WHAT THE BEST PREDICTION FINANCIAL DISTRESS WITH COMPARE ZMIJEWSKI, ALTMAN Z-SCORE AND OHLSON ?

Novi DARMAYANTI[1], Muhammad ASRORI[2], DAMAYANTI[3], RIKAH[4], Ari KUNTARDINA[5]

[1]Darul' Ulum Islamic University, Indonesia
[2]Politeknik Negeri Semarang, Inonesia
[3,4]YPPI Rembang University, Indonesia
[5]STIE Cendekia Bojonegoro, Indonesia
Corresponding author: Novi Darmayanti
E-mail: novidarmayanti@unisda.ac.id

Abstract:

Financial distress is a condition where the company's finances are experiencing a loss because it is considered unable to pay its obligations when they are due. The increase in cigarette excise rates will undoubtedly impact the shares of cigarette issuers and increase the selling price of cigarettes, which will allow the company to experience financial distress. Cigarette companies need to analyze financial conditions to predict opportunities for financial distress. Among them are using bankruptcy prediction models, one of which is Zmijewski, Altman z-score, and Ohlson. The researchers aimed to determine the prediction of financial distress in cigarette companies listed on the IDX for the 2018-2022 period using the Zmijewski method, Altman z-score, and Ohlson. This research is descriptive. The results show that the Zmijewski method predicts all healthy companies, the Altman Z-Score method for three companies is healthy, and the Ohlson method has two companies in good health. Ohlson's method has a high degree of accuracy %, with Typel Elrror 1 at 20% and Typel Elrror II at 8%. So, the Ohlson model is the most appropriate for predicting financial distress in cigarette companies listed on the Indonesian Elfelk Exchange (BEI).

Keywords: Financial distress, Bankruptcy, Zmijewski, Altman Z-Score, Ohlson

INTRODUCTION

Financial distress: Of course, this will be experienced by every company before that company is declared bankrupt. Financial distress is when the company's income is experiencing losses because it cannot pay its due obligations. MelnurutSeltyaningrum et al. (2020)Financial difficulties are situations in which the company has liquidity problems or problems with its ability to fulfill its obligations. This condition must be watched out for by the manager so that the manager can take accurate steps to prevent the company from being in such a state.

The company itself is built to achieve both short-term and long-term goals; obtaining profit or profit for the company is one of the short-term goals and determines the value of the company to achieve the long-term goals. The company also has a goal so that the company can avoid liquidation. However, many companies operating for an extended period often experience financial difficulties, even in bankruptcy. When a company is declared bankrupt, it must stop its operating activities because it has no other alternative.

The Researcher chose cigarette companies because the tobacco industry has made a significant contribution to Indonesia's economy from the point of view of the corporate taxes paid to the

government. One of the state revenues comes from the payment of excise made by cigarette companies, MelnurutMonavia Ayu Rizaty (2022); cigarette production in 2022 will reach 323.9 billion sticks. This number decreased by 3.26% compared to the previous year, which was 334.8 billion cigarettes in 2021. Cigarette production will continue to decline due to the government increasing the excise rate by 10% in 2023-2024. The tobacco processing industry contributes as much as 3.74% to the processing industry's total GDP. Nationally, the tobacco processing industry contributes around 0.78% of Indonesia's GDP.

An increase in excise duty on cigarette companies will increase the selling price of cigarette products, thus affecting the income or profits of the companies themselves, even creating financial difficulties for these companies. Cigarette companies need to analyze the company's financial condition, in which the company can predict opportunities for financial distress. One uses bankruptcy prediction models, Zmijelwski, Altman Z-Scorel, and Ohlson.

Formulation of the problem. Based on the background described above, the formulation of the problem in the formulation of this research is:

1. How is the financial distress of cigarette companies listed on the Indonesian Elfelk Exchange with the Almant Z-Scorel prediction model?
2. How is the financial distress of cigarette companies listed on the Indonesian Elfelk Exchange with the Zmijelwski prediction model?
3. How is the financial distress of cigarette companies listed on the Indonesian Elfelk Exchange with the Ohlson prediction model?
4. Which method has the highest level of accuracy among the Zmijelwski, Altmant z-score, and Ohlson models for cigarette companies registered in the BELI model year 2018-2022?

Signaling Theory. *Signaling theory* indicates that good-performance companies deliberately send signals to the market. The signals given to this market contain information; the intended information is about what management does to fulfill the owner's wants. The management of the company provides information about the development of corporate finance through financial reports; in these reports, the company can submit and provide information that the company has implemented accounting policies that are generally accepted.

MelnurutSudrajat & Wijayanti (2019). Signaling theory is a condition in which everyone, from the manager to the investor, has the same information about the company's prospects. MelnurutHasti et al. (2022) stated that signals and signals are behaviors designed to take something from the company to guide investors about how management perceives the company's expectations.

Financial statements. Financial reports are meaningful information for users of financial reports in making economic policies. The analysis results provide insight into the propensities and relationships used in assessing the success of a company's future. (Darmayanti, 2020). Financial reports result from an accounting process where all transactions are recorded, classified, summarized, and compiled into a financial report.

a. Components of financial reports

Financial reports consist of at least five types: balance sheets, income statements, statements of changes in equity, cash flow statements, and notes to financial reports, which are a single unit that must be analyzed because they are related.

b. Purpose of financial reports

The purpose of financial reports is to provide more detailed information about the financial position and company operations results. The objective of preparing a financial report is to provide a report on corporate profitability to parties with the same interests as investors, loan buyers, and creditors to make decisions regarding providing resources to entities.

Financial Ratio Analysis. According to Habarat (2020:20), Financial ratios are ratio calculations that use financial statements to measure a business's soundness and performance. Ratio analysis of financial statements can be used to predict a company's financial distress.(Angela Dirman, 2022). Five types of financial ratios are often used:

a. Liquidity ratio measures a company's ability to meet its current liabilities by using its current assets.

b. The activity ratio is a ratio that measures how selective a company is in managing its assets.

c. The leverage ratio, also known as the debt ratio, is the ratio that measures a company's ability to meet its long-term obligations.

d. The profitability ratio is a ratio that assesses the efficiency of management as a whole, which is reflected in the amount of profit earned from sales or investment.

e. Market ratio/Markelt Ratio is a ratio that assesses market performance relative to book value, income, or dividends. This market ratio shows how the market responds to the company.

Financial Distress. *Financial distress* illustrates the company's deteriorating financial condition, which has made it impossible to carry out its activities adequately due to severe liquidity problems. High amounts of debt can severely burden operating profits as a large portion of profits will be used to pay off existing liabilities and eventually cause distress(Darmayanti et al., 2021). Companies with financial problems are characterized by deteriorating financial conditions, suppliers yet to start providing credit facilities for purchasing raw materials, capital investments that must be released, and deferred dividend payments.(Oktaviani et al., 2020).

Melnurut Kamaluddin et al. (2019) identify two kinds of leisure difficulties: A Celtic company failing to pay the debt and a Celtic company trying melrelstructuring debt To escape failure to pay. It can be concluded that a situation of financial difficulties occurs when the company can no longer fulfill obligations to third parties.

Financial Distress Analysis Method. *Financial distress* can be predicted earlier as a signal to interested parties to make wise decisions in predicting bankruptcy. There are several models of bankruptcy detection, but this research only focuses on the meltdown model. *Almant Z-Scorel, Olshon,* and Zmijelwskin.

Zmijewski Method (1984). Meltodel Zmijelwski was discovered by Mark Zmijelwski in 1984. According to(Sudrajat Wijayanti, 2019), MeltodelZmijelwski is one of the most widely used models to measure a company's financial distress. Expansion of the Zmijelwski meltdown model that adds the primary return on ratio as detection for corporate failure to return. This method is used to determine bankruptcy in companies by using the formula:

$$X\text{-Scorel} = -4.3 - 4.5(X1) + 5.7(X2) - 0.004(X3)$$

The spare ratios in the Zmijelwski melt model are:

1) *Relturn to Total Assets Ratio*

$$(X1) = \frac{\text{Laba seltellah pajak}}{\text{Total Aselt}}$$

2) *Total Debt to Total Assets Ratio*

$$(X2) = \frac{\text{Total Utang}}{\text{Total Aselt}}$$

3) *Current Ratio*

$$(X3) = \frac{\text{Aselt Lancar}}{\text{Kelwajiban Lancar}}$$

With cut-off values as follows:
- If the score is > 0, then the company is experiencing financial distress
- If the score is <0, then the company has no potential to experience financial distress

Altman Z-Score method. The Meltode l Altman Z-Scorel was discovered by Edward I. Altman in 1968. According to Khotmi (2020), Altman starts with 22 ratios that seem intuitively sound to predict bankruptcy. The Z-score method is used to measure company performance because it is easy to use (Murwani Wulansari, 2023). Calculation of the value of Z can be obtained with the following formulas:

$$Z = 0.717 \ (X1) + 0.874 \ (X2) + 3.107 \ (X3) + 0.420 \ (X4) + 0.998 \ (X5)$$

The financial ratios analyzed are the financial ratios contained in the Altman Z-Scorel model, namely:

1) *Working Capital to Asset Ratio*

$$(X1) = \frac{\text{Aktiva Lancar} - \text{Utang Lancar}}{\text{Total Aselt}}$$

2) *Retained Learning to Total Asset Ratio*

$$(X2) = \frac{\text{Laba Ditahan}}{\text{Total Aselt}}$$

3) *Elearning Power of Total Investment Ratio*

$$(X3) = \frac{\text{ElBIT}}{\text{Total Aselt}}$$

4) *Book Value of Equity to Total Liabilities Ratio*

$$(X4) = \frac{\text{Nilai Saham}}{\text{Total Utang}}$$

5) *Total Asset Turnover Ratio*

$$(X5) = \frac{\text{Pelnjualan}}{\text{Total Aselt}}$$

With cut-off values as follows:
- If the Z-Scorel value is > 2.99, then the company is in a safe zone, or the company is in a healthy state
- If the Z-Scorel value is 1.81-2.99, then the company is in a gray zone or in a condition with the potential to go bankrupt.
- If the Z-Scorel1.81, then the company is in a state of distress, or the company is in a state of bankruptcy.

Ohlson's method. Meltodel OhlsonDiscovered by Jamels Ohlson in 1980. Olshon used a sample of 105 bankrupt companies and 2,058 non-bankrupt companies during this period. James A. Ohlson developed Meltodel Ohlson Meltodel Logit analysis (logit analysis). In this model, Ohlson found nine financial ratios, with two of them using a dummy variable to see financial distress. According to Ohlson, the company's size, liquidity, and financial structure play an important role in determining the company's financial distress. Melnurut(Rahayu, Yuliastuti, Yahya and Idayati, 2022)as for the Ohlson melt model equation as follows:

$$O = -1.32 - 0.407X1 + 6.03X2 - 1.43X3 + 0.0757X4 - 2.37X5 - 1.83X6 + 0.285X7 - 1.72X8 - .521X9$$

The financial ratios analyzed are the financial ratios contained in the Ohlson model, namely:
1) X1 = log (Total Assets / GNP price index)

$$(X1) = Log \frac{Total\ Aktiva}{Indelks\ Harga\ GNP}$$

2) X2 = Total Debt / Total Assets

$$(X2) = \frac{Total\ Utang}{Total\ Aselt}$$

3) X3 = Working Capital / Total Assets

$$(X3) = \frac{Aktiva\ Lancar - Utang\ Lancar}{Total\ Aselt}$$

4) X4 = Current Assets / Current Liabilities

$$(X4) = \frac{Aktiva\ Lancar}{Utang\ Lancar}$$

5) X5 = Value 1 if total debt is more significant than total assets, 0 if vice versa.
6) X6 = Net Income / Total Assets

$$(X6) = \frac{Laba\ Belrsih}{Total\ Aselt}$$

7) X7 = Operating Cash Flow / Total Debt

$$(X7) = \frac{Arus\ Kas\ Opelrasional}{Total\ Utang}$$

8) X8 = value one if the company's net profit has been negative for the last two years and vice versa

9) X9 = Current Net Profit – Previous Net Profit) / (Current Net Profit + Previous Net Profit)

$$(X9) = \frac{\text{Nelt Incomel} - \text{Nelt Incomel-1}}{\text{Nelt Incomel} + \text{Nelt Incomel-1}}$$

With cut-off values as follows:
- If the O-Scorel > 0.38, then the company is a financial distress company
- If the score value is <0.38, the company is classified as healthy.

METHODS

This research is descriptive, and descriptive research is a form of research that is intended to describe or describe existing events, both natural and artificial phenomena. Descriptive research is a type of research that is used to describe or analyze a research result but is not used to make broader conclusions.

In this research, the research object used is the Financial Distractions of cigarette companies registered on the Indonesian Electoral Exchange (BEI) for 2018-2022. The samples in this research are cigarette companies registered with BELI using a saturated sample, which makes the population a sample, and there are as many as five cigarette companies in 2018-2022. MelnurutSugiyono (2018:144)Saturated samples are samples that, when added in quantity, do not increase representativeness, so they do not affect the value of the information obtained.

The data collection technique used in this research uses clustered data. The data source for this research was taken from the annual financial reports of cigarette companies for 2028-2022, which were registered on the Indonesian Elfelk Exchange. It was obtained from various sources, including the official website of the Indonesian Elfelk Exchange.awww.idx.co.od, websitelwww. idnfinancialsand official website from the company.

Table 1. Operational definition

Variable	Definition	Indicator	Scale	Source
Meltodel Zmijelwski X-Scorel as (X1)	Meltodel Zmijelwski (1984) is a method often used to predict financial distress. An extension of the Zmijelwski meltdown model that adds the primary return on ratios as a delineation tool for tools for failure to provide for firms.	**X-Score = -4.3 - 4.5(X1) + 5.7(X2) -0.004(X3)** X1 = Revenue to Total Assets Ratio X2 = Total Delbt to Total Assets Ratio X3 = Current Ratio X-Scorel < 0 = the company is classified as healthy X-Scorel> 0 = the company is classified as bankrupt.	Ratio	Sudrajat & Wijayanti, (2019)
Meltodel Altman Z-Scorel as (X2)	The Altman Z-Scorel Meltodel is a method for predicting the viability of a company by combining several general financial	**Z = 0.717 (X1) + 0.874 (X2) + 3.107 (X3) + 0.420 (X4) + 0.998 (X5)** X1 = Working Capital / Asset Ratio	Ratio	Murwani Wulansari, (2023)

	indicators and giving each other different weights.	X2 = Reltaineld Elearning / Total Asset Ratio X3 = Elarning Belforel Intelrelst and taxels /Total Total assets X4 = Book Value / Equity to Total Liabilities Ratio X5 = Sales to Total Assets Z-Scorel > 2.90 = Safel Zonel Z-Scorel 1.20-2.90 = Grely Zonel Z-Scorel < 1.20 = Distrelss		
Meltodel Ohlson 0-Scorel as (X3)	James A. Ohlson developed Meltodel Ohlson Meltodel Logit analysis (logit analysis). In this model, Ohlson found nine ratios of profitability and scale as the best predictors.	**O = -1.32 - 0.407 X1 + 6.03 X2 - 1.43 X3 + 0.0757 X4 - 2.37 X5 - 1.83 X6 + 0.285 X7 - 1.72 X8 - .521 X9** X1 = log (Total Assets / GNP price index X2 = Total debt / Total Assets X3 = Work Capital / Total Assets X4 = Current Liabilities / Current Assets X5 = Value 1 if total debt is more significant than total assets, 0 if vice versa. X6 = Net Income / Total assets X7 = Operating Cash Flow / Total Debt X8 = value 1 if the company's net profit has been negative for the last two years and vice versa X9 = Current Net Profit – Previous Net Profit) / (Current Net Profit + Previous Net Profit) O-score > 0.38 = classified as a bankruptcy company ; the O-score value <0.38 = the company is classified as healthy.	Ratio	Hidayati elt al., (2021)
Financial Distress	*Financial Distress* is a company in a situation	*Financial distress* shown in a dummy form. With a binomial size, if the ROEl (Return et al.) is greater	Nominal	(Husna, 2021)

225

Selvaria (Y)	critical economics, which company will experience loss because it is considered not able to melt its obligations when it is due.	than the BI Ratel, it will be coded 0 and vice versa. • One is for companies that are categorized as financially challenged Moreover, 0 for companies that are categorized as not experiencing financial distress.

Data analysis method

1. Perform Ratio Calculations

    Information about this financial ratio can be obtained from the financial reports of cigarette companies. Then, these ratios are used to perform calculations of financial distress models.

2. Descriptive Statistics Test

    Descriptive analysis describes the data, which is seen through standard deviation, variance, maximum, minimum, sum, range, kurtosis, and skewness (Ardi et al., 2020).

3. Calculating the Accuracy Level and Type Error

    Melnurut(Husna, 2021)Calculating the level of accuracy makes it possible to see the results of the analysis or the conditions of the companies being compared. This level of accuracy is used to calculate each Zmijelwski, Altman Z-score, and Ohlson method with the formula:

$$Tingkat\ Akurasi = \frac{Jumlah\ Prediksi\ Yang\ Benar}{Jumlah\ Sampel} \times 100\ \%$$

$$Type\ I\ Error = \frac{Jumlah\ Kesalahan\ Type\ I}{Jumlah\ Sampel} \times 100\ \%$$

$$Type\ II\ Error = \frac{Jumlah\ Kesalahan\ Type\ II}{Jumlah\ Sampel} \times 100\ \%$$

RESULT AND DISCUSSION

The way to determine which model is the most accurate in predicting financial distress is to compare the company's initial alleged condition with the financial distress prediction model. Determining the initial condition of the company can compare ROEL (Return et al.) with BI Ratel. In contrast, if ROEl is greater than the BI Ratel, it shows that the investment management efforts made by the company can generate profits.

The following results are obtained based on forecasting analysis calculations using the Zmijewski method, the AltmanZ-Score, and Ohlson methods.

Table 2. Calculations using the Zmijewski method

Code	Year	X-Score	Category
	2018	-2.838916712	S
	2019	-2.922046071	S
Ggrm	2020	-3.317957062	S
	2021	-2.645151162	S
	2022	-2.47253947	S
Rmb	2018	-1.627138385	S
	2019	-1.437989879	S

Code	Year	Value	Information
	2020	-0.256700773	S
	2021	-2.125265794	S
	2022	-3.415665508	S
Hmsp	2018	-4.249209877	S
	2019	-3.820366795	S
	2020	-2.857354529	S
	2021	-2.346579017	S
	2022	-2.05695385	S
Itic	2018	-2.006997929	S
	2019	-1.919924746	S
	2020	-1.816089856	S
	2021	-2.274130154	S
	2022	-2.552874428	S
Wiim	2018	-3.370501538	S
	2019	-3.250451005	S
	2020	-3.282293821	S
	2021	-3.006227203	S
	2022	-3.074047054	S

Source: processed solely pelnelliti, 2023
Toltelaction: S = Safe, D = Distre*lss*

Cigarette companies registered on the Indonesian Electoral Exchange for five years based on the Zmijelwski meltdown model are declared healthy successively with the model results below the predetermined cut-off value, namely <0, then they are said to be healthy. The results of calculating the melt model for each company are GGRM -2.83892, -292205, -3.31796, -2.64515 and -2.47254. RMBA -1.62714, -1.43799, -0.2567, -2.12527, -33.41567. HMSP -4.2492, -3.82037, -2.85735, -2.34658, and -2.05695. ITIC -2.00699,- 1.91992,- 1.81608,- 2.27413, - 2.55287. WIIM -3.3705,- 3.25045,- 3.28229,-3.00622, and -3.07404.

Table 3. Calculations using the Altman Z-Score Method

Code	Year	Z-Score	Information
Ggrm	2018	3.442082	Safe Zone
	2019	3.543999	Safe Zone
	2020	4.033971	Safe Zone
	2021	3.259851	Safe Zone
	2022	3.096687	Safe Zone
Rmb	2018	1.710166	Gray Zones
	2019	1.520264	Gray Zones
	2020	0.398654	Distress
	2021	0.885243	Distress
	2022	1.763061	Gray Zones
Hmsp	2018	5.506593	Safe Zone
	2019	4.82505	Safe Zone
	2020	3.709268	Safe Zone
	2021	3.290124	Safe Zone
	2022	3.261222	Safe Zone
Itic	2018	0.844501	Distress
	2019	0.853085	Distress
	2020	1.01419	Gray Zones
	2021	1.264477	Gray Zones

227

	2022	1.560479	Gray Zones
	2018	3.736089	Safe Zone
	2019	3.580822	Safe Zone
Wiim	2020	3.582737	Safe Zone
	2021	3.525919	Safe Zone
	2022	3.906624	Safe Zone

Sourcelr: processed olelh pelnelliti, 2023
Toltelaction: safe lZonel= Safe, grleeey Zonel= Gray Zone, Distrelss Zonel= Bankrupt

Based on the Altman Z-Scorel, there has been a difference in predictive results where there are three companies in a healthy state with yields above the cut-off value of 2.90 for five years, namely GGRM with a value of 3.442082,3.543999,4.0339713, 259851 and 3.096687.HMSP5.506593, 4.82505, 3.709268, 3.290124, and WIIM 373608, 3.58082,3.582737, 3.525919, and 3.906624. The other two companies are in the gray zone because their Z-Score results are between the cut-off value of 1.20-2.90 and the distress zone. After all, their Z-Score results are below the cut-off value, which is 1.20. The Z-Scorel values of the two companies are RMBA1.710166, 1.520264, 0.398654, 0.885243, and 1.763061.ITIC0.844501, 0.853085, 1.01419, 1.264477 and 1.560479.

Table 4. Calculations using the Ohlson method

Code	Year	O-Score	Information
	2018	-0.02515	S
	2019	-0.15912	S
Ggrm	2020	-0.4985	S
	2021	-0.00341	S
	2022	0.323615	S
	2018	-0.6873	S
	2019	1.866405	D
Rmb	2020	-0.30635	S
	2021	1.51342	D
	2022	-0.55383	S
	2018	-0.98319	S
	2019	-0.69409	S
Hmsp	2020	0.136687	S
	2021	0.631567	D
	2022	0.927775	D
	2018	1.305558	D
	2019	5.424663	D
Itic	2020	8.590155	D
	2021	0.25979	S
	2022	0.092411	S
	2018	-1.71015	S
	2019	-1.39364	S
Wiim	2020	-1.78589	S
	2021	-1.1867	S
	2022	-1.24543	S

Source: processed solely pelnelliti, 2023
Toltelaction: S = Safe, D = Distre*lss*

Based on the Ohlson model, two companies have been in a healthy state for five consecutive years, namely GGRM with a value below the cut-off value of 0.38, namely-0.02515, -0.15912, -0.4985,

-0.00341, and 0.323615.WIIM ie-1.71015, -1.39364, -1.78589, -1.1867 and -1.24543.RMBA is in good health in 2018, 2020, and 2022 with a value of -0.30635 and -0.55383 for each year, for 2019 with a value of value1.866405and 2021 with a value of value1.51342categorized as different because the categorized value is above the cut-off value of 0.38. HMSP was declared healthy in 2018-2020 with a score of -0.69409 and 0.136687 each year but changed to become distressed in the next two years, namely 2021 and 2022, with a value of value0.631567 and 0.927775. In contrast, ITIC is in 3 years in 2018, 2019, and 2020, with 1.305558, 5.424663, and 8.590155 for every year. Then, in the next two years, I became healthy with grades in 2021 and 0.092411 in 2022.

Descriptive statistics

Table 5. Descriptive statistics

Descriptive Statistics					
	N	Minimum	Maximum	Means	Std. Deviation
Zmijewski	25	-4.25	-,26	-2.5977	,85187
Altmant Z-Score	25	,40	5,51	2.7246	1.40288
Ohlson	25	-1.79	8.59	,3936	2.25365
Valid N (Listwise)	25				

Source: Data processed using SPSS.25

The results of the descriptive statistics table above show that the minimum X-Scorel value is -4.25, the maximum value is -0.26, the average value is -2.5977, and the standard deviation is 0.85187. Based on the results above, it can be seen that the average cigarette company is predicted not to experience financial distress or to be healthy according to the Zmijelwski methodology (X-Scorel). The results of the Z-Score show that the minimum value of the Z-Score is 0.40, the maximum value is 5.51, the average value is 2.7246, and the standard deviation is 1.40288. Based on the above results, the company is predicted to be healthy or non-financially disturbed according to the Atlmant Z-Scorel model. From the results above, it is known that the minimum O-Scorel value is -1.79, the maximum value is 8.59, the average value is 0.3936, and the standard deviation is 2.25365. The results show that the average pelDipre Cigarette company is experiencing financial distress, according to meltodelOhlson (O-Scorel).

Table 6. Level of accuracy

Calculation of Accuracy Level and Type of Error											
		Zmijewski method			Altman Z-Score method				Ohlson's method		
Year	Sample	Correct Prediction	Wrong prediction		Correct Prediction	Wrong prediction			Correct Prediction	Wrong prediction	
			Type I	Type II		Type I	Type II	Gray Zone		Type I	Type II
2018	5	2	3	0	3	1	0	1	3	2	0
2019	5	2	3	0	3	1	0	1	4	1	0
2020	5	3	2	0	5	0	0	0	4	1	0
2021	5	4	1	0	4	0	0	1	4	0	1
2022	5	4	1	0	2	1	0	2	3	1	1
Total	25	15	10	0	17	3	0	5	18	5	2
Level of accuracy		60%	40%	0%	68%	12%	0%	20%	72%	20%	8%

Source: processed solely pelnelliti, 2023

Based on the results of data analysis carried out by the Zmijelwski method, it has an accuracy rate of 60%. In comparison, the Altman Z-Scorel method has an accuracy rate of 68%, and the Ohlson method has an accuracy rate of 72%. This shows that the Ohlson melt model has the highest level of accuracy, followed by the Altman Z-Scorel melt model at 68% and the last Zmijelwski melt model at 60%. It can be concluded that the Ohlson model accurately predicts financial distress in cigarette companies.

Discussion. Cigarette companies listed on the Elfelk Indonesia Exchange for five years based on the Zmijewski method were declared healthy successively with method results below the predetermined cut-off value of <0, so they were said to be healthy. This financial condition can be seen from the components used in calculating the annual debt ratio, namely total debt and total assets. According to(Wahyuni Rubiyah, 2021), the amount of debt is the most influential component; the five companies have a lower debt value than total assets, which makes them not predicted to experience financial distress using the Zmijewski method.

Judging from the initial suspicion of using the company's ROE, ROE can help companies predict future business prospects. At the GGRM company in 2022, the company experienced a significant decrease in profit due to an increase in the cost of goods sold. RMBA experienced negative profits in 2018 and 2020; in those years, the costs incurred by the company were very high. ITIC from 2018-2020, in actual conditions, the company experienced financial distress because the company needed to be more effective and efficient in generating net profit using equity capital. WIIM in 2018 and 2019 could have been more effective and efficient in generating net profit using its equity capital. The number of correct predictions is 15 with an accuracy rate of 60%, and the number of errors I cell is 10 with an accuracy of 40%, and errors II 0 with an accuracy rate of 0%. This is different from the research conducted by Farha (2022), which says that the Zmijelwski model has the highest accuracy level.

Based on the Altman Z-Score, there were different prediction results where three companies were in good health with results above the cut-off value of 2.90 for five years, namely GGRM, HMSP, and WIIM. The other two companies are declared in the gray and distressed zones because their Z-Score results are below the cut-off value 1.20. According to(2021), companies predicted financial distress using the Altman method, and their financial conditions are not good, as evidenced by negative working capital, declining sales, and negative company profits, which can also be seen from the ratio of retained earnings to total assets which shows a negative value. RMBA is in a gray area in 2018, 2019, and 2022 and is in distress in 2020 and 2021 due to negative retained earnings to total assets from 2018-2022 and a decrease in sales each year. ITIC, which was in the distress zone from 2018-2020, will turn into a gray zone in 2021-2022. Where the WCTA was negative for four years and one year, it experienced a positive value; this indicated that ITIC had changed and could overcome its financial performance. Three companies are in a stable financial condition according to the Altman z-score method. This condition can be seen from the positive WCTA for five years and sales, which have increased even though the HMSP company had experienced a decline in sales for two years in 2020 and 2021 but was able to increase its sales again.

Judging from the initial allegations of ROE owned by the company, ROE can help the company make predictions about future business prospects. At the GGRM company in 2022, the company experienced a significant decrease in profit due to an increase in the cost of goods sold. WIIM in 2018 and 2019 could have been more effective and efficient in generating net profit using its equity capital. The number of correct predictions is 17 with an accuracy rate of 68% and the number of errors in I cells is 3 with an accuracy of 12% and II errors are 0 with an accuracy rate of 0%, and the predicted errors are only five cells with an accuracy of 20%. This is supported by research conducted by

Munawarah et al. (2019), where in his research, the Altman method is different from the method with the highest level of accuracy. Not in line with the research conducted , Rubiyah (2021), the plantation selector company registered on the Indonesian Stock Exchange, said that the Altman Z-Scorel model is the most appropriate and accurate model for predicting financial distress.

Based on the Ohlson method, two companies have been in good health for five consecutive years, namely GGRM and WIIM, with a value below the cut-off value of 0.38. RMBA is in good health in 2018, 2020, and 2022, with 2019 and 2021 categorized as a state of distress. HMSP was declared healthy in 2018-2020 and became a disorder in the next two years, namely 2021 and 2022. On the other hand, ITIC is in a 3-year distress situation in 2018, 2019, and 2020, with the results of the next two years being healthy in 2021 and 2022. According toAsmaradana Langgam Bujang (2022), the ratio that significantly affects the magnitude of Ohlson's calculation results is the profitability ratio, where there is a ratio of X9 "(Nit-Nit-1)/NIt+Nit-1)". RMBA experienced prediction fluctuations where, in 2018, it was declared healthy. The following year, it was declared in distress because X9 had negative results because the previous year's income was negative, but changed back to being healthy in 2020 and returned to being in distress in 2021 due to the same thing where X9 was negative because net profit in the previous year was negative. HMSP was initially healthy from 2018-2020 and turned into distress in 2021-2022 due to a negative X9 because HMSP's net income decreased continuously every year of the study period. ITIC experienced a level of financial performance where in 2018-2020, it experienced distress and turned healthy because X9 decreased, so it was not predicted to experience financial distress. Because the X9 ratio has a negative coefficient value when the value is lower, it will cause the O value to be higher so that it is predicted Financial distress.

Judging from the initial allegations of ROE owned by the company, ROE can help the company make predictions about future business prospects. At the GGRM company in 2022, the company experienced a significant decrease in profit due to an increase in the cost of goods sold. RMBA in 2018-2020 had a negative profit; in that year, the costs incurred by the company were very high. WIIM in 2018 and 2019 could have been more effective and efficient in generating net profit using its equity capital. In category two companies, as many as 2 out of 25 samples that were predicted to experience financial distress were, in fact, not experiencing financial distress. HMSP in 2021 and 2022 is predicted to experience financial distress. However, it is in a healthy condition where its net profit is positive even though it has decreased from the previous year. This means that HMSP can manage its equity capital to earn profits effectively and efficiently. The number of correct predictions is 18 with an accuracy rate of 72%, the number of errors I cell is 5 with an accuracy of 20%, and errors II 2 with an accuracy rate of 8%. So that this research can strengthen previous research conducted by the Researcher, the number of correct predictions is 18 with an accuracy rate of 72%, the number of errors I cell is 5 with an accuracy of 20%, and errors II 2 with an accuracy rate of 8%. So that this research can strengthen previous research conducted by the Researcher, the number of correct predictions is 18 with an accuracy rate of 72%, the number of errors I cell is 5 with an accuracy of 20%, and errors II 2 with an accuracy rate of 8%. So that this research can strengthen previous research conducted by Researcher byEllvama et al. (2021)in retail companies listed on the Indonesian Electoral Exchange, with research results showing that the Ohlson melted method is the best analysis with the highest accuracy rate of 100% and type II error 0%. Research conducted by food and beverage companies shows that the Ohlson method has the highest accuracy level.

Based on the results of the data analysis that has been carried out, the Zmijewski method has an accuracy rate of 60%. In comparison, the Altman Z-Scorel method has an accuracy rate of 68%, and the Ohlson method has an accuracy rate of 72%. This shows that the Ohlson method is the

method that has the highest level of accuracy and is followed by the Altman Z-Score method of 68% and finally the Zmijelwski method of 60%. It can be concluded that the Ohlson model accurately predicts financial distress in tobacco companies so that it can be used as an analytical method for predicting the financial distress of cigarette companies listed on the Indonesian Stock Exchange (IDX).

This research is not in line with the research conducted by byFarha (2022) and AndSalim & Ismudjoko (2021), who said that the Zmijelwski method is the method with the highest level of accuracy, while in this study, the Zmijewski method is the method with the lowest level of accuracy. This research is in line with research conducted by (Ellvama et al., 2021)in the results of their research comparing the Almant, Springatel, Grovelr, Ohlson, and Zmijelwski methods, the method that has the highest level of accuracy is the Ohlson method and makes the Ohlson method the best analysis as the Early Warning System in predicting financial distress. This research is also in line with the research conducted by bySelptian and Cahyaningdyah (2020), who compared the Altman and Ohlson meltdowns and said that the Ohlson meltdown is a model that has the highest level of accuracy and can be used to predict financial distress in companies in Indonesia. However, this is not in line with the research conducted byWahyuni & Rubiyah (2021), who said that the Altman model is the most measured, but in this study, the Altman model is the model with the second highest degree of accuracy, in this study, the Ohlson model is the model with the highest level of accuracy. This research aligns with the research conducted by Pranav Nittala SVN Pavan Raghava and Ummidi Siva Krishna (2020). In his research that compared the Altman and Ohlson melt models, the Ohlson melt model had the highest accuracy rates of 87.75%, 71.2%, and 70% in their respective years since the date of liquidation.

CONCLUSION

Based on the results of a comparative analysis of financial distress prediction methods for cigarette companies listed on the Indonesia Stock Exchange for the 2018-2022 period using the Zmijewski Method, Altman Z-Score, and Ohlson, it can be concluded as follows:

1. Pelte cigarette company registers on the E Exchangelfelk Indonesianldamn sel5 years old based on meltodelZmijelwhiskey stated that show to belie row just my resultsltodelbelow the cut off value telt hat is determined that is <0 then say that. Amount of correct dictionary sellouts was 15 deals with an accuracy rate of 60%, and the number of I am wrong lots was 10 with 40% accuracy and critical error II with 0 0% accuracy rate.

2. Based on Altman Z-Scorelmelhave pelrbeldaan pre resultsldiction where telnet three peldeep intolada select with results above the cut-off value of 2.90 sel5 years, namely GGRM, HMSP, and WIIM. 2 p.mlother companies stated in gr*ly zon*al current Z-Score results in it is between the cut off values of 1.20-2.90 and distre*ss zonel*currylna Z-Score results below the cut-off value of 1.20. The Z-Score value of two the company is RMBAAndITIC. Amount of prelcorrect dictionary sellouts was 17 deals with an accuracy rate of 68%, and the number of wrong lots was three deals with an accuracy of 12%, and so on error II 0 level accuracy of 0% and dipolar diction*ary arela*sellots of 5 with 20% accuracy.

3. Based on meltodelOhlson target 2 per company that is a bit deeplada select sel5 years old respectively, namely GGRM and WIIM deal with a value below the cut-off value of 0.38. Select the RMB in Colada. SelectSelect 2018, 2020, and 2022 deal only for 2019 and 2021 said there is a distre*lss*currylIf the result is above the cut-off value of 0.38. HMSP stated that in 2018-2020, Fox may become Distre*lss*at for two years; the riku are 2021 and 2022. Selbehind ITIC, distre*lss*3 years in 2018,2019, and 2020 deal only with the results of the value above the cut-off value two years

blrikunya also gelatin 2021 and 2022. amount of prelcorrect dictionary sellouts of 18 deals with an accuracy rate of 72%, the number of being wrong of 5 with 20% accuracy, and critical error II 2 with an 8% accuracy rate.

4. Delivery meltodel has a degree of accuracy belrbelda-belyes, but meltodelZmijeleven's accuracy rate is 60%, and the number tolerror I have an accuracy rate of 40%, and tolerror II has 0 0%. MeltodelAltman Z-Scorelmelhave an accuracy rate of 68%, adjust level to error I 12%, level to error II 0%, and palmy company have gir*ly arela*20%. MeltodelOhlson me shape meltodeldelonly the highest accuracy level is 72% adjust type*lElerror 1*selblsar 20% and Type*lElerror II*selblsar 8%. Seluntil meltodelOhlson the mostlpat used in melmpreldiction financial distress*lss*on PElte cigarette companylregister on the E Exchangelfelk Indonesianlvain (BElI).

REFERENCES

Ardi, MFS, Desmintari, D., & Yetty, F. (2020). Financial Performance Analysis of Financial Distress in Textile and Garment Companies on the IDX. *Unified Scientific Journal of Accounting, 8*(3), 309–318. https://doi.org/10.37641/jiakes.v8i3.383

Asmaradana, L. B. (2022). Analisis Financial distress dengan Model Altman, Grover, Springate, Zmijewski, dan Ohlson pada Perusahaan Subsektor Jasa Konsumen yang terdaftar di BEI. *JIKEM: Jurnal Ilmu Komputer, Ekonomi dan Manajemen*, *2*(1), 1325-1341.

Bansal, R., Kashyap, S. K., Pranav, P., Krishna, U., Ahmad, Z., & Chauhan, A. (2020). Altman and Ohlson model in predicting distress of Indian companies: A comparison of models. European Journal of Molecular & Clinical Medicine, 7(8), 2020.

Dirman, A. (2020). Financial distress: the impacts of profitability, liquidity, leverage, firm size, and free cash flow. *International Journal of Business, Economics and Law*, *22*(1), 17–25.

Darmayanti, N. (2020). Bankruptcy Prediction Analysis of Stock Prices Using the Zmijewski and Springate Models (Empirical Study of Oil and Gas and Coal Mining Sub-Sector Companies Listed in Bei in 2016-2018). Ekonika : *Journal of Economics, Kadiri University, 5*(2), 157. https://doi.org/10.30737/ekonika.v5i2.848

Darmayanti, N., Africa, LA, & Mildawati, T. (2021). The Effect of Audit Opinion, Financial Distress, Audit Delay, and Change of Management on Auditor Switching. *International Journal of Economics and Finance Studies, 13*(1), 173–193. https://doi.org/10.34109/ijefs.202112230

Elvama, A., Fitriadi, A., Nasyaroeka, J., & Oktarina, K. (2021). ANALYSIS MODELS BY ALMATN, SPRINGATE, GROVER, OHLSON, ZMIJEWSKI AS AN EARLY WARNING SYSTEM FOR THE PREDICTION OF FINANCIAL DISTRESS. *Journal of Echoes of Economics, 11*(1), 1780–1802. https://e-jurnal.stieprasetiyamandiri.ac.id/index.php/gem/article/view/309

Farha. (2022). Comparison of the Accuracy of Bankruptcy Prediction Models (Altman et al.). *Solids, 12*(1), 1–7.

Hasti, W., Mariani, M., & Makshun, A. (2022). The Effect of Leverage, Capital Structure, and Company Size on Financial Performance in the Mining Sector Companies. 2(2), 139–150.

Hidayati, FW, Jhoansyah, D., Deni, R., & Danial, M. (2021). ANALYSIS OF THE ALTMAN MODEL, THE ZMIJEWSKI MODEL, AND THE OHLSON MODEL TO PREDICT FINANCIAL DISTRESS. *Indonesian Journal of Social Science, 2*(2), 230–240.

Husna, L. (2021). PREDICTING COMPANY FINANCIAL DISTRESS IN.

Hutabarat, F. (2020). ANALYSIS OF THE COMPANY'S FINANCIAL PERFORMANCE (G. Pusptasi (ed.); pp. 1–108). Desanta Muliavisitama Publisher.

Kamaluddin, A., Ishak, N., & Mohammed, NF (2019). Financial distress prediction through cash flow ratios analysis. *International Journal of Financial Research, 10*(3), 63–76. https://doi.org/10.5430/ijfr.v10n3p63

Khotmi, H. (2020). Comparative Analysis of Company Bankruptcy Prediction with the Altman Z-Score, Springate, and Grover Models. *Valid Scientific Journal, 17*(2), 162–173.

Monavia Ayu Rizaty. (2022). INDONESIAN CIGARETTE PRODUCTION DOWN TO 323.9 BILLION CIGPS AS PER 2022. DataIndonesia.Id. https://dataindonesia.id

Munawarah, M., Wijaya, A., Fransisca, C., Felicia, F., & Kavita, K. (2019). The accuracy of the Altman Score, Zmijewski Score, Grover Score, and Fulmer Score in determining Financial Distress in Trade and Service Companies. *Owner, 3*(2), 278. https://doi.org/10.33395/owner.v3i2.170

Murwani Wulansari. (2023). BANKRUPTCY PREDICTION ANALYSIS USING THE ALTMAN Z-SCORE METHOD AT PT. ASTRA OTOPARTS TBK. 7(November 2022), pp. 268–276.

Oktaviani, B., Hizai, A., & Mirdah, A. (2020). The Effect of Liquidity, Profitability, Leverage, and Company Size on Financial Distress in Mining Companies Listed on the Indonesia Stock Exchange in 2015-2018. Jambi Accounting Review, 1(April), 20-34.

Rahayu, Yuliastuti, Yahya and Idayati, F. (2022). Analysis of Using the Ohlson Score (O-Score) Model to Predict Financial Distress in Textile and Garment Companies. *Braz Dent J., 33*(1), 1–12.

Salim, MN, & Ismudjoko, D. (2021). An Analysis of Financial Distress Accuracy Models in Indonesia Coal Mining Industry: An Altman, Springate, Zmijewski, Ohlson and Grover Approaches. 2020(2015), 1–12. https://doi.org/10.32996/jefas

Septian, A., & Cahyaningdyah, D. (2020). Analysis of The Bankruptcy of Companies with Altman Model and Ohlson Model. 9(3).

Setyaningrum, KD, Dorkas, A., Atahau, R., Madea, I., Management, PS, Kristen, U., Wacana, S., Distress, F., & Manufaktur, P. (2020). Z-SCORE ANALYSIS IN MEASURING FINANCIAL PERFORMANCE TO PREDICT BANKRUPTCY OF MANUFACTURING COMPANIES DURING THE COVID-19 PANDEMI A manufacturing company is a business entity whose main activity is to process raw materials into finished goods, therefore t. 3(2), 74–87.

Sudrajat, MA, & Wijayanti, E. (2019). ANALYSIS OF PREDICTION OF BANKRUPTCY (FINANCIAL DISTRESS) WITH COMPARISON OF THE ALTMAN, ZMIJEWSKI AND GROVER MODELS. 3(2).

Sugiyono. (2018). Business Research Methods (Suryandari et al. (ed.); 3rd ed., pp. 2–398). ALPHABETA, CV.

Wahyuni, SF, & Rubiyah. (2021). Financial Distress Analysis Using the Altman Z-Score, Springate, Zmijeski, and Grover Methods for Plantation Sector Companies Listed on the Indonesia Stock Exchange. MANIEGGIO: *Scientific Journal of Master of Management, 4*(1), 62–72.