Altman Z-Score Method Application to Predict Financial Distress on Property and Real Estate Sector Listed in Indonesia Stock Exchange

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ABSTRACT: Financial distress is a bankruptcy prediction model that is useful as an early warning system to anticipate information on the worst possibilities that will occur in the future. This study aims to determine the effect of liquidity, leverage and operating cash flow on financial distress with firm size as a moderating variable. In predicting financial distress, it is proxied by the Altman Z-Score model. The sample determination method using a purposive sampling method and obtain 17 samples of property and real estate companies listed on the Indonesia Stock Exchange in 2016-2020. According to the research, liquidity positively affects financial distress; leverage negatively affects financial distress; operating cash flow does not affect financial distress. The effect of liquidity on financial distress can not moderated by firm size; nevertheless, firm size can moderate the effect of leverage on financial distress.

KEYWORDS: Financial Distress, Firm Size, Leverage, Liquidity, Operating Cash Flow

I. INTRODUCTION

In 2008, particularly in the fourth quarter, the Indonesian economy came under increasing pressure due to the global crisis that occurred in 2007. Uneven international economic development, the declining export performance, an expanding balance-of-payments deficit in Indonesia, and a severe decrease in the rupiah currency rate are driving it. According to a report sourced from Bank Indonesia's official website, the economic growth of developing countries began to improve gradually and increased from 4.4% in 2016 to 4.7% in 2017 (Bank Indonesia, 2017). However, in early 2020, the economy began to be shaken again due to economic pressure from the *Covid-19* pandemic outbreak. It led to difficult financial conditions for almost all company sectors. Not implementing organizational strategic policies will be a financial challenge during a pandemic that leads to bankruptcy.

According to (Platt & Platt, 2002), the effect of decreasing financial circumstances before the company experiences bankruptcy or liquidation knowns as financial distress. Companies categorized as experiencing financial distress have had negative operating profits for two consecutive years (Almilia & Kristijadi, 2003). A debt ratio more significant than the company's assets might generate financial difficulty. According to agency theory, there is a possibility error on the part of the agent or company management that deliberately ignores the interests of the principal.

In the era of globalization, companies not only compete with domestic competitors but also begin to compete with foreign companies. Therefore, every sector of the company can experience financial difficulties. The sector that is considered the most vulnerable to fluctuations in interest rates, macroeconomic conditions (inflation), government policies, and volatility in the rupiah exchange rate, which can affect people's purchasing power, is the property and real estate sector. Based on financial statement information obtained from the Indonesia Stock Exchange (IDX) website, the sector experienced a decrease in the number of sales and total profits presented in Figure 1.

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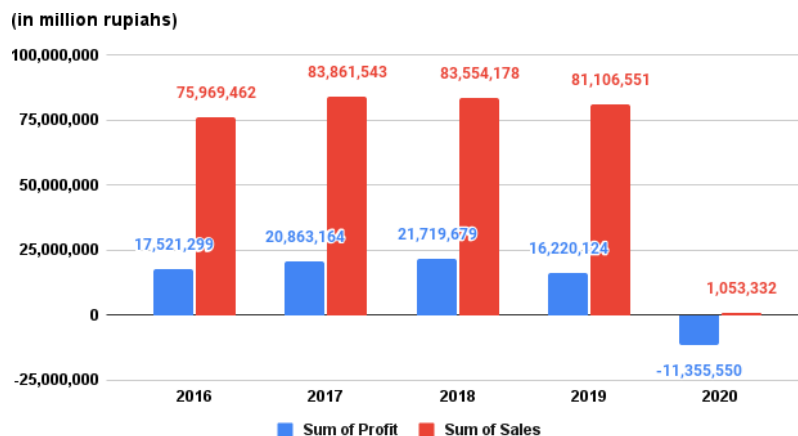

Figure 1. Diagram of Total Profit and Total Sales of Property and Real Estate Companies on the IDX 2016-2020

Figure 1 shows that the total profit and sales of property and real estate companies tend to decrease from 2018 to 2020. Based on Bank Indonesia's Q3 2017 Survey of Resident Property Prices (SHPR) (Sugianto, 2017) states that the factors that hinder the growth of the property business are mortgage interest (20.36%), down payment requirements (16.57%), taxes (16.13%), licensing (14.45%), and rising prices of building materials (11.68%). In the current post-pandemic condition, the property and real estate sector is still experiencing sluggishness (Intan, 2022). It is due to the depressed purchasing power of the community, so property and real estate sales have not recovered. In this situation, if the company is unable to compete, the company will lose money due to the swelling of costs and expenses borne, so the longer company experience financial difficulties.

The purpose of establishing a company is to maximize profit with cost efficiency to ensure the prosperity of the company owner. With this purpose in mind, firm management must optimize company performance and operations to minimize unfavorable situations, such as a year-over-year reduction in revenue. An audited and published financial report demonstrates the company's success. According to (Kasmir, 2019), diverse stakeholders can comprehend financial reports to become more significant. It is necessary to analyze financial reports carefully using appropriate analysis methods and techniques, one of which is ratio analysis. With the ratio analysis to predict bankruptcy, the company can know its financial condition, whether it is in a healthy or unhealthy condition. This study uses the Altman Z-Score calculation method to determine the value of financial distress with independent variables, which including liquidity, leverage, and operating cash flow, and moderating variables, namely firm size.

II. LITERATUR REVIEW

A. Agency Theory

Agency theory states when the principal authorizes the agent or management to manage the company, including when making decisions (Yuniningsih, 2017). Agency theory occurs due to two rational individuals with conflicting interests (*asymmetric information*), namely when one party has information that the other party does not own. An agent fulfill a commitment to carry out corporate activities in the principal's interests. Financial reports require agents to be transparent and accountable for their effectiveness in managing the organization. In this study, agency theory is supposed to offer investors and firm owner confidence that they would obtain a return on their investment.

B. Signaling Theory

Signaling theory explains the impetus or reason for companies to provide certain information to external parties. In this case, the company must present information in a complete, timely, relevant, and accurate manner. The purpose of financial statement disclosure about signal theory is to present information about the company's prospects, influencing stakeholders in decision-making. The more extensive the company's financial performance disclosure, the more indirectly it provides positive signal information to stakeholders. According to (Dirman, 2020), the information provided by the company can be in the form of good news, such as profits information and investment returns. While the bad news can be in the form of losses experienced by the company, resulting in no dividend distibution or even information about the high value of the company's debt which indicates the risk of bankruptcy.

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C. Financial Distress

Financial distress is the company's unhealthy financial condition and occurs before bankruptcy (Hapsari, 2012). Companies that experience bankruptcy do not occur suddenly. According to (Oktasari, 2020), financial distress can also occur when the company's operating cash flow is insufficient or inadequate to fulfill its current obligations, and the company is forced to take corrective action by carrying out financial restructuring between the company, creditors, and investors. Companies that experiencing financial difficulties will negatively value investors and creditors when making capital investments. In this study, the prediction of financial distress is measured using the modified Altman Z-Score model equation (1995) as follows (Ramadhani & Lukviarman, 2009):

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

Description:

Z"= *Financial Distress Index*
X1= *Working Capital to Total Assets*
X2= *Retained Earnings to Total Assets*
X3= *Earn Before Interest and Taxes to Total Assets*
X4= *Book Value of Equity to Book Value of Debt*

D. Liquidity

Liquidity is a ratio that describes the company's ability to pay short-term obligations that will mature (Yuniningsih et al., 2018). A company has a higher likely to avoid the possibility of financial distress by being more liquid. It means that the company has a means of payment (current assets) that is greater than its current liabilities. The formula used in this study to determine liquidity which measured by Current Ratio as follows (Zhafirah & Majidah, 2019):

Current Ratio = $\dfrac{\text{Current Asset}}{\text{Current Liabilities}}$

E. Leverage

Leverage is a ratio used to assess the extent to which the company is financed by debt. The use of funds derived from leverage must be careful because the higher the value of debt will result in company bankruptcy (Yuniningsih et al., 2019). The higher leverage ratio value, the higher the debt and interest expense. The calculation of leverage in this study uses the Debt to Asset Ratio (DAR) as follows (Opitalia & Zulman, 2019):

Debt to Asset Ratio = $\dfrac{\text{Total Debt}}{\text{Total Assets}}$

F. Operating Cash Flow

According to (Eviyenti & Sanjaya, 2021), operating cash flow is a financial report including the effect of cash from operating activities, investment transactions, financing/funding transactions, and a net growth or reduction in the company's cash during a period. The lower value of operating cash flow will indicate the company's failure to maximize its operational activities. This ratio is measured by the formula (Tania & Wijaya, 2021):

Operating Cash Flow = $\dfrac{\text{Cash Flow from Operations}}{\text{Current Liabilities}}$

G. Firm Size

Company size indicates the size of a company which can be measured by total assets, total sales, and average total assets (Mujiani & Jum'atul, 2020). The proportion of assets that the company owns increases with its size. In addition, companies are considered more capable of facing the threat of financial distress if the company has a relatively large number of assets. In this study, firm size is measured by the formula (Rahmadianti & Asyik, 2021):

Firm Size = Ln (Total Asset)

III. RESEARCH METHODS

Based on the type of research, this research use a quantitative approach. The research was conducted to predict financial distress conditions in all property and real estate companies listed on the Indonesia Stock Exchange (IDX) for 2016-2020. The study used a purposive sampling technique, 17 company samples were obtained from 73 companies with a total data of 85 observational. The data analysis technique use multiple regression analysis and Moderated Regression Linear (MRA). The

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variables used to measure financial distress (Y) are three independent variables, namely liquidity (X1), leverage (X2), and operating cash flow (X3), as well as one moderating variable, namely firm size (Z).

IV. RESULTS AND DISCUSSION
A. CLASSICAL ASSUMPTION TEST

Table 1. Normality, Multicollinearity, and Heteroscedasticity Test Results

	symp. Sig. (2-tailed)	X1	X2	X3
Normality	.200	-	-	-
Multicollinearity **(VIF)**	-	1.407	1.431	1.070
Heteroscedasticity **(Residual)**	-	.678	.260	.573

Source: SPSS data processed

Based on the output of the normality test results in table 1, it can be seen that the *2-tailed asymptotic* significance value of the *unstandardized residual* in the study is 0.200. This value is greater than 0.05. It can be concluded that the normality assumption is met or the data is normally distributed. The next classic assumption test is the multicollinearity test. Multicollinearity test occurs if the *tolerance* value < 0.10 or VIF > 10. Table 1 shows that no variables have a VIF value of more than 10. It means that there is no correlation between the independent variables. Then, in table 1, the heteroscedasticity test output shows that the *Sig.* value is greater than 0.05. It means that this study's independent variables do not show symptoms of heteroscedasticity.

Table 2. Autocorrelation Test Results

Model	R	R Square	*AdjustedR Square*	*Std. Error of the Estimate*	*Durbin-Watson*
1	.987ª	.974	.973	1.17347189	1.839

Source: SPSS data processed

Based on table 2, the analysis results show the calculated *Durbin-Watson* value of 1.839. As for the *Durbin Watson* table value with 71 data and three independent variables, the numbers dL = 1.5284 and dU = 1.7041 are obtained. The test obtained the results dU (1.704) < d (1.839) < 4-dU (2.296). The test results explain that the calculated *Durbin Watson* lies in an area with no correlation between these values.

B. Moderating Regression Analysis (MRA)
Moderating variables are those that have the ability to strengthen or weaken the correlation between the independent variable and the dependent variable.

Table 3. MRA Test Results

	B	Sig
X1*Z	-.057	.129
X2*Z	-2.481	.031

a.   Dependent Variable: Y

Source: SPSS data processed

Based on table 3, the results show that the effect of the firm size that moderates liquidity on financial distress (X1*Z) obtained a coefficient of -0.057 with a significance level of 0.129 > 0.05. So, it is concluded that the firm size variable can not prove to be a moderating variable that provides a relationship between the liquidity variable (current ratio) on financial distress. The effect of firm size, which moderates leverage on financial distress (X2*Z), obtained a coefficient value of -2.481 with a significance level of

0.031 < 0.05. It can be concluded that the firm size variable proves to be a moderating variable that strengthens the relationship between the leverage variable (debt to total asset ratio) on financial distress.

C. Multiple Linear Regression Analysis

The analysis method use in this research is multiple linear regression analysis. Through multiple linear regression analysis, it can be seen the influence or relationship between the independent variable and the dependent variable, the results of that presented in table 4.

Table 4. Multiple Linear Regression Analysis Results and T-Tests

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std.Error	Beta	t	Sig.
1	(Constant)	.631	.284		2.223	.030
	CR (X1)	1.164	.028	.957	40.862	.000
	DAR (X2)	-2.536	1.085	-.055	-2.338	.022
	OCF (X3)	.022	.536	.001	.042	.967

Source: SPSS data processed

Based on table 4, the multiple linear regression analysis carried out produces an equation:

$$Y = 0.631 + 1.164\ CR - 2.536\ DAR + 0.022\ OCF$$

The equation can be explained that the value of a (constant) is 0.631. It means that if the independent variable is zero or constant, the value of Financial Distress (Y) increases by 0.631. The regression coefficient value of the Current Ratio (X1) variable shows positive results, amounting to 1.164. This result shows a unidirectional change, if the CR (X1) variable increases by one unit, the Financial Distress (Y) variable will increase by 1.164. The next is the regression coefficient value of the Debt to Total Asset Ratio variable, which is negative, namely -2.536. The results show a change in the opposite direction, meaning that if the DAR (X2) variable increases by one unit, the Financial Distress (Y) variable will decrease by -2.536. The next variable is Operating Cash Flow (X3) which has a regression coefficient of 0.022. The result obtained is an unidirectional change, meaning that if the OCF (X3) variable increases by one unit, the Financial Distress (Y) variable will increase by 0.022.

D. Partial Test (T-Test)

The individual parameter significance test demonstrates how significantly each independent variable contributes to the variation in the dependent variable. Based on table 4, it can be interpreted that the partial test of Current Ratio or CR (X1) on Financial Distress or FD (Y) gives a coefficient of 1.164 with a significance level of 0.000 < 0.05, it can be concluded that liquidity has a positive effect on financial distress. The more value of liquidity (Current Ratio) increases, the more likely the company will experience financial distress.

The partial test results in table 4 to determine the effect of Debt to Total Asset Ratio or DAR (X2) on Financial Distress or FD (Y) shows a coefficient value of -2.536 with a significance level of 0.022 < 0.05, it can be concluded that leverage has a negative effect on financial distress. The higher the leverage value (Debt to Total Asset Ratio) will not necessarily experience financial distress.

In table 4, the partial test of Operating Cash Flow or OCF (X3) on Financial Distress or FD (Y) shows a coefficient value of 0.022 with a significance level of 0.967 > 0.05. It can be concluded that operating cash flow has no significant effect on financial distress.

E. Simultaneous Test (F-Test)

The F test was conducted to determine the joint influence of the independent variables on the dependent variable.

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Table 5. Partial Test Results (F test)

ANOVAª						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	**Regression**	3443.495	3	1147.832	833.552	.000ᵇ
	Residuals	92.261	67	1.377		
	Total	3535.756	70			

a. Dependent Variable: Y

b. Predictors: (Constant), X1, X2, X3

Source: SPSS data processed

Based on the ANOVA test results in table 5, it can be seen that the regression model produces a calculated F value of 833.552 with a significance value of 0.000. It means that the significance value is less than 0.05. Thus, it is concluded that the independent variables, including CR (X1), DAR (X2), and OCF (X3), can jointly affect the dependent variable, namely the FD variable (Y).

F.   Coefficient of Determination (Adjusted R^2)

The coefficient of determination (R2) measures the ability of the independent variable to explain the dependent variable. The results of the coefficient of determination analysis are shown in table 6 below

Table 6. Results of the Coefficient of Determination

Model	R	R Square	*Adjusted R Square*
1	.987ª	.974	.973

Source: SPSS data processed

Based on the output generated in table 6, it can be interpreted that the coefficient of determination is *Adj. R Square* of 0.973. It means that the dependent variable, namely FD (Y), is influenced by variable X, namely CR (X1), DAR (X2), and OCF (X3) in this study by 97.3%, and other factors outside the model influence the remaining 2.7%.

DISCUSSION

The Effect of Liquidity on Financial Distress

Based on partial testing conducted in this study shows that liquidity has a positive effect on financial distress. The more value of liquidity (current ratio) increases, the more likely the company will experience financial distress. The liquidity ratio is a measure that shows how effectively a company can fulfill its short-term obligations. A high liquidity ratio does not necessarily mean that the company will avoid the threat of financial distress. The company's annual sales decline and the utilization of ineffective company assets are the reasons contributing to this.

In conditions when the company will fulfill due short-term obligations, the company needs a sufficient amount of cash from current assets. Companies whose accounts receivable balances are extensive and challenging to collect will show low accounts receivable turnover. As the number of short-term liabilities that will mature increases and are not followed by good corporate policies, it will cause the company to experience financial difficulties. The partial test results are in line with research conducted by (Nasution, 2019), (Oktasari, 2020) and (Syuhada et al., 2020).

The Effect of Leverage on Financial Distress

Based on the output of the partial test in this study, leverage has a negative effect on financial distress—the more the leverage value increases, the lower the company's chance of experiencing financial difficulties. Leverage is a ratio states that there is an activity of borrowing third-party funds. The use of funds derived from leverage must be careful because the higher value of debt will result in company bankruptcy (Yuningsih et al., 2019). Companies with high debt-to-total asset ratio value will not necessarily experience financial distress. Suppose the company can optimize loan funds and minimize operating expenses in the current year. In that case, the company can achieve profits according to the target so that cash flow can be positive. The partial test results are in line with research conducted by (Kariani & Budiasih, 2017), (Masdupi et al., 2018), and (Oktaviani, 2020).

The Effect of Operating Cash Flow on Financial Distress

This study's partial testing shows that operating cash flow has no significant effect on financial distress. Operating cash flow measures the company's activities in paying off loans, paying dividends, corporate spending, and cash receipts from sales and

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other income that are not described in the income statement and balance sheet. The high and low operating cash flow allows the company to experience failure in maximizing the company's operations, resulting in a decrease in profits. If the company's earnings decrease worsens, it will face financial difficulties. The partial test results align with research conducted by (Rissi & Herman, 2021) and (Tania & Wijaya, 2021).

The Effect of Liquidity on Financial Distress Moderated by Firm Size
The Moderated Regression Analysis (MRA) test conducted in this study proves that firm size can not moderate the effect of liquidity on financial distress. The ability of the company to pay soon-to-be-matured short-term obligations is known as liquidity (Yuniningsih et al., 2018), while company size is a scale of the size of the company, which can be seen from the number of assets owned. In companies with a large number of assets, if the company can not manage properly, it will not provide income and only create more liabilities. It means that even though the company have many assets, there is no guarantee that it will avoid financial difficulties. The Moderated Regression Analysis (MRA) test results align with research conducted by (Tania & Wijaya, 2021).

The Effect of Leverage on Financial Distress Moderated by Firm Size
The Moderated Regression Analysis (MRA) test conducted in this study proves that firm size can moderate the effect of liquidity on financial distress. Leverage states how many external loans finance the company's assets. Company/firm size can support corporate debt funding. The large companies can more easily access capital markets and have flexibility in obtaining funds. However, the smaller company's size, the greater possibility of experiencing financial difficulties. The small companies have high growth opportunities and tend to face principal-agent conflict of interest. This condition can result in small companies funding most of their operational activities using loans from external parties. The greater loan value, the greater interest expense, which complicates the company's finances. The results of the MRA test align with research conducted by (Kariani & Budiasih, 2017).

CONCLUSIONS
The relevant conclusions are derived from the analysis and discussions that have been accomplished as follows:

Liquidity proxied by the current ratio positively influences the prediction of financial distress. The more liquidity value increases, the more company experiences financial difficulties. To minimize this possibility, companies can increase current assets that can be converted into cash in a relatively fast time, such as increasing cash sales.

Leverage proxied by DAR has a negative influence on financial distress. The higher values have a lesser likelihood of experiencing financial distress. The high DAR value must be carefully handled so that most of the company's assets funded by external loans may be converted into capital to increase company profits.

Operating cash flow has no significant effect on financial distress. The high current assets (characterized by an increasing amount of receivables) can reduce the value of operating cash flow. Otherwise, the high current liabilities (indicated by an increasing debt) will increase the value of the operating cash flow. The companies with a good cash flow value will not experience financial distress.

The effect of liquidity on financial distress can not moderated by firm size, as measured y *Ln* total asset. The size of the company, described by the high and low value of assets, if not appropriately managed, it will not provide income. It will only reduce liquidity that resulting liabilities in the future.

The effect of leverage on financial distress can moderated by firm size. The large companies can easily access the capital market to provide external funding assistance to companies, thereby minimizing financial difficulties and vice versa.

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