely: (1) for 2 years of negative net operating income and for more than one year of non-payment of dividends [21]. Discharge for employment or elimination of dividend payments [22]. (3) The company has a performance that shows a negative operating profit, a negative net income, a negative book value of equity and a merger of the company. (4) Measuring financial distress through a lower cash flow than the current long-term

debt [23]. (5) Negative economic value added (EVA) [7]. This study differs from previous studies by using negative retained earnings as a determining factor for financial distress.

The financial distress model needs to be developed because, knowing the financial distress of the company from an early age, actions are expected to anticipate the direction of bankruptcy. Brahmana [24] has stated that there are two reasons for conducting research into the financial distress of a company. The first is to examine the relationship and influence between the variables of the financial factor and the measurement of failure or bankruptcy. The second is to develop a model for predicting or predicting bankruptcy. In this research, the first objective is to test the effect of the financial ratios on the financial distress of the company. This study uses the financial ratios of the statement of revenue and the information on the balance sheet. The ratio used in this study is the ratio of profitability to leverage.

Altman uses financial ratios to predict a company's bankruptcy. By examining 66 companies in America using the Multivariate Discriminant Analysis (MDA) approach, often referred to as the Altman Z-score method. Some deficiencies are often encountered in the MDA approach in the assumption of data normality and group dispersion. This led to a bias towards the level of relevance and estimated errors [25]. The Binary Logit Regression (BLR) method for predicting company bankruptcy was first used by Ohlson [25]. His research shows that firm size (size), financial structure (total liabilities to total assets), performance and current liquidity are groups of ratios (variables) that have significant determinants in predicting bankruptcies. Agrawal [26] found that the logistic regression method was more accurate than the Z-score method with a total classification accuracy rate of 63.3 per cent, based on Giampaoli's findings [27].

According to Putra [28], the profitability ratio is a ratio that measures the efficiency of company management and executives, as evidenced by the ability to generate profit. According to Widarjo [29], the efficiency of the use of company assets will reduce the costs incurred by the company. The company will have investments and sufficient funds to run its business. With sufficient funds, the company is likely to experience less financial distress.

The greater the ability of the company to generate profits, the less likely it will be to experience financial distress. In this study, the profitability ratio is measured by ROA, which indicates the ability of the capital invested in all assets to generate net profits. Profitability ratios have a negative and significant effect on predicting financial distress [30]. Research conducted by Al-Khatib [31]shows that profitability does not affect financial distress. The return on assets (ROA) ratio can predict the likelihood of financial distress having a positive effect [17]. This ratio is used to measure the effectiveness of the company in the management of its assets. Too many assets will cause a high cost of capital, which will reduce profits. Conversely, too small assets will result in a loss of profitable sales.

H_1 : The return on the asset ratio has a negative impact on financial distress.

Leverage Ratio and Financial Distress According to Kasmir [32], the leverage ratio is the ratio used to measure the extent to which the assets of the company are financed by debt. This ratio can be calculated on the basis of information from the balance sheet, i.e. the assets and debt items accounts. According to Iskandar [17], companies with higher debt levels will experience financial distress and bankruptcy more easily than companies with lower debts. In this study, the ratio of leverage is measured by the debt to the total asset. This ratio shows some of the assets used to guarantee debts. In a study conducted by Hapsari [33], the leverage ratio is affecting financial distress. Research conducted by Widhiari [34] has shown that the leverage ratio has no effect on financial distress.

H_2 : Debt on the total asset ratio has a positive impact on financial distress.

III. RESEARCH METHOD

3.1 Research design

This study uses a quantitative approach to research using statistical tests. The population identified in this study is the manufacturing companies listed on the Indonesian Stock Exchange from 2010 to 2018. Sample selection shall be made by means of an objective sampling technique, namely the selection of samples on the basis of certain criteria. The criteria to be used are: (1) IDX-listed manufacturing sector companies. (2) The company's financial statements are complete and audited. (3) The components required for the calculation process are clearly stated in the financial statements. While all the data that make up the population in this study are the sample used in this study.

The dependent variable used in this study is the financial distress of the company, which is a categorical variable, zero for companies in financial distress and one for healthy companies. The category of financial distress experienced is shown by the negative retained earnings of the company, where Hess [35] claimed that the retained earnings were still the best predictor of bankruptcy. The independent variables used in this study are the financial ratios of the income statement, financial position, cash flow and stock beta. The financial ratios from the information on the income statement and financial position used in this study are leverage and profitability.

137 companies met the criteria on the basis of the sample selection criteria and were sampled in this study. The study uses secondary data on the company's financial statements from the Indonesian Stock Exchange (IDX) from 2014 to 2019.

Table 1. Operationalization and Variable Measurement

Variable	Proxi	Measurement
Variabel Dependen **Financial Distress**	1= Financial Distress 0 = Non Financial Distress	Nonfinancial distress, if you experience a positive retained earnings, is categorized as 0, while companies that experience a negative profit balance are categorized as experiencing financial distress, then categorized as 1.
Independent Variable		
Profitability ratio	Return on Asset	$ROA = \frac{EBIT}{Total\ Asset}$
Leverage ratio	Total Debt-to-Capitalization Ratio	$DTC = \frac{SD + LTD}{SD + LTD + SE}$ DTC = Total debt to capitalization SD = short-term-debt LTD = long-term-debt SE = shareholder's equity

IV. RESULT AND DISCUSSION

a. Goodness of Fit Test

Based on Table 2 of the Hosmer and Lemeshow Tests, the value of Chi Square is 277,766 with a sig value of 0.000. It can be seen from these results that the Sig value is smaller, i.e. 0.000 < 0.05, which means that there is a significant difference between the predicted classification and the observed classification. This means that the logistic regression model is appropriate for further analysis. The Chi square estimate is intended to determine the effect of the ratio of profitability and leverage on the forecasting of financial distress.

b. Overall Model Fit

The -2Log likelihood statistic is used to determine whether the independent variables added to the model can significantly improve the model. At Block Number = 0 (Beginning Block), i.e. the first model with constants without any independent variables, the value of -2Log likelihood is 874,165. Table 5 shows that block number 0 in block number 1 decreased to 596,398.

Table 2. Overall Fit Model Test

Model	
Block	-2 Log likelihood
Block number 0	874.165
Block number 1	596.398

Based on Table 5, the initial -2 log likelihood value (block number 0 result) is 874,165 and the-2 log likelihood value for block number 1 is 596,398. With a decrease in the-2 log likelihood value, this indicates that the model used is a good regression model and is feasible to use.

c. Test of The Coefficient of Determination

The coefficient of logistic regression determination can be seen in the value of Nagelkarke R Square. The value of Nagelkerke R Square is 0.438, indicating that the ability of the independent variable to explain the dependent variable is 0.438 or 43.8%. In other words, an independent variable in the form of financial ratios can predict 43.8% of the dependent variable. While the remaining 56.2% may be predicted and explained by other independent variables not included in the model.

d. Qualification Matrix

The qualification matrix will demonstrate the predictive power of the regression model to predict the likelihood of a company experiencing financial distress. Classification power can be indicated by a cross-tab table between the logistic regression model predictions and the observation results shown in Table 3.

Table 3. Cross Tabs

Observed	Predicted		
	Financial Distress		Percentage Correct
	,00	1,00	
Financial Distress	620	18	97.2
	104	80	43.5
Overall Percentage			85.2

Based on Table 3, the results of the overall classification, the percentage of truth for companies experiencing FD (financial distress) and NFD (non-financial distress) is the same forecast, namely 85.2%, i.e. 80 observations are correctly forecast and only 18 observations are expected to be the opposite.

e. Logistic Regression Analysis Test Results

To test the hypothesis, a logistic regression test was used to test all variables, namely profitability and leverage in predicting financial distress. Based on Table 4, the results of the test are as follows:

Y = -1,764666+ -23,606452 ROA +1,673446 DTC

The data generated from these tests can be explained by the results of the statistical hypothesis test in Table 4.

Table 4. Hypothesis Testing

	B	Wald	df	Sig.
ROA	-23.606	95.669	1	0.000
DTC	1.673	15.408	1	0.000
Constant	-1.764	50.278	1	0.000

The results of the Hypothesis 1 test of the profitability ratio as measured by the return on assets (ROA) show a regression coefficient of-23.606 and a significant value of 0.000. Because the coefficient of regression is negative. The value of 0.000 < 0.05 means that this result means that Ho is rejected and Ha is accepted, which means that the profitability ratio has a significant negative effect in predicting financial distress. These results support the hypothesis that the profitability ratio has a negative effect.

The results of the Loan Ratio Hypothesis Test 2 as measured by Debt to Total Assets (DTA) show a regression coefficient of 1,673 and a significant value of 0,000. Because the regression coefficient is positive with a value of 0.00 < 0.05, this result means that Ho is rejected and Ha is accepted, which means that the leverage ratio has a significant effect in predicting financial distress.

V. DISCUSSION

Logistic decline is known to have a significant impact on profitability in predicting financial distress. The results of these tests show that profitability has a significant and positive impact in predicting financial distress. The results of ROA can predict the possibility of financial distress having a positive effect. Too many assets will cause a high cost of capital, which will reduce profits. Conversely, too small assets will result in a loss of profitable sales. This result is not consistent with the assumption that the profitability ratio has a negative effect and is not consistent with the Iskandar [17] research finding that the ROA ratio has a negative effect on the likelihood of financial distress.

As a result of logistic regression, the leverage ratio is known to have a significant impact on predicting financial distress. The results of these tests show that profitability has a significant and positive impact in predicting financial distress with a significant value of 0.015 < 0.05. Companies that experience financial distress generally have a high DTA ratio, with total and almost as large debts as their total assets, and some companies even have total debt. Companies with more debt than their total assets generally have negative equity. Thus, it does not exclude companies that have a high level of debt that violate the debt agreement with creditors because the number of assets owned cannot guarantee the debt of the company, and companies that have a high level of debt will also be charged high interest costs while the amount of debt is higher. As a result of the total assets of the company, the book value of the company's equity is negative. The results of this study

are also consistent with the studies by Spica [21] and Pasaribu [7], and Hapsari [33] which state that the leverage ratio can be used to predict financial distress.

VI. CONCLUSIONS AND SUGGESTIONS

The aim of this study is to determine the effect of the financial ratios to predict the likelihood of financial distress. Financial ratio indicators are based on profitability ratios and leverage ratios. Based on the data processing carried out in the manufacturing sector by companies listed on the Indonesian Stock Exchange (IDX) in 2014-2019. It can therefore be concluded that the profitability ratio as measured by Return on Assets (ROA) has a positive and significant impact in predicting financial distress and that the leverage ratio measured by Debt to Total Asset (DTA) has a positive and significant impact in predicting financial distress.

Suggestions for management to be used as a basis for taking corrective action where there are indications that the company is experiencing financial distress. For investors, it can be used as a basis for taking the right decisions to invest in a company. By paying attention to the profitability and leverage ratios demonstrated empirically in this study, these financial ratios have the potential to influence financial distress. For further research, it is better to use other measures to project the financial distress of a company or to use more than one proxy to determine financial distress, such as the use of interest coverage ratios, negative book value of equity and negative cash flow, or to use macro-economic factors that can be used to predict corporate financial distress.

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