Analysis of Zmijewski Model's Accuracy in Predicting Potential Financial Distress for Indonesian Islamic Banking

ABSTRACT

Every banking activity and product has risks. Risk is the result or consequence of an activity during the process or in future circumstances that can cause losses. Financial Distress can be characterized by a decrease in various financial ratios, a reduction in assets, a decline in sales, a decrease in profits and profitability levels, a reduction in working capital, and a continuous increase in debt. So, in this research, the author ~~wants~~(wanted) to know the level of accuracy of the Altman z-score model in predicting potential financial Distress for Sharia Commercial Banks in Indonesia. The population used in this research ~~is~~ (was) Sharia Commercial Banks registered with the Financial Services Authority. The sampling technique that the researchers used was purposive sampling, with a total sample of 12 Islamic commercial banks. The research results showed that only one bank experienced financial Distress, while 11 other banks experienced good economic conditions. The Zmijewski model is good because it has a high level of accuracy

Keywords:Financial Distress; Zmijewski Model; Sharia Commercial Banks; Credit Risk; Indonesia

INTRODUCTION

Every banking activity and product has risks. Risk is the result or consequence of activity, either during the process or in future circumstances, that can cause losses. According to the provisions of Financial Services Authority No. 18/POJK.03/2016, banks must manage eight risks: credit risk, liquidity risk, market risk, operational risk, legal risk, strategic risk, existence risk, and honour risk. Meanwhile, Islamic banks face risks based on the Financial Services Authority's provisions in No. 65/POJK.03/2016. Not only limited to eight types of risk, Islamic banks face two additional risks, namely return risk and investment risk. [1].

Sharia Commercial Banks (BUS) experienced asset growth from 2018 to 2022 with an amount of Rp. 316.691 billion and continues to increase every year until it reaches Rp. 473.344 billion. Third-Party Funds (DPK) increased by IDR from 2018 to 2022. 257.606 billion to go Rp. 389.580 billion in 2019. Sharia Commercial Bank financing also experienced an increase from 2018 to 2022, with the amount in 2018 amounting to Rp. 202.766 billion to reach Rp. 287.827 in 2022. For non-performing financing (NPF), the increase occurred from 2018 to 2020, decreased in 2021, and then increased again in 2022[2].

There has been an increase in assets, third-party funds (DPK) and financing. This increase is good for the development and growth of Sharia Commercial Banks. In contrast, the increase in Non-Performing Financing (NPF) shows an increase in problematic financing in Sharia Commercial Banks. An increase in Non-Performing Financing (NPF), or what can be called problematic financing, will affect the productivity of Islamic banking [3]. The high level of Non-Performing Financing of Islamic banks certainly greatly influences Islamic banks, where Islamic banks are known as banks that are resistant to various economic crises. However, of course, the quality of Sharia banks depends on the management of the Islamic banks themselves. Suppose Islamic banks cannot reduce the value of their non-performing financing. In that case, Islamic banks may face various risks that will later affect operations and cause financial difficulties [4].

Financial distress conditions can be seen from the start before bankruptcy occurs using a model or analysis method from an early age. This model can be used to identify early symptoms of Financial Distress so that conditions can be improved before bankruptcy occurs. Researchers, including the Zmijewski Model, have developed several prediction models. The Zmijewski Score method is the most suitable method for banking companies [5]. Research on financial distress has been carried out quite a lot

in large Indonesian companies. However, more research is needed on financial distress conditions in Sharia banking. So, in this research, the author ~~wants~~(wanted) to know the level of accuracy of the Zmijewski model in predicting potential financial distress for Sharia Commercial Banks in Indonesia.

Financial Distress

Financial distress is when a company is categorized as facing a financial crisis and is declining to fulfill its responsibilities to creditors. A company can no longer bear the burden of obligations that should be paid to operate its business, so it is facing financial distress [6]. Financial distress is when a company's operating cash flow is insufficient to satisfy current obligations (such as credit trading or interest expenses), and the company is forced to take corrective action [7]. Financial distress can be experienced by all companies [8]. Moreover, if a country's macroeconomic conditions are disturbed, this can also trigger financial distress in companies in that country [9]. Apart from macroeconomic conditions, financial distress can also be influenced by managerial ownership factors [10], profitability, liquidity, activity, leverage [11], and corporate governance [12].

Zmijewski Model

Zmijewski (1984) developed this model by building on several previous models that had been developed. Zmijewski's score is a multiple discrimination analysis ratio. This multiple discriminant analysis requires several financial ratios related to bankruptcy to create a functional model [13]. The Zmijewski model uses ratio analysis to measure a company's performance, leverage and liquidity [14].

Zmijewski's 1983 method was the result of 20 years of repeated research. Zmijewski uses liquidity and leverage ratio analysis to measure a company's performance in his research. Zmijewski made predictions using a sample of 75 bankrupts and 73 healthy companies from 1972 to 197 and used the F-Test indicator on the rate of return, liquidity, leverage, turnover, and fixed group ratios to show significant differences between healthy and unhealthy companies [15].

Fundamental financial ratios are used to predict financial distress in companies, according to the Zmijewski (1984) model. Zmijewski's research used a random sampling method to find the model. However, logistic regression is the statistical technique used. The results from previous research on bankruptcy prediction are reviewed using the Zmijewski Model. These ratios were taken from 75 companies facing bankruptcy and 73 from 1972 to 1978 [16]. Next, the resulting model is as follows:

$$X = -4{,}3 - 4{,}5X1 + 5{,}7X2 - 0{,}004X3$$

Information:
X1: Return On Assets
X2: Debt Ratio
X3: Current Ratio

According to the Zmijewski model, a company is considered bankrupt if its profitability exceeds 0.5 or the X value is 0. Therefore, it is anticipated that the company will file for bankruptcy if the X number is greater than or equal to 0 [17].

METHODS

The type of research used is quantitative research with a descriptive approach. It is done to determine the value of each variable, either one variable or more, without connecting one variable to another because this research aims to predict the potential for Financial Distress in Sharia Commercial Banks using the Zmijewski model. The population used in this research is Sharia Commercial Banks registered with the Financial Services Authority from 2018 to 2022. The number of Sharia Commercial Banks in Indonesia is 13 Sharia Commercial Banks. The sampling technique that the researchers used was the purposive sampling technique. By criteria:

1. Sharia Commercial Banks registered with the OJK
2. Sharia Commercial Banks operating during the 2018-2022 period
3. Sharia Commercial Banks that have annual financial reports during the research period, namely from 2018 to 2022

Based on these criteria, 12 Sharia commercial banks are sampled. Only one bank does not fit into these criteria, namely Bank Syariah Indonesia, because the bank has not been operating for approximately five years.

Descriptive statistical analysis is usually used to provide an overview of the data from each research variable without making general conclusions [18]. The data analysis technique carried out in this research uses a modified Altman Z-Score model for Sharia commercial banks. Next, researchers used descriptive analysis to describe the calculation results. They were followed by analyzing the level of accuracy and type error for each model to get the best or most accurate model. The highest accuracy of the prediction model can be seen from the first. The high level of accuracy shows what percentage of the model correctly predicts the company's condition and is based on all existing research objects. The level of accuracy of the financial distress prediction model in percentage can be calculated as follows:

$$Accuracy\ Level = \frac{Number\ of\ correct\ predictions}{Sample\ size} \times 100\%$$

Next, analyze the percentage of error types. The first type of error is an error that occurs if the model predicts that the research object will not go bankrupt, but in reality, the company goes bankrupt. The error rate can be calculated in the following way:

$$Error\ Type = \frac{Number\ of\ incorrect\ predictions}{Sample\ size} \times 100\%$$

Accuracy and error rates are used to conclude which model is most suitable to be applied. The prediction model that has the highest level of accuracy in predicting financial distress in the company [19].

RESULTS AND DISCUSSION

The sample for this research used 12 sharia commercial banks, namely Bank Muamalat Indonesia, BPD West Nusa Tenggara Syariah, Bank Aceh Syariah, Bank Victoria Syariah, BPD Riau Kepri Syariah, National Pension Savings Bank Syariah, Bank Jabar Banten Syariah, Bank Mega Syariah, Bank Syariah Bukopin, BCA Syariah, Bank Panin Dubai Syariah, and Bank Aladin Syariah in 2018-2022.

Table 1. Variable Description Data

	N	Min	Max	Mean	Std. Deviation
Return on Asset	60	-9.78	10.80	1.1017	3.35315
Debt Ratio	60	0.04	0.90	0.2702	0.27676
Current Ratio	60	0.99	508.41	15.9020	64.90647

Source: Primary data processed, 2024

The results of the SPSS 26 analysis and output carried out on Sharia commercial banks using the Zmijewski model can be seen in the Return on Asset (ROA) ratio; the minimum value is -9.78, and the maximum value of the ROA ratio is 10.80 with the average (mean) ROA ratio being 1.1017 and a standard deviation of 3.35315.

Meanwhile, in the Debt Ratio of Sharia commercial banks using the Zmijewski model, the minimum Debt Ratio value is 0.04, and the maximum Debt Ratio value is 0.90 with an average (mean) Debt Ratio of 0.270 and a standard deviation of 0.27676.

The minimum Current Ratio value is 0.99, and the maximum Current Ratio value is 508.41, with an average (mean) Current Ratio of 15.9020 and a standard deviation of 64.90647, obtained from Sharia Commercial Banks from 2018 to 2022.

The calculation results of the Zmijewski model are as follows:

$$X = -4{,}3 - 4{,}5X1 + 5{,}7X2 - 0{,}004X3$$
$$X = -4{,}3 - 4{,}5(66.10) + 5{,}7(16.21) - 0{,}004(954.12)$$
$$X = -213.17$$

The calculation results above show that the results of the analysis using the Zmijewski model in the period 2018 to 2022 in Islamic Commercial Banks out of 60 samples were in the healthy category because the value obtained was less than 0, namely -213.17, meaning that in the five years, they were in a healthy condition. (Non Distress).

The details for each bank are as follows:

Table 2. Zmijewski value of each Sharia Bank

No	Bank	Zmijewski	Cut Off Value	No	Bank	Zmijewski	Cut Off Value

1	Bank Aceh Syariah	-10,78	Non Distress	7	Bank Tabungan Pensiunan Nasional Syariah	-38.15	Non Distress
2	BPD Nusa Tenggara Barat Syariah	-9.39	Non Distress	8	Bank Mega Syariah	-10.69	Non Distress
3	Bank Muamalat Indonesia	-3.46	Non Distress	9	Bank Panin Dubai Syariah	-0.66	Non Distress
4	Bank Victoria Syariah	-4.33	Non Distress	10	Bank Syariah Bukopin	1.37	Distress
5	BPD Riau Kepri Syariah	-5.08	Non Distress	11	BCA Syariah	-7.05	Non Distress
6	Bank Jabar Banten Syariah	-4.70	Non Distress	12	Bank Aladin Syariah	-0.48	Non Distress

Source: Primary data processed, 2024

Based on the table above, it can be seen that the Zmijeski value for Sharia Commercial Banks for the 2018-2022 period shows that there is only one bank experiencing financial distress, namely Bank Syariah Bukopin, with a Zmijewski value of 1.37. Meanwhile, based on the results of Zmijewski's calculations, other banks are categorized as healthy. The results of the data above are that the Zmijeski value of each Sharia commercial bank is below the cut-off value, namely 0, so Sharia commercial banks are in the safe category and tend to be stable even though the Zmijeski value varies every year.

The average Zmijeski value for sharia commercial banks during the 2018-2022 research period was Bank Aceh Syariah with a value of -10.78, BPD West Nusa Tenggara Syariah with a value of -9.39, Bank Muamalat Indonesia with a value of -3.46, Bank Victoria Syariah with a value of -4.33, BPD Riau Kepri Syariah with a value of -5.08, Bank Jabar Banten Syariah with a value of -4.70, National Pension Savings Bank with a value of -38.15, Bank Mega Syariah with a value of -10.69, Bank Panin Dubai Syariah -0.66, Bank Syariah Bukopin with a value of 1.37, BCA Syariah with a value of -7.05, and Bank Aladin Syariah with a value of -0.48. On average, Sharia Commercial Banks do not experience financial problems with the potential for bankruptcy because the average Zmijewski value shows a value of $X < 0$; namely, the company is in a healthy financial condition and does not have the potential to experience bankruptcy.

The level of accuracy of the financial distress prediction model is as follows:

Table 3. Accuracy Level

	Prediction		
Sharia Commercial Bank	Financial Distress	Non-Financial Distress	Total
	1	59	60
Accuracy Level		98%	
Error Level		2%	

Source: Primary data processed, 2024

Based on the calculated results of the accuracy and type of error in the Zmijewski model, it can be seen that the Zmijewski model from 2018 to 2022 has an accuracy level of 98% with an error type of 2%. Based on the analysis, it was carried out correctly on 59 out of 60 samples. According to the table above, the accuracy of this bankruptcy prediction model analysis can be seen from 1 bank that experienced bankruptcy. It was concluded that the Zmijewski model is good because it has a high level of accuracy with a low error rate.

The Zmijewski model is used in credit analysis to predict potential financial distress or difficulties in financial institutions, including Sharia banking. This model was developed by Robert W. Zmijewski in 1984 and has become one of the tools commonly used in banking practice to identify credit risk [20]. To prevent and handle financial distress, Islamic banks must implement effective risk management practices, including strict supervision of asset quality, good liquidity management, and portfolio diversification. Banks must also have a mechanism to identify early signs of financial distress and take appropriate

corrective steps to overcome these problems. Regulators and financial supervisory authorities play an essential role in preventing and handling financial distress in Islamic banks [21]; [22]. They are responsible for setting strict financial standards, carrying out routine supervision of financial institutions, and providing support in crisis management when necessary.

Islamic banks that do not experience financial distress generally have solid characteristics and performance and can manage risk well. They mostly have consistent year-over-year profit growth, healthy liquidity ratios, and manageable leverage. In addition, the bank may also have a quality financing portfolio with a low level of bad loans. An excellent Islamic bank has an effective risk management system (Hussain & Al-Ajmi, 2012). They have an integrated and well-directed risk identification, measurement and management process. It includes credit, liquidity, market, operational and Sharia risk management. Banks that are good at risk management tend to have the ability to anticipate and overcome challenges that may arise in the future [24].

CONCLUSION AND SUGGESTION

The research results show that Indonesian Sharia commercial banks do not have the potential for financial distress. Analysis of the accuracy level of the Zmijewski Model in predicting potential financial distress in Islamic banking in Indonesia can provide valuable insight for financial institutions, regulators and other stakeholders in managing credit risk and maintaining the financial system's stability as a whole. Although the Zmijewski Model can provide valuable insight into predicting potential financial distress, it is essential to remember that every model is flawed. Therefore, this model should be used as one tool within a broader risk analysis framework, considering other qualitative and contextual information.Researchers can use other models such as Altman Z-Score, Springate, and Grover for further research.

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