

# Analysis of Bankruptcy Prediction with Financial Ratios Altman Z-Score Model: Case Study of Oil and Gas Companies Listed on IDX in 2017-2021

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## ABSTRACT

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Because Indonesia has abundant oil and natural gas, companies that manage oil and natural gas have established themselves there. The advent of these businesses will most likely result in rivalry. So, in this study, we will use the Altman Z-score ratio to assess the probability of bankruptcy in oil and gas companies listed on the IDX. The population targeted is individuals working in the mining sector, which produces oil and gas and is traded on the Indonesian Stock Exchange. A total of seven samples were collected. The data collection technique is a documentation technique that involves gathering secondary data with the requirements received from [www.idx.co.id](http://www.idx.co.id) (IDX official website). The data analyst used panel data regression analysis with reviews. The data analyst employed is panel data regression analysis using reviews. The results of the study showed that the ratio used has a significant effect on bankruptcy prediction with the Altman Z-score model. They are evidenced by the value of  $f$  count (46.6564) >  $f$  table (2.6896) with a significance of  $0.000 < 0.05$ .

*Keywords:* Bankruptcy, altman z-score, regression panel data

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## 1. INTRODUCTION

Indonesia is a nation that is favored because of its abundant natural wealth. Oil and natural gas are one of them. The need for oil and gas for human life is significant in everyday life, for example, family needs, transportation, and electricity, because of other conditions that may arise. Over the last ten years, the contribution of oil has decreased, as has the gift to the State Budget (APBN). Today, blends of oil and gas account for more than 13% of household income (in 1990, this figure was 40%). As mentioned earlier, the ongoing oil area is disrupting the Indonesian economy to achieve a high level of development. In the long run, public interest in energy is getting bigger. At the same time, Pertamina is overwhelmed in fulfilling it due to the absence of expert staff, innovation, and assets, so contests are generally not cornered by Pertamina. Competition is available to the general public. This causes the question to arise why in the world, oil prices fall while in Indonesia, oil prices rise. [1].

Indonesia should prepare new oil reserves amid increasing global average energy needs. According to the Minister of Maritime Affairs of the Republic of Indonesia, based on data obtained from the Special Task Force for Upstream Oil and Gas Business Activities (skkmigas), it is stated that the consumption of oil and gas in the community continues to increase even though national oil and natural gas production is declining, while [2]. With this, a company must improve its ability to continue to compete significantly in determining the performance of the company from conditions that lead to failure to fulfill obligations and requirements that describe the company's bankruptcy. This problem triggered us to analyze more deeply, especially concerning bankruptcy risk from existing conditions in oil and gas companies in Indonesia.

The discussion about bankruptcy in their research is one of the conditions when a company is experiencing a lack and insufficiency of funds in continuing business. Looking at the extent to which a company can meet its liabilities with a comparison of its assets, it is there that its financial health plays an essential role in the success of its functioning. However, poor financial health can threaten a company's operational continuity and lead to business failure [3].

The reason why researchers choose the object of research of Oil and Gas companies is that there is September 3, 2022, the Indonesian government officially raised the price of Fuel Oil or commonly called BBM, with the option of increasing fuel prices apparently to help the government save the subsidy budget to be channeled to infrastructure projects. Similarly, we were reminded of the cooking oil scarcity at the beginning of the year due to the increasing price of *Crude Palm Oil* (CPO). Global energy needs are increasing due to the declining development of oil production every year and making Indonesia's economic conditions in this industry experience a drastic decline. This requires Indonesia to look for new oil reserves.

The main reason we use financial ratios is that in financial ratios, we can predict the business coherence of an organization even though the organization is still in a congested zone and, oddly enough, in liquidation. The Altman Z-Score method is used to assess an entity's liquidation. The exciting thing about the Altman Z-Score is its reliability as an insightful instrument, regardless of the organization's size. Even assuming the company is prosperous, the company must be careful if the Z-Score shows poor financial value. If an organization has good economic performance, it should be watched out for because of the massive gamble of liquidation. [4].

Based on the survey, researchers are interested in further investigating bankruptcy predictions by correcting deficiencies that exist in previous researchers. It aims to obtain more complete results regarding bankruptcy predictions using the financial ratios of the Modified Z-Score Altman model. This study requires a population from Oil and Gas companies listed on the IDX. Thus, this study complements previous research on the Altman Z-score model that has not been appropriate to the company's status and the use of analytical methods in the study.

## 2. LITERATURE REVIEW

### 2.1 Signalling theory

*Signaling theory* describes the ice process companies go through when sending signals to users of financial statements. Alerts sent to users l financial reports in the form of information about records made by management by the owner's wishes. This signal shows that the company intends and is driven to provide information transparently to eliminate information asymmetry between the company and outside parties. Due to the availability of this symmetry of information, outsiders may be able to assign a lower value to the company, which affects its value. Addressing this knowledge gap includes lowering outside skepticism of the company's prospects [5].

Based on this description, bankruptcy prediction analysis can be used to inform outside parties about the company's ability to meet its obligations. The signals generated by the bankruptcy prediction analysis can indicate whether the company is healthy or bankrupt. With this statement, it can be concluded that outsiders (potential investors) can analyze the rewards and dangers associated with these signals.

### 2.2 Bankruptcy

Based on Law Number 4 of 1998, bankruptcy is a condition where an entity that, by the court decision, is considered to have two or more creditors and cannot pay off at least one debt that has matured and been collected. Bankruptcy is a condition where the company's operating cash flow experiences inadequate funds to pay off its current obligations, which causes the company to make improvements. If liquidity problems cannot be overcome, then the company can be said to be bankrupt. Corporate bankruptcy is characterized by the weakening of a company when it makes profits or tends to experience a deficit.

### 2.3 Financial Ratios

Financial ratios compare one item of financial statements with other things that obtain a number and have relevant and substantial relationships. Connects elements of financial information, such as elements of diverse assets and liabilities, with each other. Aspects of assets and liabilities and

parts of the balance sheet with profit and loss. Financial ratio analysis is a ratio made by integrating figures from the income statement and balance sheet.

#### **2.4 Altman Z-Score Mods**

Altman Z-Score is a statistical analysis tool that can be useful in predicting a company's bankruptcy. Edward I. Altman created the first Z-score formula in 1968. This formula was developed after researching several manufacturing companies in the United States that are traded on exchanges. As a result, this model is more suitable for predicting the business viability of companies that go public.

In 1995, after Altman conducted research with the objects of various manufacturing companies and produced two bankruptcy detection formulas. However, Altman did not stop because the variable X5 from the results of the previous research formula could not be used. After all, the ratio varies significantly in industries with varying asset sizes. An adjusted model is then developed by removing asset turnover variables to minimize industry effects caused by the presence of those variables. This model can calculate the probability of bankruptcy in any enterprise, including manufacturing and non-manufacturing [6].

Model as follows:

$$Z \text{ Score} = 6,56(X_1) + 3,26(X_2) + 6,72(X_3) + 1,05(x_4)$$

Remarks:

$X_1 = \text{Working Capital} / \text{Total Assets}$

$X_2 = \text{Retained Earnings} / \text{Total Assets}$

$X_3 = \text{Earning before interest and taxes} / \text{Total Assets}$

$X_4 = \text{Book Value of Equity} / \text{Total Liabilities}$

#### **Hypothesis Development**

##### **1. Effect of Z-Score Analysis in assessing financial condition on bankruptcy prediction**

The model known as Z-Score is essentially looking for a Z value, which is a value or number that shows the state of a company's finances, whether it is healthy or not, as well as its performance which also reflects the company's future. Altman z score model, a company will be said to be healthy if the nlai z score is more significant than 2.99. And the company's condition is not healthy when the z score is less than 1.81. This z-score value is obtained from several kinds of ratios. A company will be said to have an excellent financial condition if it has indicators such as current liquidity ratios, high profitability, high solvency, and high activity ratios.

From this description, the Altman Model offers a ratio indicator that can predict bankruptcies for up to two years into the future. Which concluded that displaying the findings of the Z-Score Analysis can be a consideration to reduce the danger of financial difficulties for company management. The researchers hope that by doing so, investors and creditors will be more cautious in investing. Found that in predicting bankruptcy, the Altman Z-Score calculation model can be used to see the status of bankrupt, gray, and healthy companies in the coal mining business from 2012 to 2014.

HI: Altman Z-Score model positively influences bankruptcy prediction

##### **2. The Effect of WCTA, RETA, ROA, and BVE/TL Ratios on Bankruptcy Prediction**

The ratio of working capital to total assets is often found in the study of company problems. Every company needs work to finance its daily operations. Usually, companies that experience operating losses will have shrinking current assets. With this, the company cannot protect itself from the crisis due to the decline in the value of existing investments.

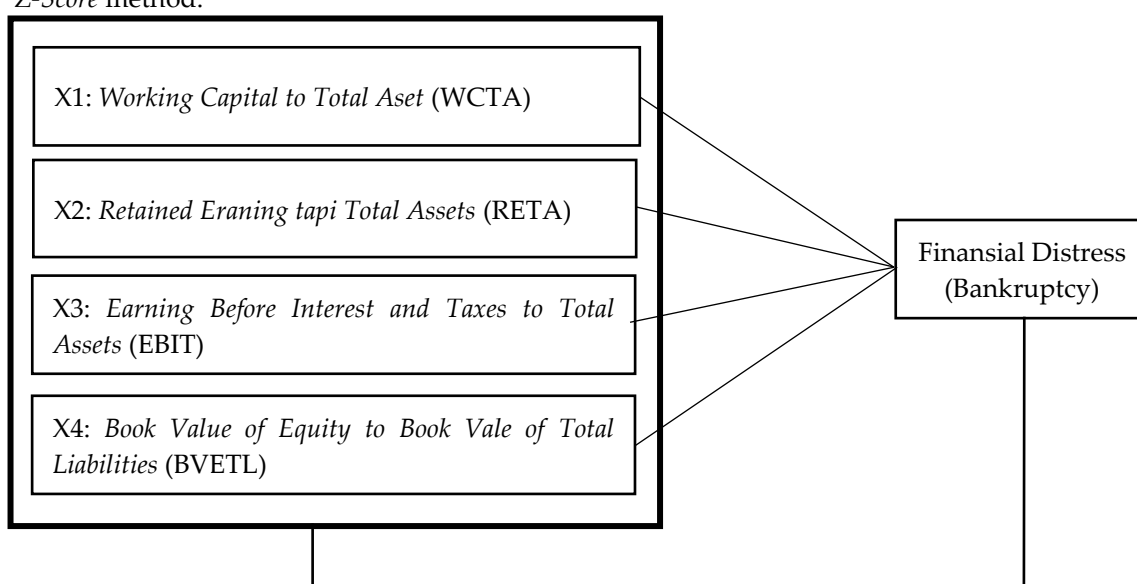
The ratio of retained earnings to total assets. Retained earnings refer to the total income invested since the company's establishment minus dividends distributed to investors. This

cumulative measure over time can be said that a relatively young company will probably exhibit a low RETA ratio because it does not have time to build incremental profits. The chances of being classified as insolvent will be relatively higher than in an older company because the incidence of failure is much higher in the company's initial year.

The ratio of earnings before interest and taxes to total assets. For investors, it compares healthy or unhealthy companies to corporate profits without considering the risk of interest and tax payments. It explains that the company cannot meet debt obligations and employee salaries when the EBIT-TA ratio is low.

The BVETL ratio shows the influence on bankruptcy predictions by looking at the debt owned by the company and how capable the company is of paying it off. So an equation is obtained that shows the similarity of the relationship between the two variables.

This hypothesis is consistent with the research conclusion conducted by Dhea Rini Sururi (2021), so the ratio of WCTA, RETA, EBIT-TA, MVBV, and STA significantly affects financial distress. H2: The ratio of WCTA, RETA, EBIT-TA, and MVBV affects the bankruptcy prediction of *the Altman Z-Score* method.



**Figure 1.** Frame of Mind

Source: Data processed in 2022

### 3. METHODS

#### 3.1 Research Design

Based on the methodology, the type in this study is classified as quantity. Quantitative research is a research method that focuses on the study of data in the form of numbers and statistical analysis. Quantitative research is a method of finding information about what we want to know using numerical data.

This study used a descriptive design. The descriptive approach can be used in case studies or survey research, and researchers use the descriptive case format in this research. This case study is intended to anticipate bankruptcy by using financial ratios.

#### 3.2 Population and Sample

The population used as the object of this study is a company engaged in mining that produces Oil and Gas listed on the Indonesia Stock Exchange. The total population is 14 issuers, and the sample is selected based on *Purposive sampling* with the following criteria:

**Table 1.** Sampling Criteria

|  |  |
|--|--|
| The selection considered by the researcher is based on the following criteria: |  |
| 1  | The object of research is the oil and gas business that is publicly traded on the Indonesia Stock Exchange   |
| 2  | Companies that produce annual financial statements from 2017 to 2021 are selected as examples  |
| 3  | The sample used in this study uses Rupiah currency in its financial statements, so the parameters for determining the value of the money are the same. |

Source: Data processed in 2022

### 3.3 Sampling Techniques

The *nonprobability* Sampling technique with *Purposive Sampling* was used in this study. *Nonprobability* sampling is a sampling strategy in which each population element has a different probability when used as a sample. In contrast, *respondents are selected to become members in purposive sampling* based on the researchers' criteria.

**Table 2.** Sample Selection List

| No.                                  | Explanation  | Number of Companies |
|--------------------------------------|--|---------------------|
| 1                                    | Oil and Gas companies listed on the Indonesia Stock Exchange | 14                  |
| 2                                    | Financial Statements that do not use rupiah currency         | (7)                 |
| Total sampled                        |  | 7                   |
| <b>Total samples over five years</b> |  | <b>35</b>           |

Source: Data processed in 2022

### 3.4 Data Collection Techniques

The data collection technique is a documentation technique carried out by collecting secondary data with relevant needs collected through [www.idx.co.id](http://www.idx.co.id) (IDX official website), then the data obtained is studied according to requirements.

### 3.5 Data Analysis Techniques

#### Altman Z-score Analysis Modification

Based on Z-Score analysis, this analysis seeks to answer the problem of the first hypothesis about the effect of the company's financial status. After calculating each Z-Score component, enter the result into the Z-Score formula. With the following procedure:

$$Z = 6.56 (X1) + 3.26 (X2) + 6.72 (X3) + 1.05 (X4)$$

Information:

Z = Value of Bankruptcy (*Financial Distress*)

X1 = *working capital / total assets*

X2 = *retained earnings / total assets*

X3 = *earnings before interest and taxes / total assets*

X4 = *Book value of equity/book value of liabilities*

After knowing the calculation results, cut-off values of 2.99 and 1.81 are used using the following criteria:

- If the Z value obtained is more than 2.60, the company will likely go bankrupt.
- Companies with a Z score between 1.10 and 2.60 indicate that the company is in a gray area, i.e., facing financial problems, although not as severe as the company experienced in bankruptcy.
- Companies with a Z value of less than 1.10 are expected to fail.

**Table 3.** Modification of Z-Score Value

| No. | Nilai Z | Explanation |
|-----|---------|-------------|
| 1   | > 2,60  | Healthy     |

|   |                   |                    |
|---|-------------------|--------------------|
| 2 | $1,10 < Z < 2,60$ | Grey Area          |
| 3 | $< 1,10$          | Financial Distress |

Source: Data processed in 2022

### Classical Assumption Test

Given that the research data used is secondary data, it is necessary to test several assumptions to qualify for multiple regression analysis, namely:

#### a. Multicollinearity Test

The purpose of this test is to find out the relationship between independent variables. The existence of a strong relationship between independent variables in the model-making is not recommended because it will damage the accuracy of meter estimation. In this scenario, the regression coefficient calculates the actual value. Multicollinearity refers to the significant relationship between independent variables.

There should be no correlation or relationship between independent variables in a viable regression model. When independent variables are correlated, they are not orthogonal. Orthogonal variables are independent variables that have a correlation value between them of zero. In looking at the presence or absence of multicollinearity in the regression model is as follows:

- 1) The R-value produced by the em Paris regression model estimates is relatively high. However, there is still an independent variable that does not significantly affect the dependent variable.
- 2) Check the correlation matrix of independent variables. The existence of multicollinearity will be seen when there is a strong enough correlation between variables (usually greater than 0.90). The lack of substantial correlation between independent variables does not rule out multicollinearity.

Hypotheses in multicollinearity testing, as follows:

- $H_0$ : no multicollinearity occurs
- $H_1$ : multicollinearity occurs

Basis of decision making:

- If  $r < 0.90$  (no multicollinearity occurs), then it is accepted  $H_0$
- If  $r > 0.90$  (multicollinearity occurs), then it is rejected  $H_0$

#### b. Heteroscedasticity Test

The heteroskedastitest is used to see if there is a variance inequality between the residuals of one observation and the residuals of another statement in the regression model. with the following decision-making criteria:

- 1) There is no heteroscedasticity in the regression model because the significant value is greater than 0.05.
- 2) A significant value of 0.05 indicates that the regression model is heteroscedasticity.

### Panel Data Regression Analysis

Panel data regression combines time series and cross-section data. It is possible to examine the same cross-section data in the deterioration of this panel data but at different periods. Panel data is data from the same number of people observed simultaneously. The general equation of a panel data model can be expressed as follows:

$$Y_{it} = a_{it} + x_{it}\beta + e_{it}$$

Remarks:

- Y = Variable depend
- a = Constanta
- X = variable Independent
- $\beta$  = Regression Coefficient
- e = error / residual
- i = *cross-section*

$t$  = time series

When performing regression analysis using panel data, three commonly used estimation model techniques: Common Effect Model, Fixed Effect Model, and *Random Effect Model*

**a. Standard Effect Model (CEM)**

The *Common Effect Model* is a panel data regression model that uses the least squares approach to combine time series and cross-section data. This is the most basic strategy for estimating panel data regression models. The Ordinary Least Squares (OLS) approach can be used to calculate standard effect models.

**b. Fixed Effect Model (FEM)**

The *fixed Effect Model* is a panel data regression model with effects varying between individuals and unknown parameters that can be estimated using *the minor square dummy technique*.

**Panel Data Regression Model Selection Test**

**a. Uji Chow**

The Chow test is used to identify which models to use: the expected effect model and *the fixed effect model*. When setting a panel data regression model, the hypothesis is that if the value of the chi-square *cross section* is sig. (0.05), then the *fixed effect* model will be selected. If the chi-square cross-section value is greater than the sig value, then a standard effect model is used, and the Hausman test is not needed [7]

**b. Uji Hausman**

The Hausman test determines which model to use, between the fixed effect model (FEM) and *the random effect model* (REM). A fixed effect model determines the panel data regression model if the random cross-section value is significant (0.05). A random effect model is used if the random cross section value is greater than the sig value (0.05). [7]

**Test the hypothesis**

**a. Coefficient of determination ( $R^2$ )**

The coefficient of determination is used to calculate the contribution of the independent variable to the fluctuations in the rise and fall of the dependent variable. The coefficient of judgment has a value between 0 and 1. As a result, the coefficient of determination represents the ability of the independent variable to explain the dependent variable.

**b. Statistical F-Test (Simultan Significance Test)**

The F test used in the model tests all independent variables. This test is carried out to determine whether the independent variable has a significant influence on the independent variable.

1) Set a hypothesis:

$H_0$  = There is no interaction between the independent factor and the dependent variable.

$H_1$  = The independent variable affects the dependent variable when combined.

2) The following decision to reject or accept  $H_0$ :

1. If the significant value is more than 0.05 and  $F_{\text{calculate}} < F_{\text{table}}$ , then  $H_0$  is approved.

2.  $H_1$  is approved because the significance value is 0.05 and  $F_{\text{calculate}} > F_{\text{table}}$ .

**c. t-Test (Partial Significance Test)**

The t-test tests each independent variable about the dependent variable. This test is done to see whether a variable has a significant influence.

1) Set a hypothesis:

$H_0$  = The independent factors do not influence the dependent variable separately.

$H_1$  = The independent factors have an individual influence on the dependent variable.

2) Compare the value of the t count and the t table. The following is the decision to accept or reject:

1. If the significant value is more than 0.05 and  $T_{\text{calculate}} < T_{\text{table}}$ , then  $H_0$  is allowed.

2.  $H_1$  is accepted because the significance value is 0.05 and  $T_{\text{calculate}} > T_{\text{table}}$ .

#### 4. RESULTS AND DISCUSSION

## A. Results

### Descriptive Statistical Analysis

Descriptive statistical analysis can be used in this study to provide a more specific picture of how a research variable is described. Through descriptive statistics, it is possible to ascertain the characteristics of the samples used in the study—a detailed examination of information from 35 companies that were part of the study from 2017 to 2021. The lowest value explains the variables, highest discount, mean, and standard deviation in the descriptive statistics used in this study.

**Table 4.** Descriptive Statistics

|              | Y         | X1        | X2        | X3        | X4        |
|--------------|-----------|-----------|-----------|-----------|-----------|
| Mean         | -5.208848 | -1.682218 | -1.823975 | -2.120315 | -0.361818 |
| Median       | -0.344299 | -1.526198 | -1.249183 | -2.621711 | -0.132544 |
| Maximum      | 2.273109  | -0.139223 | -0.034069 | -0.001326 | 2.038275  |
| Minimum      | -25.01800 | -6.107872 | -6.722375 | -5.988395 | -4.045799 |
| Std. Dev.    | 9.454389  | 1.247794  | 1.978403  | 1.782630  | 1.291242  |
| Skewness     | -1.237071 | -1.443669 | -1.434100 | -0.111033 | -1.343741 |
| Kurtosis     | 2.824408  | 5.815406  | 3.880447  | 1.770763  | 5.471947  |
| Jarque-Bera  | 8.971969  | 23.71721  | 13.12757  | 2.275491  | 19.44408  |
| Probability  | 0.011266  | 0.000007  | 0.001411  | 0.320541  | 0.000060  |
| Sum          | -182.3097 | -58.87764 | -63.83913 | -74.21101 | -12.66363 |
| Sum Sq. Dev. | 3039.106  | 52.93764  | 133.0787  | 108.0442  | 56.68836  |
| Observations | 35        | 35        | 35        | 35        | 35        |

Based on the table, working capital to total assets, *retained earnings* to total assets, *earnings before interest and tax* to total assets, and *book value equity to total* each have a minimum, maximum, average, and standard deviation. Adjustments can be used in the data collection of this study to eliminate outliers that are too big or too small.

### Altman Z-Score Analysis Modification

Based on the results of the Z-score calculation during 2017-2021, the z-score results can be recapitulated as follows:

**Table 5.** Altman Z-Score Sample

| No. | Company Code | Year | Z-Score | Predictions |
|-----|--------------|------|---------|-------------|
| 1   | ELSA         | 2017 | 4.302   | Healthy     |
|     |              | 2018 | 4.302   | Healthy     |
|     |              | 2019 | 3.198   | Healthy     |
|     |              | 2020 | 3.860   | Healthy     |
|     |              | 2021 | 4.199   | Healthy     |
| 2   | MYTHS        | 2017 | -1.6    | Bankrupt    |
|     |              | 2018 | -0.517  | Bankrupt    |
|     |              | 2019 | -24.706 | Bankrupt    |
|     |              | 2020 | -8.108  | Healthy     |
|     |              | 2021 | 9.705   | Healthy     |
| 3   | MTFN         | 2017 | -22.661 | Bankrupt    |
|     |              | 2018 | -15.668 | Bankrupt    |
|     |              | 2019 | -21.442 | Bankrupt    |
|     |              | 2020 | -25.018 | Bankrupt    |
|     |              | 2021 | -24.598 | Bankrupt    |
| 4   | PKPK         | 2017 | -0.344  | Bankrupt    |
|     |              | 2018 | 1.227   | Grey Area   |
|     |              | 2019 | -3.919  | Bankrupt    |
|     |              | 2020 | -2.652  | Bankrupt    |
|     |              | 2021 | -2.810  | Bankrupt    |



|   |       |      |        |           |
|---|-------|------|--------|-----------|
| 5 | NOISE | 2017 | 1.854  | Grey Area |
|   |       | 2018 | 2.184  | Healthy   |
|   |       | 2019 | 1.740  | Grey Area |
|   |       | 2020 | 1.803  | Grey Area |
|   |       | 2021 | 2.128  | Healthy   |
| 6 | SURE  | 2017 | -4.391 | Bankrupt  |
|   |       | 2018 | -4.597 | Bankrupt  |
|   |       | 2019 | -2.618 | Bankrupt  |
|   |       | 2020 | 3.313  | Healthy   |
|   |       | 2021 | 3.124  | Healthy   |
| 7 | LIMBS | 2017 | 2.768  | Healthy   |
|   |       | 2018 | 3.141  | Healthy   |
|   |       | 2019 | -4.585 | Bankrupt  |
|   |       | 2020 | -21.5  | Bankrupt  |
|   |       | 2021 | -18.3  | Bankrupt  |

Source: Data processed in 2022

**Table 6.** Company Category

| Year  | Model Altman |           |          |
|-------|--------------|-----------|----------|
|       | Healthy      | Gray Area | Bankrupt |
| 2017  | 2            | 1         | 4        |
| 2018  | 3            | 1         | 3        |
| 2019  | 1            | 1         | 5        |
| 2020  | 3            | 1         | 3        |
| 2021  | 4            | 0         | 3        |
| Total | 12           | 4         | 18       |

Source: Data processed by Eviews 12 of 2022

**Regression Model Selection**

**a. Uji Chow**

The Chow test aims to determine which test model is better to use between *common* and fixed effects.

**Table 7.** Test Chow

| Effects Test             | Statistic | d.f.   | Prob.  |
|--------------------------|-----------|--------|--------|
| Cross-section F          | 10.407412 | (6,24) | 0.0000 |
| Cross-section Chi-square | 44.850695 | 6      | 0.0000 |

Source: Data processed by Eviews 12 of 2022

Based on the table above, the p-value in the chi-square cross-section is  $0.0000 < \alpha = 0.05$ , so the *Fixed Effect* model is better to use than the *Common Effect* model.

**b. Uji Hausman**

This test determines the better model between *Fixed Effect* and *Random Effect*.

**Table 8.** Uji Hausman

| Test Summary         | Chi-Sq. Statistic | Chi-Sq. d.f. | Prob.  |
|----------------------|-------------------|--------------|--------|
| Cross-section random | 10.080646         | 4            | 0.0391 |

Source: Data processed by Eviews 12 of 2022

The table above shows the p-value of  $0.0391 < \alpha = 0.05$ , which means that the fixed effect model is better than others to use in this study.

**Classical Assumption Test**

With the Fixed Effect Model's selection, the relevant classical assumption tests are Heteroscedasticity and Multicollinearity.

### a. Heteroskedastisitas

This test aims to test whether there will be an inequality of variance in the regression model from the residual of one observation to another. In testing heteroscedasticity in this study using the Glacier Test. Here's the test:

**Table 9.** Heteroscedasticity Test Results

Periods included: 5  
Cross-sections included: 7  
Total panel (balanced) observations: 35

| Variable | Coefficient | Std. Error | t-Statistic | Prob.  |
|----------|-------------|------------|-------------|--------|
| C        | 2.213584    | 0.772246   | 2.866425    | 0.0075 |
| X1       | -0.001072   | 0.308949   | -0.003468   | 0.9973 |
| X2       | -0.190937   | 0.184502   | -1.034873   | 0.3090 |
| X3       | -0.080886   | 0.205017   | -0.394533   | 0.6960 |
| X4       | -0.320892   | 0.288090   | -1.113857   | 0.2742 |

Source: Data processed by Eviews 12 of 2022

From the output results above, it can be seen that the prob value of each independent variable is more than 0.05, where X1 is 0.9973, X2 is 0.3090, X3 is 0.6960, and X4 is 0.2742. This shows that the regression model is homoscedasticity or, in other words, no heteroscedasticity problem exists.

### b. Multikolinieritas

The multicollinearity test aims to determine whether there is a correlation or relationship between the independent variable (independent) and the regression model. There should be no relationship between the independent variables in the corresponding regression model. The multicollinearity model is not a good regression model. The results of this study's multicollinearity test are as follows:

**Table 10.** Multicollinearity Test Results

|    | X1        | X2        | X3       | X4        |
|----|-----------|-----------|----------|-----------|
| X1 | 1.000000  | -0.231917 | 0.271740 | -0.284289 |
| X2 | -0.231917 | 1.000000  | 0.059807 | 0.261974  |
| X3 | 0.271740  | 0.059807  | 1.000000 | 0.071202  |
| X4 | -0.284289 | 0.261974  | 0.071202 | 1.000000  |

Source: Data processed by Eviews 12 of 2022

From the test results in the table above, there are no symptoms of multicollinearity, which is caused by the value of the correlation coefficient of each variable smaller than 0.90.

### Panel Data Regression Analysis

In regression panel data that has been determined using a fixed effect model, the formula in the selected model is as follows:

$$Y_{it} = \beta_0 + \beta_1 X_{1it} + e_{it}$$

**Table 11.** Results of Fixed Model Panel Data Regression Analysis

| Variable | Coefficient | Std. Error | t-Statistic | Prob.  |
|----------|-------------|------------|-------------|--------|
| C        | 4.622847    | 1.465478   | 3.154497    | 0.0043 |
| X1       | -0.642004   | 0.650035   | -0.987645   | 0.3332 |
| X2       | 6.109045    | 0.501170   | 12.18955    | 0.0000 |
| X3       | -0.425601   | 0.254899   | -1.669687   | 0.1080 |
| X4       | 1.855485    | 0.353878   | 5.243297    | 0.0000 |

Source: Eviews Processed Data 12 the Year 2022

Based on the results of the regression above, an equation of the regression line can be obtained as follows:

$$Y_{it} = 4.622847 + -0.642004X_{1it} + 6.109045X_{2it} + -0.425601X_{3it} + 1.855485 X_{4it} + e_{it}$$

The regression equation of the panel data can be explained as follows:

- The test's constant is 4.622847, meaning that if the independent variable remains, the dependent variable is 4.622847.
- The WCTA regression coefficient is -0.642004, meaning that if another independent variable has a fixed value and WCTA increases by 1 in units, it will decrease the value of Financial Distress by -0.642004. The coefficient is negative, indicating that there is no relationship between financial stress and WCTA
- The regression coefficient of RETA is 6.109045, which shows that assuming other independent variables remain, every 1% increase in RETA will increase the value of financial distress by 6.109045.
- The regression coefficient of EBIT-TA is -0.425601, so it can be interpreted that every increase in EBIT-TA by 1% will decrease the value of Stock Return by -0.425601, assuming the other independent variable is constant.
- The regression coefficient of BVE-TL is 1.855485, so it can be interpreted that every increase in EBIT-TA by 1% will add to the value of Financial distress by 1.855485, assuming other independent variables are constant.

### Test the hypothesis

#### a. Coefficient of Determination

Analysis of the coefficient of determination of this study using the basis of R square

**Table 12.** Coefficient of Determination Test Results

|                    |          |
|--------------------|----------|
| R-squared          | 0.861512 |
| Adjusted R-squared | 0.843047 |

Source: Data processed by Eviews 12 of 2022

From the test results above, it can be seen that the R-square value is 0.86. This shows that the independent variable can explain the dependent variable of 86% while other variables outside the model explain the rest.

#### b. T Test

The T-test tests the effect of an independent variable on the dependent variable.

**Table 13.** T Test Results based on *Fixed Effect* Estimation

| Variable | Coefficient | Std. Error | t-Statistic | Prob.  |
|----------|-------------|------------|-------------|--------|
| C        | 2.213584    | 0.772246   | 2.866425    | 0.0075 |
| X1       | -0.001072   | 0.308949   | -0.003468   | 0.9973 |
| X2       | -0.190937   | 0.184502   | -1.034873   | 0.3090 |
| X3       | -0.080886   | 0.205017   | -0.394533   | 0.6960 |
| X4       | -0.320892   | 0.288090   | -1.113857   | 0.2742 |

The table t value can be seen in the statistical table  $df=n-k-1 = 35-4-1 = 30$ , with a significance of 0.05 and a 1-sided test obtained table t result = 1.69726/-1.69726

- WCTA has no partial effect on bankruptcy. This can be seen from the calculated t value, which is greater than the tablet where the value is  $(-0.003468) > (-1.69726)$  or the probability value is  $0.0075 > 0.05$ . Therefore, WCTA has an insignificant negative effect on bankruptcy.
- RETA has no partial effect on bankruptcy. It can be seen that the t count  $(-1.034873)$  is more significant than t- table  $(-1.69726)$ , and the probability is 0.3090, which means greater than 0.05. Therefore, RETA has an insignificant negative effect on the stock price.

- c) EBIT-TA has no partial effect on insolvency. It can be seen that the t count (-0.394533) is more significant than t- table (-1.69726) and the probability of 0.6960, which means greater than 0.05. Therefore, RETA has an insignificant negative effect on the stock price.
- d) BVE-TL has no partial effect on bankruptcy. It can be seen that the t count (-1.115837) is more significant than the t- table (-1.69726), and the probability is 0.2742, meaning greater than 0.05. Therefore, RETA has an insignificant negative effect on the stock price.

### c. F Test

The F test is a test that is useful for determining whether the independent variable of the dependent variable will affect simultaneously or together or not. Here are the test results:

**Table 14.** F-Test Results based on *Fixed Effect* estimates

|                   |          |
|-------------------|----------|
| F-statistic       | 46.65643 |
| Prob(F-statistic) | 0.000000 |

Source: Data processed by Eviews 12 of 2022

The F value of the table can be seen in the statistical f table where  $df_1 = 4$  and  $df_2 = n - k - 1$  or  $35 - 4 - 1 = 30$  with a significance of 0.05, then obtained the f value of the table of 2.6896.

From these data, the statistical F value is greater than the F of the table ( $46.6564 > 2.6896$ ). This shows that WCTA, RETA, EBIT-TA, and BVE-TL affect *financial distress* or bankruptcy.

## B. Discussion

### 1. The effect of Z-Score Analysis in assessing financial condition on bankruptcy prediction

Based on the results of the bankruptcy prediction, companies with the stock code MTFN have experienced financial distress for 5 consecutive years. Indication of *financial distress* because the z-score value is lower than  $< 1.10$ . We can know that companies are in difficulty paying long-term obligations. This can always happen to companies that experience financial distress when earnings are very sensitive to economic recession or high fixed costs. These are all events of continuous decline in the company's financial performance before bankruptcy. While companies with ELSA stock code have been in the healthy category for five consecutive years, shown by a positive value, which is higher than the  $> 2.60$  that the company always gets in financial ratios. We can know that the company is successful in managing assets to meet its long-term obligations and efforts to manage its cash flow in making payments for various kinds of company operations. This condition will further improve the company's financial situation.

Which found that Altman z-score analysis can be used to forecast whether a company will experience financial trouble or insolvency.

The study's findings also corroborate Altman's hypothesis that business bankruptcies can be predicted using Altman's z-score model. Because Altman's z-capability score assesses the company's liquidity condition utilizing the ratio of working capital to total assets, the cumulative state of the company's profit using the percentage of retained earnings to total assets (X2), evaluates the company's profit capability utilizing the ratio of *earnings before interest and tax to total assets* (X3), and determine how much the company's assets will depreciate through the balance of *book value equity to total liabilities* (X4).

### 2. The Effect of WCTA, RETA, ROA, and BVE/TL Ratios on Bankruptcy Prediction

Based on tests conducted simultaneously or simultaneously, it is proven that working capital to total assets retained earnings to total assets, earnings before interest and tax, and book value equity to total Liabilities significantly affect whether a company experiences financial difficulties or bankruptcy. The fact that  $F_{calculate} (46.6564) > F_{table} (2.6896)$  and the significance level of  $0.000 < 0.05$  indicates this. According to accepted theory, a company may be able to manage its activities and fulfill its financial responsibilities if the WCTA, RETA, EBIT-TA, and BVE-TL ratios result in high and improved ratio values. Well to prevent possible economic challenges that result in *financial distress* or bankruptcy for the organization.

The results of this study are in line with research conducted by Dhea Rini Sururi (2021) entitled *The Effect of Financial Ratios on Bankruptcy Prediction of Altman Z-score Model at PT Jasa Marga (Persero) Tbk* that in the conclusion of its research WCTA, RETA, EBIT-TA, MVBV, and STA together turned out to have a significant effect on financial distress.

## CONCLUSION

The effect of financial ratios on oil and gas companies' financial projections for 2017–2021 was studied using data research findings and panel data analysis testing using regression model estimation selection methods, estimation model testing, traditional assumption testing, and hypotheses. Testing. Based on the results of the model estimation can be known:

The results of simultaneous panel data analysis of WCTA, RETA, EBIT-TA, and BVE-TL were declared to affect bankruptcy prediction using the Altman Z-score model significantly. This is due to Altman's ability to assess the company's liquidity condition using the working capital to total asset ratio (X1), evaluate the cumulative state of the company's profits using the retained earnings to total asset ratio (X2), assess the company's profitability utilizing the percentage of *earnings before interest and tax to total assets* (X3), as well as measuring how much the company's assets will decrease in value through the ratio of *book value equity to total liabilities* (X4). The results of this study are evidenced by the weight of f count (46.6564) > f table (2.6896) with a significance of  $0.000 < 0.05$ .

### Suggestion

Based on the results of the research and discussion above, the suggestions that researchers can give are as follows:

1. Researchers are further expected to develop bankruptcy prediction analysis using financial ratios other than the Altman Z-score method
2. Researchers are then expected to develop other proxies beyond financial ratios, such as other factors that can be used economically, politically, etc. A more accurate level of predictive discord can be obtained if researchers can use or create other representatives.

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