

# The Effect of Financial Ratios to Financial Distress Using Altman Z-Score Method in Real Estate Companies Listed in Indonesia Stock Exchange Period 2014 - 2018

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## ABSTRACT

**Purpose** - The purpose of this paper is to find out the effect of the Financial Ratios on Financial Distress using the Z-Score Altman method. **Design/Methodology/approach** - This paper uses data from 21 property and real estate companies listed in BEI period 2014-2018 with 105 data observations. The variables used are ROE (Return On Equity), DER (Debt to Equity Ratio), CR (Current Ratio), WCR (Working Capital Ratio), and Z-Score. **Findings** - The results show that ROE and WCR have a significant positive effect on Z-Score Altman's financial distress; DER and CR have a significant negative effect on Z-Score Altman's financial distress. While simultaneously shows that at least one variable has a significant effect on Z-Score Altman financial distress. The financial condition of companies in the real estate sector has worsened over the years, marked by the increasing number of companies that were in financial distress from 5 companies in 2014 to 9 companies in 2018. Likewise, companies in the financial condition of gray areas from 8 companies in 2014 became nine companies in 2018, while companies with a healthy financial condition decreased from 8 companies in 2014 to 3 companies in 2018. **Research limitation/implications** - The sample is small, and consequently, findings may not be generalizable to the population. **Originality/value** - This paper aims to obtain empirical evidence of how financial ratios affect financial distress and also the exposure of financial distress probabilities to real estate companies that are used as research samples.

**Keywords:** Altman Z-Score, Financial Distress, ROE, DER, CR, WCR, Real Estate Companies

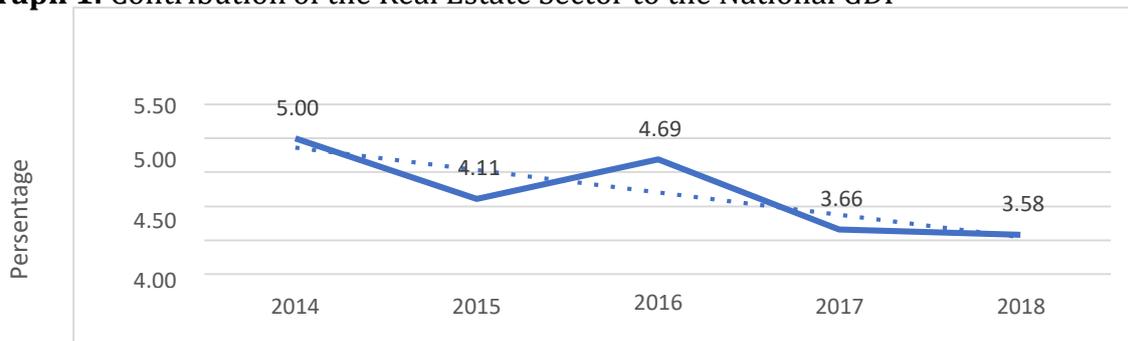
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## INTRODUCTION

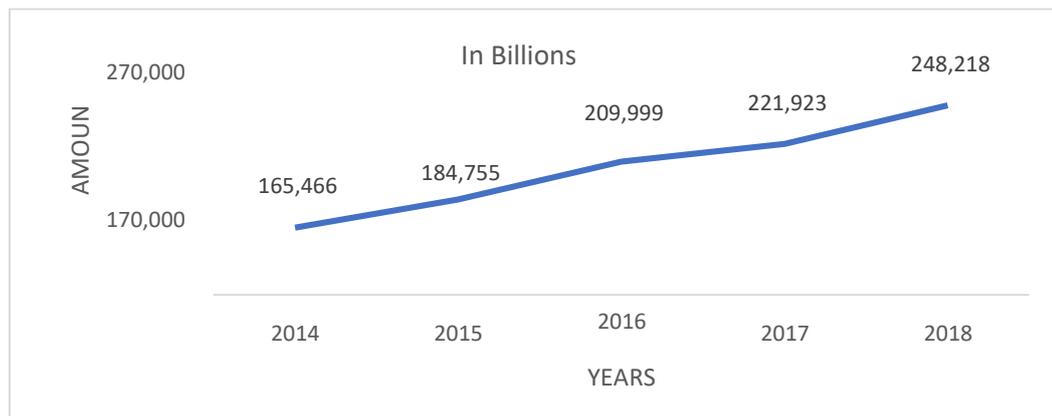
The study was conducted on real estate sector companies listed on the Indonesia Stock Exchange in the period 2014 - 2018. This research was motivated by the real estate industry trend, which has slowed in the last five years (2014-2018).

**Graph 1:** Contribution of the Real Estate Sector to the National GDP



For trends in the level of debt/leverage Real estate corporations do not follow the downward trend in GDP; on the contrary, the graph below shows the bank credit given to the real estate sector business field has increased from time to time in the study period 2014-2018.

**Graph 2:** Banking Loans in the Real Estate Sector, Rental Business, and Corporate Services

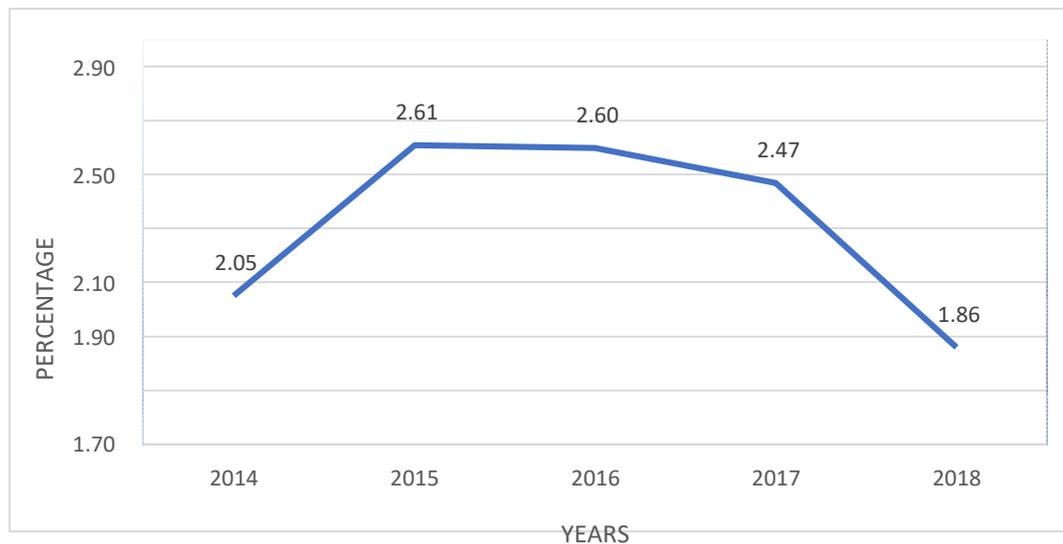


Non-performing banking loans for the Real Estate, Leasing, and Corporate Services business sector experienced a significant increase of 0.56% (in 2014 amounted to 2.05% to 2.61% in 2015).

Bank Indonesia issued Regulation No.17 / 10 / PBI / 2015 concerning the Loan to Value ratio or Financing to Value ratio for credit or property financing and down payment for

motor vehicle credit or financing. The background to the issuance of this regulation is to be able to control lousy credit in the Real Estate and Motorized Vehicles sector.

**Graph 3:** Troubled Banking Loans in the Real Estate Sector, Rental Business, and Corporate Services



From the graphs of non-performing banking loans above, the Government has succeeded in suppressing the growth rate of non-performing loans in the sector from its peak in 2015 of 2.61%, down to 1.86% in 2018 (Bank Indonesia, 2019).

## LITERATURE REVIEW

Financial Distress is an economic condition of a corporation that experiences an inability to pay short-term obligations. However, on a long-term projection, it is still considered to be able to pay off long-term obligations. The initial stage of bankruptcy is Financial Distress if this initial stage cannot be resolved, it will end in bankruptcy. Financial Distress Prediction is essential for Corporate stakeholders, including (Almilia and kristijadi 2003):

1. Creditors: creditors can analyze whether or not to give credit based on the projected Financial Distress model information. This model is also useful for monitoring credit.
2. Investors: Investors get information from financial distress model projections to be able to analyze whether Corporations have the possibility of financial difficulties in the future so that capital and interest cannot be returned.

3. Regulator: One of the functions Regulator is supervision; in this case, the task is to pay attention to each Corporation within the area of its work responsibility whether the Corporation can fulfill its obligations. For this purpose, it is necessary to analyze the stability and ability to meet Corporate obligations through the Financial Distress prediction model.
4. Supervisor: the supervisor/auditor can supervise the Corporation and provide an assessment through the Financial Distress prediction model.
5. Management: the basis for decision making can use this prediction model so that decisions are taken a right so that bankruptcy can be avoided.

The following aspects of the Corporation that cause Corporate bankruptcy are (Darsono and Ashari, 2005):

- a. Lack of management capabilities and competencies
- b. Corporations have unbalanced capital with total debt owed by Corporations.
- c. Fraud by Corporate management can cause losses so that it can eventually bring bankruptcy to the Corporation.

Many theoretical models that can be used to study, analyze, and predict financial pressures and bankruptcy include the Springate Model, the CA-Score Model, and the Altman Z-Score Model. This study uses the Altman Z-Score Model.

Multiple Discriminant Analysis was first introduced by Altman (2019). The Altman Z-score model as a measure of bankruptcy performance and bond risk is not stagnant or fixed, but rather evolves, along with the state of the Corporation and the situations in which the method is applied. The Z-Score model is an equation in financial ratios used weighted to find the maximum ability of the model, which is a number to represent the firm performance.

The Altman model continues to evolve, starting with the first Altman Z-Score model, this model is useful for bankruptcy predictions from go-public and manufacturing corporations (Loman and Malelak, 2015). After this first model, the revised Altman model (Revised Model) was issued, this bankruptcy model is suitable for use by manufacturing corporations listed and not listed on the Indonesia Stock Exchange. The revised Altman model cannot be used by the financial industry because it has the characteristics of a Balance Sheet (Financial Position Report) that is different from the manufacturing industry (Loman and Malelak, 2015).

Altman revised the model so that this new model could be used in every corporation issuing bonds, manufactures, and non-manufactures. This new model is known as the modified Altman model (Revised Four Model). This formula is different for manufacturing corporations that have gone public on the exchange and have not yet gone public.

### **Financial Ratios**

This financial ratio analysis is useful to provide financial distress projections and the Company's business performance.

Not all financial ratios are used in this scientific study, The author chooses only the ratios that are relevant for detecting Financial Distress as an independent variable, namely Return on Equity (ROE), Debt to Equity Ratio (DER), Current Asset Ratio (CA), Working Capital Ratio (WCR) with the following meanings (Atmaja, 2018):

ROE (Return on Equity), which is the ratio between profit after tax with total equity to measure the rate of return on capital. This ratio looks at the extent to the entire wealth if the corporation can provide a profit.

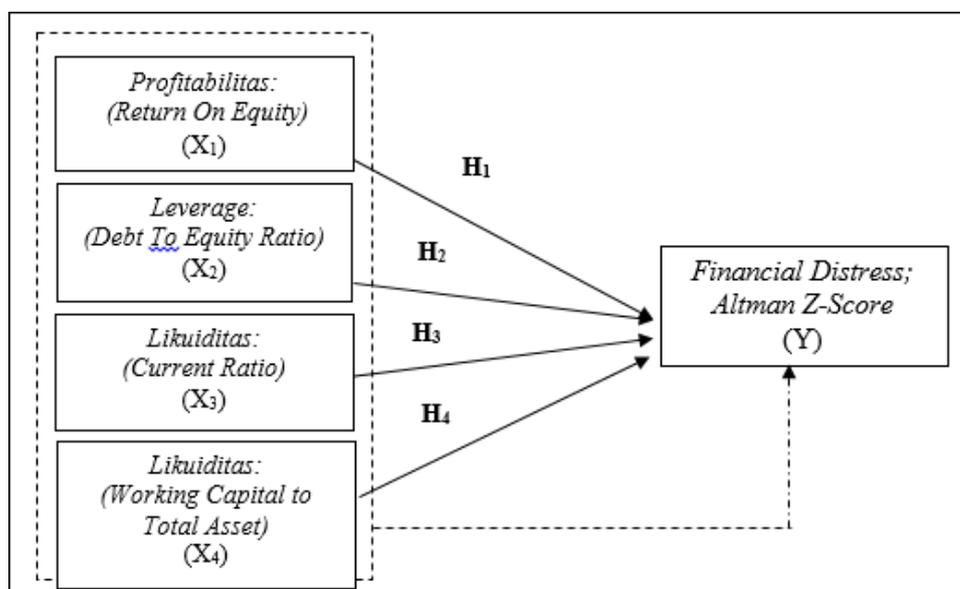
DER (Debt to Equity Ratio) is a ratio used to analyze financial statements to show the amount of collateral available to creditors.

The current ratio is the ratio to measure the ability of the Corporation to meet the payment of the current debt or debt that will mature when the debt is billed.

WCTO (Working Capital to Total Assets), which is a comparison of working capital with total assets owned by the Corporation.

### **Research Conceptual Framework**

**Picture 1:** Conceptual Framework



The bigger the corporation, the shorter the payback period for the investment to be received by investors and shareholders (Imran & Ramli, 2019; Mariam, 2019; Ramli, 2019a; Takaya, Ramli & Lukito, 2019; Ramli, 2018a). Significant profits will reduce the probability of Financial Distress / financial pressures of a Corporation, because of these profits, the Corporation can have sufficient working capital and can meet its obligations according to maturity. Therefore H1, which is formulated as Return on Equity, has a significant influence on Financial Distress. This hypothesis agrees with research by Assaji & Machmuddah (2017) and Widati & Pratama (2015).

**H1: Profitability (Return On Equity) influences Financial Distress (Altman Z-Score) significantly**

High debt is not accompanied by an increase in income/profits will make the weak firm performance. (Mariam & Ramli, 2019; Priarso, Diatmono & Mariam, 2018; Ramli, 2018b; Puteri & Ramli, 2018; Ramli & Maniagasi, 2018; Ramli, 2019b). This is because the Corporation must bear the interest expense and principal return on the debt, if operating profit cannot cover the interest expense, the Corporation will suffer losses (Ramli, 2017a; Chandra, Takaya & Ramli, 2019; Ramli 2017b), and the Corporation will begin to experience liquidity problems, Financial Distress and the potential for bankruptcy.

Christine, Wijaya, Chandra, Pratiwi, Lubis, Nasution (2019), Moleong (2019), and Widati & Pratama (2015) research on the influence of Debt Equity Ratio to predict Financial Distress revealed that Leverage has a significant effect on Financial Distress. The higher the level of Corporate leverage will increase the potential for experiencing Financial Distress.

**H2: Leverage (Debt to Equity Ratio) has a significant influence on Financial Distress (Altman Z-Score).**

Current ratio to measure the ability of Corporations to pay their short-term liabilities using current assets. The higher this ratio indicates, the less likely the Corporation to experience Financial Distress (Restianti and Agustina, 2018).

The results of research from Nasution (2019) and Ginting (2017) revealed that the Current Ratio has a significant effect on Financial Distress.

**H3: Liquidity (Current Ratio) has a significant effect on Financial Distress (Altman Z-Score)**

Another financial ratio to measure the level of corporate liquidity is to calculate Working Capital. Working capital, in comparison with the total assets of the Corporation, will produce a liquidity ratio; the value of this ratio will indicate the performance of the Corporation's financial liquidity. If this ratio gets higher, the value illustrates that the Corporation is in an excellent financial performance and can pay all current debts, and the remaining funds for working capital are very large to reduce the potential for adding new debt. The higher the Working Capital Ratio will reduce debt and reduce the cost of capital so that the higher corporate profits will cause the possibility of smaller Financial Distress. Research by Meiwawan (2017) and Fazalina & Sukmana (2017) concluded that Working Capital Ratio has a significant effect on Financial Distress.

**H4: Liquidity (Working capital to Total Assets) has a significant effect on Financial Distress (Altman Z-Score)**

## RESEARCH METHODS

### *Research design*

The purpose of this research is to obtain empirical evidence about the influence of corporate performance measured through the financial ratios of ROE, DER, CR, and WCR on the probability of Financial Distress / financial pressures measured through the Altman Z-Score method.

The nature of this research is descriptive and quantitative explanatory research to test hypotheses to analyze the effect of financial ratio variables on Financial Distress / financial pressure with the Altman Z-Score method.

This study uses a cross-sectional time horizon, which means the research is only carried out in a certain time with only one focal point.

The unit of analysis in this research is the Corporate Organization of the property and real estate sub-sector listed on the Indonesia Stock Exchange during 2014-2018.

### ***Variables and Measurements***

The variables in this research are:

#### 1. Bound / Dependent Variable

The dependent variable is a variable that is the focus of the researcher. The dependent variable studied was Financial Distress / financial pressures, which are economic failures that have the potential for bankruptcy and were assessed using the Altman Z-Score method (Loman and Malelak, 2015).

For this study, the authors used the Altman Z-Score Model for the manufacturing industry, public corporations with the following metrics (Altman, 2018):

$$Z = (1.2 * X1) + (1.4 * X2) + (3.3 * X3) + (0.6 * X4) + (1.0 * X5)$$

*Information:*

*Z = Total Index*

*X1 = Working Capital To Total Assets (WC / TA)*

*X2 = Retained Earnings To Total Assets (RE / TA)*

*X3 = Earnings Before Interest & Taxes To Total Assets (EBIT / TA)*

*X4 = Market Value of Equity to Book Value of Debt (MVE / BVD)*

*X5 = Sales To Total Assets (S / TA)*

The evaluation criteria include:

- a. Z-Score > 2.99 is classified as a very healthy Corporation, so that it does not experience financial difficulties.
- b. 1.81 < Z-Score < 2.99 are in the gray area.
- c. Z-Score < 1.81 is classified as a corporation that has considerable financial difficulties and high risk so that the possibility of bankruptcy is huge.

#### 1. Free / Independent Variables.

The independent variables studied were financial ratios consisting of:

##### a. *Return on Equity*

$$\text{ROE} = \frac{\text{Earning After Tax}}{\text{Total Equities}}$$

*b. Debt to Equity Ratio*

$$\text{DER} = \frac{\text{Total Liabilities}}{\text{Total Equities}}$$

*c. Current Ratio*

$$\text{CR} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

*d. Working Capital Ratio*

$$\text{WCR} = \frac{\text{Working Capital (Current Assets - Current Liabilities)}}{\text{Total Asset}}$$

***Population and Sample*****1. Population**

The population in this study is the property and real estate sub-sector listed on the Indonesia Stock Exchange for the last five years in 2014-2018, amounting to 62 companies.

**2. Samples**

This study uses purposive sampling with the criteria for Corporations Property and Real estate, where the corporation has listed its shares on the Indonesia Stock Exchange in 2014 and has financial statement data available to the public for the 2014-2018 period, with this technique, showed 21 corporations that meet the criteria.

***Research Data Analysis Methods***

This research is quantitative, so the data are analyzed using statistics. The appropriate statistic for this research is descriptive statistics.

Regression analysis is a technical data processing using panel data structures conducted through EViews 9th edition. Panel data regression is a combination of cross-sections with time-series data, where the same cross-section units measured at different times.

## **RESEARCH RESULT AND DISCUSSION**

### **Data Description**

Based on the financial statement data examined, here is a descriptive statistical table for the independent variables ROE, RER, CR, WCR, and the Z-Score dependent variable:

#### **Descriptive Statistics**

<b>Description</b>	<b>ROE</b>	<b>DER</b>	<b>CR</b>	<b>WCR</b>	<b>Z-SCORE</b>
Mean	0.124424	0.980949	2.435658	0.225591	2.583859
Median	0.103975	0.940975	1.871062	0.195866	2.248771
Maximum	0.321200	3.700960	7.759731	0.722491	11.23004
Minimum	-0.041363	0.243722	0.393509	-0.140423	0.471248
Std. Dev.	0.079767	0.534431	1.731888	0.223209	1.691577
Observations	105	105	105	105	105

### **Research Results and Discussion**

#### **1. Classical Assumption Test**

Testing classic assumptions in this study were conducted to determine the symptoms that interfere with the regression process with the following four tests:

##### **a. Normality Test**

In the normality test panel data model, this is not done.

##### **b. Heteroskedasticity Test**

In the panel data model, the heteroskedasticity test was not performed.

##### **c. Multicollinearity Test**

The correlation value that can be tolerated in the multicollinearity test is 70% or 80% (0.7 or 0.8). The following multicollinearity test results:

	ROE	CR	DER	WCR
ROE	1			
CR	-0.259519	1		
DER	0.049590	-0.346852	1	
WCR	-0.222198	0.785686	-0.320898	1

Source: Data Processed With EViews, 2019

The table above shows all the correlation values  $<0.80$  for each variable carried out crossline, the research model shows no symptoms of multicollinearity (there is no powerful relationship between independent variables) so that a regression test can be used.

#### **d. Autocorrelation Test**

The autocorrelation test is not performed on panel data regression models with data time series and cross-section.

### **1. Panel Regression Test**

Panel data regression must go through the stages of determining the right estimation model, whether using a common effect model, fixed effect model, or random-effect model.

#### **a. Chow Test**

##### **Chow Test Results**

Redundant Fixed Effects Tests  
Equation: PANEL  
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	10.248685	(20,80)	0.0000
Cross-section Chi-square	133.388881	20	0.0000

Source: Data Processed With EViews, 2019

From the processing, results obtained, the probability of the cross-section chi-square is  $0,000 < 0.05$  so that  $H_0$  is rejected, and  $H_1$  is accepted so that the conclusion derived is the right model Fixed Effect Model (FEM).

**e. Hausman Test****Hausman Test Results**

Correlated Random Effects - Hausman Test

Equation: PANEL

Test cross-section random effects

	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Test Summary			
Cross-section random	31.622820	4	0.0000

Source: Data Processed With EViews, 2019

From the processing results obtained, the probability of a random cross-section of 0,000 <0.05 so that H0 is rejected (H1 accepted), and it can be concluded that the right model is the Fixed Effect Model (FEM).

**f. Lagrange Multiplier (LM) Test**

LM testing is done if the Hausman test results produce the right model conclusion is the Random Effect Model (REM). Because the Hausman test results yield the conclusion that the right model is FEM, FEM is the best model and does not need to LM test.

**1. Determination Coefficient Test (Adjusted R<sup>2</sup>)**

<b>Determination Coefficient Test Results</b>			
R-squared	0.849685	Mean dependent var	25838.61
Adjusted R-squared	0.804590	S.D. dependent var	16915.76
S.E. of regression	7477.643	Akaike info criterion	20.88148
Sum squared resid	4.47E+09	Schwarz criterion	21.51338
Log-likelihood	-1071.278	Hannan-Quinn criteria.	21.13754
F-statistic	18.84227	Durbin-Watson stat	1.687273
Prob (F-statistic)	0.000000		

The results of processing in the Panel Data Regression model obtained adjusted R<sup>2</sup> value of 0.8046 or 80.46 percent, which means the ability of independent variables namely ROE, DER, CR and WCR are able to explain the dependent variable behavior namely Financial Distress by 80.46% percent while the rest namely 19.54% explained by other variables that affect Financial Distress but not included in the model. These findings indicate that the model used has the goodness of fit.

## 1. The T-test (partial/individual testing)

### Fixed Effect Model Results

Dependent Variable: Financial Distress			
Independent Variable	Coefficient	T stat	Prob
ROE	4.189277	3.057588	0.0030
DER	-1.105470	-4.504347	0.0000
CR	-0.500538	-3.163103	0.0022
WCR	6.264917	3.031722	0.0033

#### **H1: Profitability (Return On Equity) has a significant effect on financial distress (Altman Z-Score).**

The processing results obtained ROE coefficient ( $\beta_1$ ) of 4.189277 means that if ROE rises by 1 percent will increase the Z-Score by 4.189277 points (reduce the probability of financial distress of the company) and vice versa decrease in ROE by 1 percent will reduce the value of Z-Score (increasing the P-value of a company's financial distress) by 4.189277 points. The probability of t is 0.0030 < 0.05, which means that  $H_0$  accepted so that the hypothesis stating that ROE has a significant positive effect on the company's financial distress.

#### **H2: Leverage (Debt to Equity Ratio) has a significant effect on financial distress (Altman Z-Score)**

From the processing results obtained DER coefficient ( $\beta_2$ ) of -1.105470 means that if DER rises by 1 percent then the Z-Score value will decrease by - 1.105470 points (the condition of the company is experiencing financial distress) and vice versa if DER has reduced by 1 percent, the Z-Score will increase by -1,105470 points (the state of the company is increasingly not experiencing financial distress).

The value of the statistical probability variable DER of 0,000 < 0.05 indicates that  $H_0$  is rejected ( $H_a$  accepted), so it can be concluded that DER has a significant adverse effect on the Z-Score (financial distress condition).

### **H3: Liquidity (Current Ratio) has a significant effect on financial distress (Altman Z-Score)**

The calculation results showed with the estimated coefficient value of CR ( $\beta_3$ ) of -0,500538, which means an increase of CR by 1 percent will decrease the Z-Score by 0.500538 points (more experiencing financial distress) and conversely a decrease of CR by 1% will increase Z-Score (increasingly not experiencing financial distress) of 0.500538%. With the probability value of t statistic of  $0.0022 < 0.05$ ,  $H_0$  rejected ( $H_a$  accepted), so it can be concluded that there is a significant negative effect of CR on the Z-Score (financial distress condition).

### **H4: Liquidity (Working capital to Total Assets) has a significant effect on financial distress (Altman Z-Score)**

The processing results showed with an estimated coefficient of WCR ( $\beta_4$ ) of 6.26491, which means an increase in WCR of 1 percent will increase the value of Z-Score (companies are frequently not experiencing financial distress) by 6.26491 points and vice versa decreasing WCR by 1% will reduce the Z-Score 6.26491 (companies are increasingly experiencing financial distress). The probability value of t statistic of  $0.0033 < 0.05$  indicates that  $H_0$  rejected and  $H_a$  was accepted so that it can be concluded that WCR was proven to have a significant positive effect on the value of Z-Score (financial distress condition).

#### **1. Concurrent Test (Test F)**

For global testing, the results of processing in the Financial Distress model obtained the probability value of F-statistic that is  $0,000 < 0.05$  (alpha 5%) so that the null hypothesis is rejected and  $H_a$  is accepted. It can be concluded that at least one independent variable has a significant influence on a dependent variable. More details can be seen in the following table.

<b>Concurrent Test Results (Test F)</b>			
R-squared	0.849685	Mean dependent var	25838.61
Adjusted R-squared	0.804590	S.D. dependent var	16915.76
S.E. of regression	7477.643	Akaike info criterion	20.88148
Sum squared resid	4.47E+09	Schwarz criterion	21.51338
Log likelihood	-1071.278	Hannan-Quinn criter.	21.13754
F-statistic	18.84227	Durbin-Watson stat	1.687273

Prob(F-statistic) 0.000000

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## CONCLUSIONS, IMPLICATIONS AND SUGGESTIONS

### Conclusion

Based on the results of the study, the following conclusions can be obtained:

- a. Return on Equity Profitability Ratios has a significant positive effect on financial distress with the Altman Z-Score method.
- b. Debt Equity Ratio has a significant negative effect on financial distress with the Altman Z-Score method.
- c. Current Ratio Liquidity Ratio significant adverse effect on financial distress with the Altman Z-Score method.
- d. Working Capital Ratio (WCR) shows a positive and significant effect on financial distress using the Altman Z-Score method.
- e. Financial distress analysis using the Altman Z-Score method shows the Z-Score of real estate sector companies is getting lower year by year, marked by the increasing number of companies that are in the Z-Score  $<1.81$  category of financial distress from 5 companies in 2014 become nine companies in 2018. Likewise with companies that are in the number  $1.81 < Z\text{-Score} < 2.99$  gray regional financial categories from 8 companies in 2014 to 9 companies in 2018. While companies that number Z- Score  $> 2.99$  financial categories are healthy, declining from 8 companies in 2014 to 3 companies in 2018.

### Managerial Implications

Based on these research managerial implications that might be useful as follows:

- a. For company management, it is necessary to conduct and pay attention to financial ratio analysis because from this study, all financial ratios studied are ROE, DER, CR, and WCR have a significant influence on financial distress prediction. Analysis with the Z-Score method also needs to be done internally management because this Altman formula has been more than fifty years proven to used and reliable.
- b. For Investors and Creditors, the earlier they learn and analyze the financial ratios and Z-Scores of the companies where they invest/provide credit, they will be able

to avoid investors and creditors from the worst possible default on their investment/credit.

- c. For regulators who have a routine monitoring and supervision function to the issuer's compliance and financial statements, the regulator can provide input and warnings to issuers to immediately focus on the right strategy to improve the issuer's business and financial performance.
- d. For academics so that this research becomes a reference source for future study and as a comparison for previous research so that this research can be further refined and provide more excellent benefits for education.

### **Suggestions for Next Research**

Following the results of the study, the ideas the authors convey are as follows:

1. For the next research, it can take a broader sample, not only the property and real estate sector, but also add a sample of construction companies so that this one business sub-sector is complete.
2. The next research can add other independent variables such as GDP growth, inflation, lending rates, etc.
3. The limitations of the author in examining financial distress are only by using the Altman Z-Score model. The next researcher is expected to be able to develop a financial ratio model by looking for relationships with other bankruptcy theories such as CA Score and Springate.

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