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Financial Distress Analysis Using the Altman Z-Score and Ohlson Methods on Companies Listed on the Indonesian Sharia Stock Index for 2020-2023

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ABSTRACT

This research aims to determine and analyze the potential for bankruptcy using the Altman Z-Score and Ohlson O-Score methods in companies listed on the Indonesian Sharia Stock Index (ISSI) for the period 2020 - 2023. Data was obtained from published financial reports published on the website www.idx.co.id with the time period 2020 – 2023. The research population is manufacturing companies in the consumer goods sector, pharmaceutical sub-sector listed on the Indonesian Sharia Stock Index (ISSI) with sample data from annual financial reports for 4 consecutive years. This type of research is quantitative descriptive, where the descriptive itself describes whether a company's financial performance is good or bad, while quantitative explains the company's financial reports. The results of this research show that the company Kimia Farma (Persero) Tbk. (KAEF) is in the bankruptcy category during 2020 - 2023 due to high levels of liabilities, while PT. Darya-Varia Laboratoria Tbk. (DVLA) is in the healthy category based on analysis using the Altman model. Meanwhile, the analysis uses the Ohlson model for both companies which are declared in the healthy category during 2020 - 2023.

Keywords: Financial Management, Islamic Finance, Altman Model, Ohlson Model, Bankruptcy

JEL Classification:

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INTRODUCTION

A nation's ability to adapt to changing technological advancements and increasingly demanding work environments is characterized by its resilience. This is seen in the large number of growing and successful Indonesian businesses.

Due to the size of the Muslim population in Indonesia, the syariah market is somewhat small. One method to reduce market volatility in the Islamic finance sector is to shift Islamic investment transactions to the modal exchange. Currently, the

Indonesian legal system's most operationally sound and financially sound entity is the Bursa Efek Indonesia (BEI). The Indonesian Stock Market Index (ISSI) is a market index that tracks the daily closing

prices of stocks (DES) that are reported by Otoritas Jasa Keuangan (OJK) and the global stock market prices.

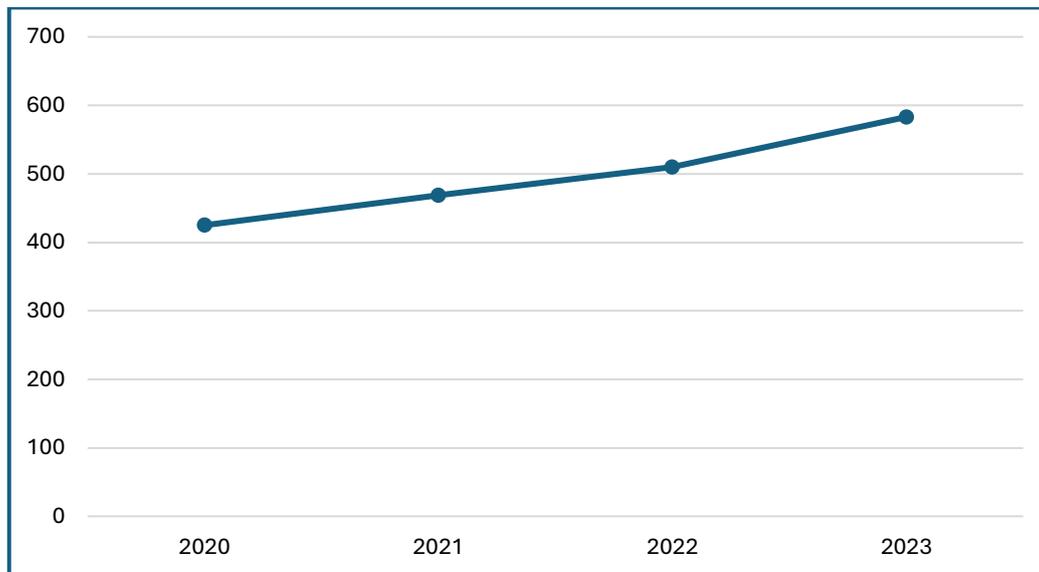


Figure 1 Companies Listed on The Indonesian Sharia Stock Index for 2020 - 2023

Source: Indonesian Stock Exchange

The Islamic Stock Index will continue to rise during the 2020–2023 period. It is observed that there were around 425 businesses in 2020, 469 businesses in 2021, 510 businesses in 2022, and 583 businesses in 2023.

Indonesia is a developing country with the largest population in Southeast Asia, around 270 million people and is the fourth largest country in the world. This makes Indonesia a potential market for producers. As a developing country, one of the basic needs of the Indonesian people is health. The world of health is closely related to medicine and the pharmaceutical industry. The pharmaceutical industry is a business entity that has permission from the Minister of Health to carry out activities in the manufacture of drugs or medicinal ingredients.

Every year human needs for health increase, especially in developing countries like Indonesia with dense populations.

Increased competition and changes in market conditions mean that producers must carefully address and make decisions in matters concerning the company. Company performance can be measured from the results of analysis of the company's financial reports. The benefit of financial report analysis is that it provides an overview of the company's performance, the image can be used to project aspects of the company's finances in the future. With the aim of avoiding the company from a crisis that causes bankruptcy, and can be a reference for managers, investors and company owners to create a policy.

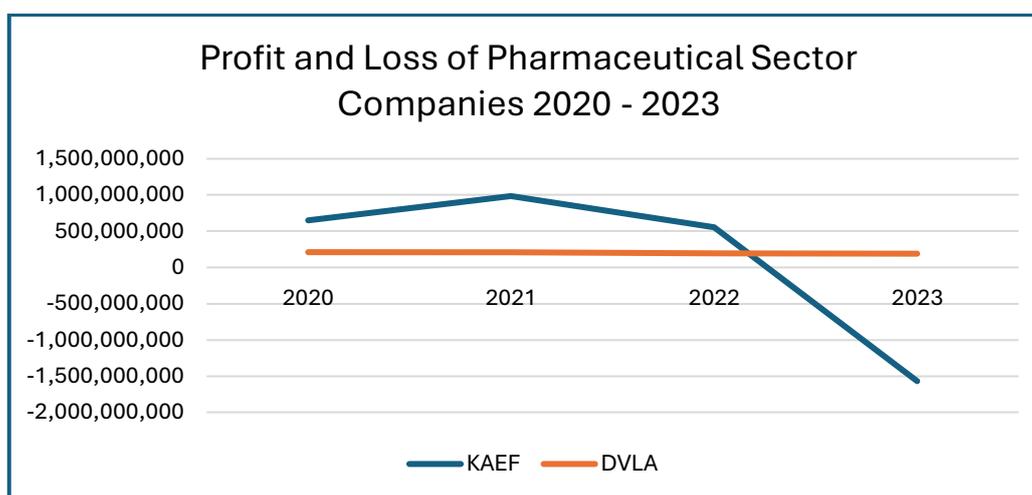


Figure 2 Profit and Loss of Pharmaceutical Sector Companies 2020 - 2023

Source: Author Estimation (2024)

The graph above shows the rise and fall of profits (losses) of pharmaceutical sector companies listed on the Indonesian Sharia Stock Index. Kimia Farma Company (Persero) Tbk. (KAEF) experienced significant ups and downs in profit (loss) between 2020 – 2023. In 2020 the company posted a profit (loss) of IDR. 653 million, then in 2021 it will increase to Rp. 985 million. However, in 2022 – 2023 the company experienced a consecutive decline in profit from Rp. 558 million to Rp. – 1.57 billion. Meanwhile, the company Darya-Varia Laboratoria Tbk. (DVLA) posted a fairly stable profit (loss) during 2020 – 2023, in 2020 the company recorded a profit (loss) of IDR. 210 million. In 2021 to 2023 the company experienced a decline in profits but it was not significant, the company recorded a profit (loss) of IDR. 208 million, Rp. 198 Million, Rp. 190 million for 3 consecutive years.

Wahyuni & Rubiyah (2021) a currency crisis arises when a company's operational profit margin is insufficient to cover expenses such as rent and interest, and the company needs to make amends. Ferbiana Sari (2020) significant problems cannot be solved without altering the size and functions of the company. Bankruptcy is when the company is no longer able to operate, make money, and pay creditor.

Research has shown that financial hardship has a wide range of impacts aspects of business performance and operations, including stock returns, at stage Decline in the business life cycle, financial difficulties negatively affect stock returns, while financial stress may reduce this impact (Akhmad Sigit Adiwibowo et al., 2023). In addition, financial stress increases the sensitivity of investment cash flows (ICFS) and has a negative impact on company investments. As a result, cash flow becomes more important to investment decisions, especially for financially stressed companies. Financial pressure and power did not increase accountants' adherence to conservative accounting, as its impact is limited to the procedure (Meilinda et al., 2022). Identifying stakeholders is crucial for achieving accurate outcomes. Understanding the role of stakeholders is crucial for achieving desired outcomes. To handle and minimize financial issues, individuals must recognize the need of taking proactive measures (Sheng, 2023).

Idi & Borolla (2021) after investigating the above issues, the Altman Z Score shows that companies experiencing financial stress can predict the level of financial stress he will experience. Wahyuni & Rubiyah (2021) discovered that Altman's technique is the best accurate predictor of

unstable economic conditions. However, past research has shown that the Altman Z score is not necessarily the most effective approach to forecast financial troubles, as demonstrated by the study Taufan & Setyaningsih (2019) on the usage of the Altman Z-score, Zmievsky, Grover, Springate, and Zavgren. This study demonstrates that Zavgren's model is the most reliable method for forecasting financial crises. Lutfiyah & Bhilawa (2021) research found that the Zmijewski approach accurately predicts financial difficulties.

The current research study will focus on companies in the Indonesian Sharia Index with financial reporting for 2020-2023. The purpose of this research is to calculate risk finance in firms listed on the Indonesian Stock Exchange (ISSI) using the Altman Z-Score, Ohlson technique.

LITERATURE REVIEW

Financial statements

Companies use financial reports to track their financial position with respect to assets, necessities (such as stocks and bonds), important information, and income. Financial reports are general and descriptive information general information about the Company's financial performance and management practices. Report Corporate services are used to provide information and describes the company's financial and operational activities. According to PSAK No.1 (IAI, 2021) financial reports aim to:

- A. Provide information covering financial position, performance, as well as a change in the financial position of a company that benefits a number of people large number of users in decision making.
- B. Financial statements do not provide all possible information needed by users in making economic decisions because they are generally describe financial influences and

past events, and does not required to provide non-financial information.

- C. Financial reports also show what management has done (stewardship), or management responsibility for resources entrusted to him.

As previously mentioned in PSAK, financial reporting provides information that many parties need to make decisions in the future front. However, analysis is necessary for users to obtain that information they need; Interpret financial reports to assist stakeholder interest in improving business performance.

Bankruptcy & Financial Distress

Yati & Afni Patunrui (2017) explain that in principle companies always trying to survive in the long term, but market conditions change from from time to time making it difficult for them to adapt to crises or bankruptcy. Bankruptcy usually means the incapacity of a company receiving benefits. Law UU No37 (2004) explains Bankruptcy is joint assets of debtors in a state of bankruptcy. According to Law This law, the bankruptcy administrator is responsible for taking orders and make decisions under the supervision of a dispute administration judge. According to Article 2 paragraph (1) of the Law, the court can choose which debtor have two or more unpaid debts at the same time. Matter This can be done at your own request or at the request of one or more people credit.

Financial distress is a circumstance in which a company experiences financial problems, including decreased profits and inability to pay debts and obligations. Results this is shown in the financial statements compared with the period previously. Financial distress is the financial condition of a company as well can be interpreted as a situation where liquidity problems are very serious so the company cannot function properly. Financial Reports and Financial accounting was

used by Altman (1968) in the Z-Score Chapter for determine whether a business is profitable or not.

Altman Z-Score Model

Altman's (1968) method uses multiple discriminant analysis (MDA)/model Multivariate. Multivariable models eliminate the need to calculate and interpret each financial indicator separately, which makes analysis easier the company's financial situation. This shows that this method is very accurate. Other methods have market values that are not found in the Altman method. This shows that the market value of the company's equity is sufficient to cover all company debts. According to Altman's research, this method has value high accuracy, namely 95% accuracy. The Altman model formula is:

$$Z = 1,2 (WCTA) + 1,4 (RETA) + 3,3 (EBITTA) + 0,6 (MVEBVL) + 1 (STA)$$

Information:

Z	: Bankruptcy Index
X1	: Working Capital / Total Assets
X2	: Retained Earnings / Total Assets
X3	: EBIT / Total Assets
X4	: Book Value and Equity / book Value of Debt
X5	: Sales / Total Assets

With the Altman model cut off values as follows:

1. The company is healthy, if the Z value is > 2.99.
2. The company is in a gray condition or has not gone bankrupt and also cannot be said to be healthy (in gray area conditions), if the value is $1.80 < Z < 2.99$.
3. The company goes bankrupt if the Z value < 1.80.

Ohlson Model

The second method of analyzing economic difficulties is the Ohlson (1980) method. The use of logit analysis provides a solution to the limitations of the analysis multiple discriminant. The Ohlson method was used to examine 105 bankruptcies and

2,058 bankruptcies between 1970 and 1976. The results show the accuracy of bankruptcy prediction is 96.4%. The Ohlson model formula is:

$$O = -1,32 - 0,407X1 + 6,03X2 - 1,43X3 + 0,0757X4 - 2,37X5 - 1,83X6 + 0,285X7 - 1,72X8 - 0,521X9$$

Information

O	: Bankruptcy Index
X1	: Firm Size
X2	: Total Liabilities/Total Assets
X3	: Working Capital/Total Assets
X4	: Current Liabilities/Current Assets
X5	: 1 if total liabilities > total assets; 0 otherwise
X6	: Net Income/Total Assets
X7	: Operating Cash Flow/Total Liabilities
X8	: 1 if net profit is negative; 0 otherwise
X9	: $(NIt - NIt-1) / (NIt + NIt-1)$

The Ohlson method has the following cut off values:

If the O value < 0.38, then the company is categorized as healthy.

If the O value is > 0.38, then the company is categorized as bankrupt.

The inclusion of variables as proposed by Altman (1968) was applied in this research. This research also used variables from Ohlson (1980) which were included in the research. These variables are used to analyze the potential for bankruptcy in companies listed on the Indonesian Sharia Stock Index (ISSI) for the 2020-2023 period (Rofi et al., 2024; Widiastara & Rahayu, 2019; Darmayanti et al., 2023; Lestari, 2022). The Altman Z-Score model is used because it is considered to have advantages compared to other prediction models, namely that this model combines various ratios needed to assess liquidation, profitability, solvency and activity (Santoso et al., 2023; Sobariah & Kristiastuti, 2023; Ricardo Hartanto & Hadi Santoso Dwidjosumarno, 2018). The Ohlson O-Score model is used because Ohlson in his research uses logistic analysis to avoid problems with the assumptions in the Multiple Discriminant Analysis

(MDA) Model carried out by Altman (Wisdyastuti & Rahayu, 2018; Najib & Cahyaningdyah, 2020; Pramudita, 2021). Thus, the Altman and Ohlson model is expected to be able to analyze the potential for bankruptcy in companies (Wisdyastuti & Rahayu, 2018; Dukalang et al., 2024). Research conducted by Nugroho et al. (2022) shows the accuracy of the Altman model in predicting potential bankruptcy, this is also supported by research from Beny Mahardika & Supanji Setyawan (2022) and Hudaya et al., (2024) conducted research that showed the Ohlson model was also accurate in predicting potential bankruptcy.

METHODOLOGY

In this quantitative research, descriptive methods and quantitative methods are used as alternatives to the two analytical methods mentioned previously. Researchers present the results using descriptive methods, and a sentence that shows whether a company's financial performance is good or bad. Meanwhile, information in financial reports is measured in numerical form using a quantitative approach.

ISSI (Indonesian Sharia Securities Index) 2020-2023 uses data from the official website of the Indonesian Stock Exchange www.idx.co.id. Companies that are in the Indonesian Sharia Stock

Index (ISSI) will be the main focus of this year's research.

The population used for this research is companies in the consumer goods sector, pharmaceutical sub-sector, which are listed on the Indonesian Sharia Stock Index in the 2020 - 2023 period with a total of 2 companies. The sampling technique in this research used the Purposive Sampling method. Purposive Sampling is a technique for determining and taking samples determined by researchers with certain considerations. The characteristics or criteria used in this research sampling method are:

1. Consumer goods sector companies in the pharmaceutical sub-sector listed on the Indonesian Sharia Stock Index during the 2020 - 2023 research period.
2. Annual financial report data during the 2020 - 2023 research period.
3. Companies did not list, delist and relist during the 2020 - 2023 period.

Based on the criteria set above, we obtained 2 pharmaceutical sub-sector companies listed in the Indonesian Sharia Stock Index (ISSI). The number of years of observation used in this research is 4 years consecutively starting from 2020-2023.

Table 1 Pharmaceutical Sub-Sector Companies Listed in the Indonesian Sharia Stock Index (ISSI)

No	Code	Company
1.	KAEF	PT. Kimia Farma (Persero) Tbk.
2.	DVLA	PT. Darya Varia Laboratoria Tbk.

Source: Data Processed in 2024

The items included in the research instrument have variable operational definitions.

Table 2 Variable Operational Definitions

No	Variable	Measuring	Litearture
1.	Altman Z-Score	$Z = 1,2 (WCTA) + 1,4 (RETA) + 3,3 (EBITTA) + 0,6 (MVEBVL) + 1 (STA)$	Altman (1968)
2.	Ohlson O-Score	$O = -1,32 - 0,407X1 + 6,03X2 - 1,43X3 + 0,0757X4 - 2,37X5 - 1,83X6 + 0,285X7 - 1,72X8 - 0,521X9$	Ohlson (1980)

Source: Data Processed in 2024

RESULT AND DISCUSSION

Based on the calculation of 5 bankruptcy indicator variables, the following are the results of calculating the Z-Score value of pharmaceutical

companies listed on the Indonesian Sharia Stock Index from 2020 to 2023.

Table 3 Altman calculation results (Z-score)

Code	Score				Prediction Status
	2020	2021	2022	2023	
KAEF	1,053	1,361	1,084	0,176	bankrupt
DVLA	3,670	3,642	3,984	3,837	healthy

Source: Author Estimation (2024)

The results of calculating the Z-Score value in 2020 show that the company Kimia Farma (Persero) Tbk. is in the bankruptcy category, because the predicted results of the Z-Score calculation are 1.053, which means it is below 1.81 and is in the bankruptcy category. Meanwhile, from the company Darya-Varia Laboratoria Tbk. managed to avoid bankruptcy or be healthy with a Z-Score of 3.670.

In 2021, the Z-score value of the company Kimia Farma (Persero) Tbk. there was an increase from the previous year to 1.361, but this value is still below 1.81, which means this company is still in the bankruptcy category. Z-Score Value PT. Darya-Varia Laboratoria Tbk. this year it was 3,642, where this company is in the healthy category because its Z-score value is above 2.99.

In 2022, Kimia Farma (Persero) Tbk. experienced a decrease in the Z-Score value from the previous year to 1.084. This shows that PT. Kimia Farma (Persero) Tbk. not yet able to emerge

from bankruptcy. On the other hand, this year PT. Darya-Varia Laboratoria Tbk. obtained a higher Z-Score value than the previous year of 3.984, this determines that PT. Darya-Varia Laboratoria is in the healthy category.

PT. Kimia Farma (Persero) Tbk. in 2023, get a Z-score value that is lower than the previous year of 0.176. This suddenly means that the company has not been able and is getting worse in dealing with potential bankruptcy, in 2023, PT Darya-Varia Labratoria Tbk. experienced a decline in the Z-Score value, but this decline still places the company in the healthy category and able to overcome financial problems.

The main cause of Kimia Farma's loss is because the state-owned pharmaceutical company's product sales have fallen. PT Kimia Farma Tbk recorded total sales decreased by 25.28 percent on an annual basis, from IDR 12.85 trillion in 2021 to IDR 9.6 trillion in 2022. While achieving net profit, the company managed to earn IDR

302.27 billion in 2021, but fell sharply and lost up to IDR 170 billion in 2022. Sales results in 2022 fell 16.29 percent compared to sales in 2021, which reached IDR 10 trillion. Worse conditions occurred in overseas sales with a total of IDR133.3 billion, dropping 33.5 percent compared to achievements in 2021. The cause of Kimia Farma's loss is due to the plummeting sales performance, as well as the minimal decline in operating expenses and financial expenses, which only fell by 6.11 percent and 14.19 percent.

This is also supported by research conducted by Rofi et al. (2024) who researched financial distress analysis at PT. Indofarma Tbk. In his research, it was said that the high total liabilities were not commensurate with management assets, and the working capital management carried out by PT Indofarma Tbk was not optimal, shown by negative numbers. This is in line with the Kimia Farma (Persero) Tbk company. who deal with the same financial problems.

Table 4 Ohlson calculation results (O-score)

Code	Score				Prediction Status
	2020	2021	2022	2023	
KAEF	-4,380	-4,520	-5,147	-4,469	healthy
DVLA	-7,451	-7,592	-7,957	-7,107	healthy

Source: Author Estimation (2024)

Based on the results of the O-Score model calculation, it can be seen that both companies are in the healthy category. From Ohlson's score data, Kimia Farma (Persero) Tbk. shows a negative score that decreases from year to year, but is still in the "healthy" category based on prediction status. Even though there is a decline in scores from 2022 to 2023, conditions are generally considered stable and do not lead to predictions of bankruptcy.

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Based on the Ohlson scores given to KAEF and DVLA, both companies are assessed as being in "healthy" condition from 2020 to 2023. This indicates that based on the financial variables used in the Ohlson method, both companies have a fairly

strong financial profile and do not show any risk significant bankruptcies during the period.

Research from Widiastara & Rahayu (2019) is also in line with this research, in their research it is explained that the main indicators included in the Ohlson model form a number of main indicators, including profitability and liquidity ratios. This formula also takes into account the size of the company, thus showing that larger companies are better at avoiding financial problems.

CONCLUSION AND RECOMMENDATION

The results of the analysis of potential financial difficulties using the Altman Z-Score model show that PT. Kimia Farma (Persero) Tbk. shows an induced trend with the Z-Score value continuously decreasing below the threshold indicating poor financial health. Meanwhile, PT. Darya-Varia Laboratoria Tbk. maintains its position as a company with good financial health despite experiencing a decline in the Z-Score value in 2023. This analysis provides an overview of the financial

condition of the two companies over the last four years period.

The results of the analysis of potential bankruptcy using the Ohlson O-Score model show that the two companies, Kimia Farma (Persero) Tbk. and other companies mentioned (KAEF and DVLA), are assessed as being in the "healthy" category based on the results of the O-Score or Ohlson score model calculations. Even though there is a decline in the Ohlson score from year to year, financial conditions are generally considered stable and do not lead to significant predictions of bankruptcy. This shows that both companies have a strong financial profile and are able to overcome the challenges that arise during the analyzed period (2020-2023).

Based on the results of calculations using 2 potential bankruptcy analysis models, the company is threatened with bankruptcy in a matter of years. Corrective or preventive action must be taken by management to avoid bankruptcy at all costs. Investors should choose companies with good financial performance for safer and more selective investment decisions.

Further researchers are advised to use several types analysis as a comparison material to increase accuracy analysis. The company period needs to be extended and renewed in order research results are more accurate. Apart from looking at internal company factors, External factors that can trigger bankruptcy are also necessary considered

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