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Altman Financial Distress Model Comparison Prediction on Listing and Delisting Companies

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Abstract

This study aims to compare the effectiveness of the financial ratios Working Capital to Total Assets (WCTA), Retained Earnings to Total Assets (RETA), Earnings Before Interest and Tax to Total Assets (EBITTA), and Book Value of Equity in the Altman model when predicting financial distress in companies listed and delisted on the IDX during the period 2018-2023. Financial distress is an event in which a company experiences financial difficulties that can lead to bankruptcy. This study uses secondary data generated through the company's annual financial reports listed on the IDX. The analysis method used is multiple discriminant analysis (MDA) to identify the probability of each financial ratio in the occurrence of financial distress. The results of this study are expected to provide insight for financial managers and investors when anticipating and managing financial risks, as well as contributing to academic literature related to financial distress prediction. In addition, this study also shares an overview of the effectiveness of the Altman model in the context of the Indonesian capital market during the period analyzed.

Keywords: Working Capital To Total Assets (WCTA); Retained Earnings To Total Assets (RETA); Earnings Before Interest And Tax To Total Assets (EBITTA); Book Value Equity Model Altman; Multiple Discrimininat Analysis (MDA)

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INTRODUCTION

The company's financial condition is one of the most crucial aspects in maintaining the company's long-term survival and success. Amidst the dynamics of the global economy and increasingly complex domestic challenges, companies must be able to maintain their financial health to remain competitive and survive in the market. One of the relevant indicators for assessing the company's financial health is by analyzing the potential for financial distress. Financial distress is an event where a company experiences serious financial difficulties, which can lead to bankruptcy if not done properly. Financial Distress Prediction (FDP) uses the development of statistical models that predict financial losses or wins in companies based on general information such as financial variables through accounting reports (Balassubramanian et al., 2019; Halteh et al., 2018). The financial difficulties of a company can also be observed and measured through financial reports (Marginingsih, 2022; Tahu, 2019). In Indonesia, companies that will trade financial instruments or other securities such as stocks, bonds, mutual funds or other derivative instruments publicly will register on the Indonesia Stock Exchange (IDX).

Altman Z-Score is a model that is widely used in predicting financial distress. This model uses various financial ratios to assess the probability of a company going bankrupt. In this study, we focus on four main components of the Altman model, namely WCTA, RETA, EBITTA and Book Value Equity. These four ratios provide a comprehensive picture of the company's liquidity, profitability and financial health. WCTA measures the company's liquidity by comparing working capital through total assets, RETA measures accumulated retained earnings with total assets, EBITTA measures operational profitability for total assets, and Book Value Equity provides an overview of the company's book equity value. By combining these four ratios, Altman Z-Score is able to provide a more accurate prediction of bankruptcy risk, helping companies and investors make more informed and strategic financial decisions.

This study will conduct a comparative analysis between listed and delisted companies on the IDX during the period 2018-2023. By analyzing data from these two groups of companies, it is expected to find significant differences in the financial ratios used in the Altman model. These findings are expected to provide deeper insight into the factors that influence financial distress and help stakeholders in making better decisions.

Through this study, we will explore the extent to which financial ratios are able to be used to predict financial distress, as well as identify the main differences between companies that successfully survive on the stock exchange and those that do not. Thus, this study is expected to be able to provide significant contributions to the financial

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literature, as well as become a reference for practitioners in managing corporate financial risk.

LITERATURE REVIEW

Financial distress is an event in which a company experiences serious financial difficulties, which can lead to bankruptcy if not addressed immediately. Altman (1968) defines financial distress as an event in which a company is unable to meet its financial obligations. This event is often measured using certain financial ratios that reflect the company's financial health. The Altman Z-Score model was developed by Edward Altman during 1968 to predict corporate bankruptcy. This model uses various financial ratios to assess the probability of a company's bankruptcy. Several studies have shown that the Altman Z-Score model has a high level of accuracy when predicting financial distress. Altman (2000) and Altman, Danovi, and Falini (2013) show that this model remains relevant and reliable in various economic conditions.

The WCTA ratio measures a company's liquidity by analogizing working capital to total assets. Working capital is the difference between current assets and current liabilities. This ratio shows how much of a company's assets are supported by working capital. According to Altman (1968), this ratio is important for assessing a company's liquidity and capability in meeting its short-term obligations. A higher WCTA ratio indicates that a company has better liquidity, because more of its assets are available in the form of working capital to cover short-term obligations. Therefore, companies with high WCTA tend to be better able to meet their financial obligations in the short term, reduce the risk of bankruptcy, and indicate better financial stability. Conversely, a low ratio may indicate that the company may have difficulty meeting its short-term obligations, which may affect business operations and sustainability.

The RETA ratio measures the accumulated retained earnings to the total assets of the company. This ratio shows how much of the total assets are funded by retained earnings. Altman (1968) stated that this ratio reflects the profitability and profit history of the company. Companies with a high RETA ratio usually have a better ability to survive in difficult conditions because retained earnings show the accumulation of profits that can be used to fund the company's operations, without having to rely on external financing. A high ratio also indicates that the company has been able to generate consistent profits and retain them for future growth and development, thereby increasing the stability and sustainability of the business.

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The EBITTA ratio measures a company's ability to earn operating profits before interest and taxes compared to its total assets. This ratio indicates the company's operational efficiency and its ability to generate profits from its assets. According to Altman (1968), the EBITTA ratio is important for assessing a company's profitability and operational performance. Book Value Equity is the book value of shareholder equity in a company's balance sheet. Altman (1968) stated that book equity value is important for assessing a company's solvency and financial stability. Companies with high book equity values usually have a stronger financial foundation. This study also requires an understanding of the dynamics of companies listed and delisted on the IDX. Delisting can occur for various reasons, including financial distress, poor financial performance, or strategic decisions by the company. A study by Wahyudi and Sani (2014) showed that companies that are delisted often have worse financial performance compared to companies that remain listed.

RESEARCH METHODS

This research is a comparative research through a quantitative approach. Comparative research is research that measures one or more variables according to two or more samples in an aspect being studied (Sugiyono, 2020). Quantitative research is a method used to test theories or hypotheses by measuring certain variables and analyzing the relationships between variables. This method generally collects data in the form of numbers or statistics and uses statistical analysis techniques to verify the formulated hypothesis (Hardani et al., 2020).

The quantitative approach is indeed closely related to the collection of data and numbers, and aims to provide an objective and accurate picture of the phenomenon being studied. In the quantitative approach, data is collected through standardized instruments, such as questionnaires, forms, and observations, and then analyzed using statistical techniques such as regression, analysis of variance, or correlation analysis. This approach has the advantage of providing results that are universally acceptable and acceptable to all parties because the results are objectively acceptable and acceptable to all parties. However, this approach also has disadvantages, such as not being able to capture individual subjective perceptions and experiences, and can eliminate aspects that cannot be expressed in numbers. In general, the quantitative approach is very useful in answering questions that require numerical data analysis, and has wide applications in fields such as economics, sociology, medicine, and many others. The data analysis technique for this study uses parametric statistical analysis techniques, namely

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discriminant analysis. The calculation of WCTA, RETA, EBITTA and book value of equity uses the Excel program and data testing uses SPSS 25.

RESULTS AND DISCUSSION

Table 1. Results of the One Sample Kolmogorov-Smirnov Test for Normality

		WCTA	RETA	EBITTA	BVE
N		179	179	179	179
Normal Parameters[a,b]	Mean	.1364	-.2087	.0314	4.4127
	Std. Deviation	.95897	1.38029	.26117	12.69674
Most Extreme Differences	Absolute	.317	.318	.234	.357
	Positive	.084	.053	.027	.057
	Negative	-.317	-.318	-.234	-.339
Test Statistic		1.317	1.318	1.234	1.357
Asymp. Sig. (2-tailed)		.180	.139	.410	.603

Source: Processed by researchers, 2024

Table 1 shows that the value of X1 (WCTA) is 0.180 > 0.05, X2 (RETA) is 0.139 > 0.05, X3 (EBITTA) is 0.410 > 0.05, X4 Book Value of Equity is 0.603 > 0.05 so it can be interpreted that the data is normally distributed.

Table 2. Homogeneity Test Results

Test Results

Box's M		640.168
F	Approx.	20.681
	df1	3
	df2	2237030.108
	Sig.	.372

Tests null hypothesis of equal population covariance matrices.

Source: Processed by researchers, 2024

Table 2 shows that the F value of 20.681 is also a significant value at 0.372 > 0.05 which means Ho is accepted and Ha is rejected. This means that the covariance matrix between dependent groups is homogeneous (the same).

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Table 3. Multicollinearity Test Results

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.645	.041		15.755	.000		
	WCTA	.004	.055	.007	.067	.947	.425	2.351
	RETA	.121	.044	.338	2.738	.007	.315	3.174
	EBITTA	.022	.179	.012	.124	.002	.537	1.864
	BVE	.009	.003	.224	3.182	.002	.968	1.033

a. Dependent Variable: Y

Source: Processed by researchers, 2024

Table 3 shows that the results of the calculation of the tolerance value show that there are no independent variables that have a tolerance value <0.10, which means that there is no correlation between the independent variables. The results of the calculation of the Variance Inflation Factor (VIF) value also show that there are no independent variables that have a VIF value > 10, so it can be concluded that there is no multicollinearity between the independent variables in the discriminant function.

After completing the assumption test, a Multiple Discriminant Analysis (MDA) test was conducted. This test aims to see the differences in the Working Capital to Total Assets (WCTA), Retained Earnings to Total Assets (RETA), Earnings Before Interest and Taxes to Total Assets (EBITTA) and Book Value of Equity variables in listed and delisted companies on the Indonesia Stock Exchange for the 2018-2023 period. The following are the results of the data that has been processed using the SPSS 25 analysis tool using the Multiple Discriminant Analysis (MDA) method:

Table 4. Test Results of Test of Equality of Group Means

Tests of Equality of Group Means

	Wilks' Lambda	F	df1	df2	Sig.
WCTA	.468	35.913	1	177	.000
RETA	.485	22.930	1	177	.000
EBITTA	.456	38.222	1	177	.000
BVE/BVTD	.349	29.459	1	177	.000

Source: Processed by researchers, 2024

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Table 4 shows the results of the test providing the following hypothesis values:

a. Variable X1 (WCTA) with a Sig. value of 0.000 <0.05, which means that the Ho hypothesis is rejected while Ha is accepted. This means that there is a significant difference in Working Capital to Total Assets (WCTA) partially in predicting financial distress in listed and delisted companies.
b. Variable X2 (RETA) with a Sig. value of 0.000 <0.05, which means that the Ho hypothesis is rejected while Ha is accepted. This means that there is a significant difference in Retained Earnings to Total Assets (RETA) partially in predicting financial distress in listed and delisted companies.
c. Variable X3 (EBITTA) with a Sig. value of 0.000 <0.05, which means that the Ho hypothesis is rejected and Ha is accepted. This means that there is a significant difference in Earnings Before Interest and Tax to Total Assets (EBITTA) partially when predicting financial distress in listed and delisted companies.
d. Variable X4 (Book Value of Equity) with a Sig. value of 0.000 <0.05, it can be interpreted that the Ho hypothesis is rejected while Ha is accepted. This means that there is a significant difference in the partial Book Value of Equity when predicting financial distress in listed and delisted companies.

Table 5. Results of Wilk's Lambda Chi'square Test

Wilks' Lambda

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1	.334	31.905	4	.000

Source: Processed by researchers, 2024

Table 5 shows the results of Wilk's Lambda Chi'square showing a Sig. value of 0.000 <0.05 which means Ho is rejected while Ha is accepted. This means that there is a significant difference in Working Capital to Total Assets (WCTA), Retained Earnings to Total Assets (RETA), Earnings Before Interest and Tax to Total Assets (EBITTA) and Book value of equity simultaneously when predicting distress and non-distress in listed and delisted companies.

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Table 6. Eigenvalue Test Results

Eigenvalues

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	.799[a]	100.0	100.0	.807

a. First 1 canonical discriminant functions were used in the analysis.

Source: Processed by researchers, 2024

Table 6 shows the results of the canonical correlation of 0.807 to mean the relationship of the discriminant results including moderate from the variables Working Capital to Total Assets (WCTA), Retained Earnings to Total Assets (RETA), Earnings Before Interest and Tax to Total Assets (EBITTA) also Book value of equity in listed and delisted companies. Square canonical correlation is identical to R2 in regression, namely measuring the variation between the two groups (listing and delisting) that can be explained by the discriminant variable. For the R2 value or correlation value, the canonical correlation is squared, the value (0.807)2 = 0.65 = 65%, the relationship between the independent and dependent variables is 65%, meaning that 65% of the variation between the two groups shown can be explained by the discriminant variable and the remaining value is explained by other variables outside this study.

Table 7. Structure Matrix Test Results

Structure Matrix

	Function 1
RETA	.807
EBITTA[a]	.454
WCTA[a]	.431
BVE/BVTD	-.519

Pooled within-groups correlations between discriminating variables and standardized canonical discriminant functions

Variables ordered by absolute size of correlation within function.

Source: Processed by researchers, 2024

Table 7 shows the results of the order of independent variables that have the strongest influence on the discriminant function, in order from highest to lowest: X2 Retained Earnings to Total Assets (RETA) with a function value of 0.807, X3 Earnings Before Interest and Tax to Total Assets (EBITTA) with a function value of 0.454, X1

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Working Capital to Total Assets (WCTA) with a function value of 0.431, then also X4 Book Value of Equity with a function value of -0.519.

Tabel 8. Hasil Uji *Canonical Discriminant Function Coefficients*

Canonical Discriminant Function Coefficients

	Function 1
WCTA	.774
RETA	.659
EBITTA	.205
BVE/BVTD	.048
(Constant)	.348

Unstandardized coefficients

Source: Processed by researchers, 2024

Based on table 8, the research results obtained a constant value of 0.348 while X1 (WCTA) with a discriminant coefficient of 0.774, X2 (RETA) with a discriminant coefficient of 0.659, X3 (EBITTA) with a discriminant coefficient of 0.205 and X4 (Book Value of Equity) with a discriminant coefficient of 0.048. So the discriminant function model formed is as follows:

Z = 0.348 + 0.774X1 + 0.659X2 + 0.205 X3 + 0.48X4

Tabel 9. Hasil Uji *Function at Group Centroid*

Functions at Group Centroids

Y	Function 1
Delisting	-.522
Listing	.376

Unstandardized canonical discriminant functions evaluated at group means

Source: Processed by researchers, 2024

Once the centroid value has been obtained, the cutting score can be calculated using the formula: $\frac{(13)(-0.522) + (13)(0.376)}{13+13} = \frac{-6.786 + 4.888}{26} = \frac{-1.898}{26} = -0.073$

The result of the cutting score is -0.073, then the hypothesis is as follows:

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a. If the discriminant score value < -0.073, then it is included in category 1.
b. If the discriminant score value > -0.073, then it is included in category 2.
c.

Table 10. Classification Prediction Results

Classification Results[a,c]

		Y	Predicted Group Membership: Delisting	Listing	Total
Original	Count	Delisting	60	15	75
		Listing	0	104	104
	%	Delisting	80.0	20.0	100.0
		Listing	.0	100.0	100.0
Cross-validated[b]	Count	Delisting	60	15	75
		Listing	0	104	104
	%	Delisting	80.0	20.0	100.0
		Listing	.0	100.0	100.0

a. 84.9% of original grouped cases correctly classified.
b. Cross validation is done only for those cases in the analysis. In cross validation, each case is classified by the functions derived from all cases other than that case.
c. 84.9% of cross-validated grouped cases correctly classified.

Source: Processed by researchers, 2024

Based on table 10, the prediction of the classification of Working Capital to Total Assets (WCTA), Retained Earnings to Total Assets (RETA), EBIT to Total Assets (EBITTA) and Book Value of Equity using the multiple discriminant analysis (MDA) method has an accuracy of 84.9% with 17 companies being correct in the classification prediction and 9 companies being incorrect in the classification.

CONCLUSION AND RECOMMENDATIONS

Conclusion

This study aims to understand the differences in Working Capital to Total Assets (WCTA), Retained Earnings to Total Assets (RETA), EBIT to Total Assets (EBITTA) and Book Value of Equity when estimating financial distress in listed and delisted companies on the IDX during the 2018-2023 period, then based on the results of data analysis and discussion of the conclusions that can be obtained through this study, namely:

1. There is a significant difference in Working Capital to Total Assets (WCTA) partially in predicting financial distress in listed and delisted companies on the IDX for the period 2018-2023.

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2. There is a significant difference in Retained Earnings to Total Assets (RETA) partially when predicting financial distress in listed and delisted companies on the IDX for the period 2018-2023.
3. There is a significant difference in EBIT to Total Assets (EBITTA) partially when predicting financial distress in listed and delisted companies on the IDX for the period 2018-2023.
4. There is a significant difference in Book Value of Equity partially when predicting financial distress in listed and delisted companies on the IDX for the period 2018-2023.
5. There is a significant difference in WCTA, RETA, EBITTA and Book Value of Equity simultaneously in predicting financial distress in listed and delisted companies on the IDX for the period 2018-2023.

Recommendations

This study hopes that further research will produce better research with suggestions on various things, namely:

1. Further research is advised to add proxies or other financial distress models for independent variables, such as the Springate, Zmijewski, Grover, Ohlson or Taffler models.
2. Further research is advised to expand the research population and use similar industry samples in order to see a more proportional comparison.
3. Further research is advised to add years of research so that the research results can be more accurate and consistent from the variables used.

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