AKTIVA Journal of Accountancy and Management

Volume 2 No. 2, July 2024
https://e-journal.iainptk.ac.id/index.php/aktiva
DOI: https://doi.org/10.24260/aktiva.v2i2.2204
p-issn: 2985-4792 e-issn: 2985-4806

Financial Distress Analysis as Early Warning System on Halal Tourism Industries: Case Study During Covid-19 Pandemic Era

Nindy Akbar Lintang Puspita,[1] Galuh Tri Pambekti,[2] Kharisa Rachmi Khoirunisa[3*]

[1,2,3] Faculty of Islamic Economics and Business, Universitas Islam Negeri Sunan Kalijaga
Jl. Marsda Adisucipto, Indonesia

*Email Correspondence: kharisa.khoirunisa@uin-suka.ac.id

Article Information

Article History:
Received : 2023-12-19
Revised : 2024-06-04
Accepted : 2024-06-20

Keywords: *Financial Distress, Altman, Zmijewski, Springate, Covid-19*

Kata kunci*: Kesulitan Keuangan, Altman, Zmijewski, Springate, Covid-19*

Abstract

Purpose: to know whether there is a difference in the level of accuracy between the Altman, Zmijewski, and Springate models in analyzing financial distress in halal tourism industries during the COVID-19 pandemic.
Design/methodology/approach: a quantitative method with a comparative descriptive approach
Research Findings: there are different levels of accuracy that prove that there is a difference in the level of accuracy between the Altman, Zmijewski and Springate models in analyzing financial distress tourism industries during the COVID-19 pandemic.
Contribution/Originality/Novelty: it can practically assist company management in understanding financial distress analysis and help investors, both individual and institutional investors, to see the potential for company bankruptcy as a consideration in investing

Abstrak

Tujuan Penelitian: untuk mengetahui apakah terdapat perbedaan tingkat akurasi antara model Altman, Zmijewski, dan Springate dalam menganalisis financial distress pada industri pariwisata halal pada masa pandemi COVID-19.
Desain / metodologi / pendekatan: metode kuantitatif dengan pendekatan deskriptif komparatif.
Temuan Penelitian: terdapat perbedaan tingkat akurasi membuktikan bahwa terdapat perbedaan tingkat akurasi antara model Altman, Zmijewski dan Springate dalam menganalisis industri pariwisata financial distress pada masa pandemi COVID-19.
Kontribusi / Orisinalitas / Kebaruan: secara praktis dapat membantu manajemen perusahaan dalam memahami analisis kesulitan keuangan dan membantu investor, baik investor individu maupun institusi, untuk melihat potensi kebangkrutan perusahaan sebagai pertimbangan dalam berinvestasi.

INTRODUCTION

The tourism sector in several countries significantly impacts the economic growth of the country or even the world because it is considered capable of creating many jobs for local communities. The increase in the economy can be observed in the enormous contribution of the tourism industry to the Gross Domestic Product (GDP). In addition, the tourism sector has opportunities and challenges, namely by increasing tourists, especially Muslim tourists in various

countries. Regarding tourism industry players, it is necessary to pay attention to financial resilience and performance in the tourism industry. Meanwhile, awareness and knowledge of halal products and services contributed to the increase in the halal industry (Rahman et al., 2011; Hamdan et al., 2013). Currently, products and services in the halal industry continue to show an increasing movement of enthusiasts, giving rise to a new phenomenon in halal tourism (Samori et al., 2016). This phenomenon is in line with the findings of previous studies, which showed that the awareness of Muslim tourists is very high for products and services that follow Islamic law (Shari'a) when tourists are in a halal tourism area (Battour et al. 2010; Battour et al. 2012; Jafari and Scott, 2014).

The covid-19 pandemic can indirectly be a stress test in all sectors, no exception for the halal hotel, restaurant & tourism industry. Thorik (2020) also revealed that the applicable restrictions almost stopped all daily human activities including economic activities, causing a crisis. One of the industrial sectors hardest hit by the Covid-19 outbreak is the halal halal hotel, restaurant and tourism sub-sector where restaurant and restaurant turnover has decreased by up to 70% (R. A. Gunawan, 2020). Based on the table above, it was recorded that as many as 20 companies in the halal halal hotel, restaurant & tourism sub-sector experienced a decrease in net income, even experiencing losses after the COVID-19 pandemic hit. This shows that the impact of the COVID-19 pandemic on the financial health of this sector is quite significant. So it can be said that companies in the halal hotel, restaurant & tourism sub-sector list are experiencing financial distress.

Financial distress is a condition of financial difficulty that can be experienced by various companies. Financial distress is a condition that occurs before bankruptcy (B. Gunawan & Putra, 2021). If the company does not have the readiness to predict financial distress, the company will certainly experience bankruptcy (Arini et al., 2021). The covid-19 pandemic caused unexpected economic shocks (Greenwood et al., 2020). Economic shocks that occur can cause many companies to experience financial distress (financial distress). The failure of an entity will negatively affect the business of other entities with the consequence of economic losses which in turn have a social impact (Lesáková et al., 2020). The Early Warning System (EWS) is one way or mechanism in predicting a crisis. Therefore, the Early Warning System (EWS) not only provides an overview of the occurrence of disturbances in the economy, but is a predictor of company performance (Setyawan, 2020). The analysis of financial distress in this study is one form of an early warning system, namely an early prevention effort against company bankruptcy, in which case the crisis faced is a crisis due to the COVID-19 pandemic.

This study uses the Altman, Zmijewski and Springate models to measure financial distress that occurs in halal hotel, restaurant & tourism sub-sector companies listed on the IDX and examines the accuracy of the three models. The difference in the results of the comparison of the level of accuracy between the models encourages researchers to re-compare the accuracy between the measurement models of financial distress so that it can be said that this study is a continuation of previous studies. The method of Altman, Zmijewski and Springate is the most commonly used method in research that compares the prediction results and the level of accuracy. The three measurement methods have different variables and calculation formulas so that they can affect the level of accuracy in predicting financial distress. Thus, this research also has a different topic because the research was conducted during the COVID-19 pandemic where the economic crisis had an impact on the halal hotel, restaurant and tourism sub-sector companies. The halal hotel, restaurant and tourism sub-sector was chosen by researchers as the object because companies in this sub-sector were one of the hardest hit by the current COVID-19 crisis.

This research is expected to be able to provide information on predictive results both to internal and external parties of the company. However, it should be underlined that the prediction results in this study are one of the early warning systems, so it is very possible if the results of the analysis do not match the actual condition of the company. Even so, this research can be used as signs for companies to anticipate potential bankruptcy (Elvama et al., 2021).

LITERATURE REVIEW

Financial distress has long been an issue of concern for governments and public investors (Habib et al., 2013). All established companies have the potential to experience financial distress, especially if there is a crisis in the location where the company is established (Curry & Banjarnahor, 2018). It can be interpreted that not only internal factors such as cash flow difficulties, large debts, and operational losses, but external factors can also be a factor in the occurrence of financial distress, such as the current COVID-19 crisis. Prediction of financial distress is very useful as an early warning system for stakeholders, both internal and external parties. There are several benefits of predicting financial distress, including: 1) Management is responsive in taking action to prevent bankruptcy 2) Management can take merger or takeover actions so that the company can manage the company better and be able to pay its obligations. 3) Give early warning about bankruptcy that will occur in the future.

There are five types of financial distress, namely economic failure, business failure, technical insolvency, insolvency in bankruptcy, and legal bankruptcy. Economic failure is a situation where the company's revenue is not enough to cover the total costs, business failure is a condition where the company's business operations have been stopped, technical insolvency is a company that is unable to meet current obligations, insolvency in bankruptcy is a situation where the book value of debt the company exceeds the market value of assets, and legal bankruptcy is a condition where the company has been declared bankrupt under applicable law (Wulandari & Maslichah, 2021).

Widhiari & Aryani Merkusiwati (2015) states that there are ways to test whether a company is experiencing financial distress, namely as follows: 1) there is a layoff of workers/not paying dividends; 2) interest coverage ratio; 3) cash flow is smaller than long-term debt; 4) negative net income; 5) there is a change in the price of equity; 6) Cessation of company operations by the government and required to carry out restructuring; 7) violating technical debt and predicting bankruptcy in the future. Financial distress in its measurement also uses financial ratios. Financial ratio analysis is one way to assess the performance of a company (M. Noor Salim & Ismudjoko, 2021). The number of financial ratios is obtained by connecting two numbers from two different accounting accounts by dividing the two numbers. This analysis aims to obtain information or insight into the company's liquidity, operations, profitability, and efficiency by observing the company's financial statements (Shanmugavel & Muruganandam, 2021).

Financial distress in this study was measured using three models, namely Altman Z-Score, Zmijewski Probit, and Springate S-Score. The researcher found that the Altman, Zmijewski, and Springate models were the most commonly used models in research comparing the level of accuracy. However, the level of accuracy produced varies. The Altman model has the highest accuracy in the research of Rasool et al. (2020), Hertina and Kusmayadi (2020), and Nakamura (2021). While the Zmijewski model excels in the research of Sari and Yulianto (2018), Fadrul and Ridawati (2020), Ashraf, G. S. Félix and Serrasqueiro (2019), Andriani and Sihombing, (2021). Springate excels in the research of Gupita, Soemoedipiro and Soebroto (2020). Not only studies

that compare the level of accuracy, but researchers also find studies that only compare the results of the Altman, Zmijewski, and Springate models without calculating the level of accuracy. These studies include Manalu, Octavianus and Kalmadara (2017), Boubaker et al. (2020), Astuti, Sahroni and Wardani (2021), Sandi and Rahmah (2020), Silaen, Butarbutar and Nainggolan (2020), Sidik and Indah (2021).

Altman's model uses the Multiple Discriminant Analysis method, which is the method used to classify or make predictions about a problem. This method uses five financial ratios, namely working capital to assets, retained earnings to total assets, earnings before interest and taxes to total assets, market value of equity to book value of total debts, and sales to total assets. Altman Z-Score model is a model that is more widely used when compared to other prediction models (Hadi & Anggraeni, 2008). Zmijewski's model uses ratio analysis to measure liquidity, leverage, and company performance. The ratios used are earnings after tax to total assets, total debt to total assets, and current assets to current liabilities. The Springate model uses the Multiple Discriminant Analysis methods (Fadrul & Ridawati, 2020). The ratios used are working capital to total assets, net profit before interest and taxes to total assets, net profit before taxes to current liability, and sales to total assets. These three models have different formulas that allow for differences in the level of accuracy between the three formulas. It is important to test the level of accuracy to find which model is more accurate in analyzing financial distress. Therefore, the proposed hypothesis is:

H: There is a difference in the level of accuracy between the Altman, Zmijewski, and Springate models in analyzing financial distress in the halal hotel, restaurant & tourism sub-sector companies.

RESEARCH METHOD

This section discusses data sources, sampling criteria, and operational definitions of each variable. This study uses data in the form of documentation of quarterly financial statements of companies taken from the official website of the Indonesia Stock Exchange (IDX), namely www.idx.co.id. The sample is companies in the list of halal hotels, restaurants, and tourism sub-sector companies listed on the Indonesia Stock Exchange (IDX) for the 2020-2021 period and issuing quarterly financial reports. During the period, there were 21 samples with a total of 40 observations. This study compares the results and accuracy of the models used, namely the Altman Z-Score, Zmijewski Probit, and Springate S-Score models in analyzing financial distress. Table 1 contains a data analysis model based on references to previous research.

Table 1. Data Analysis Model

Model	Definitions
Model Altman Z-Score (Modifikasi)	$Z = 6{,}56X1 + 3{,}26X2 + 6{,}72X3 + 1{,}05X4$ X1 = working capital / total assets X2 = retained earnings / total assets X3 = earnings before interest and taxes / total assets X4 = book value of equity / book value of total debt The modified Altman model has the following cut-off values: >2,60 = distress

Model	Definitions
	1,1-2,60 = kelabu (grey) < 1,1 = non distress
Model Zmijewski Probit	$$X = -4,3 – 4,5X1 + 5,7X2 – 0,004X3$$ X1 = earning after tax / total assets X2 = total debt / total assets X3 = current assets / current liabilities The Zmijewski model has the following cut-off values: >0 = distress <0 = non distress
Model Springate S-Score	$$S = 1,03X1 + 3,07X2 + 0,66X3+ 0,4X4$$ X1 = working capital / total assets X2 = net profit before interest and taxes / total assets X3 = net profit before taxes / current liability X4 = sales / total assets The Springate model has the following cut off values: >0,862 = non distress <0,862 = distress
Accuracy and Error Level	The level of accuracy is used to conclude which model is most suitable to be applied in this study (Fadrul and Ridawati, 2020). Predictions are said to be accurate if the prediction results are the same as what happened in the field. On the other hand, the result is declared an error. $$\textbf{Accuracy Level} = \frac{\textbf{Number of Correct Prediction}}{\textbf{Number of Samples}} \textbf{ x 100\% number of samples}$$ $$\textbf{Type I} = \frac{\textbf{Number of type I errors}}{\textbf{Number of Samples}} \textbf{ x 100\% number of samples}$$ $$\textbf{Type II} = \frac{\textbf{Number of type II errors}}{\textbf{Number of Samples}} \textbf{ x 100\% number of samples}$$

RESULT AND ANALYSIS

Descriptive statistics

The first discussion on descriptive statistics in table 2 is to show that Altman has the largest standard deviation value with a large value gap as well. Altman standard deviation when compared with Zmijewski and Springate has a very large difference, where Zmijewski is 1.2845 and Springate is 0.8592 while Altman is 74.9839. The smaller the standard deviation value, the better the data will be. In other words, it shows that the distribution of Altman data is not included in the good category.

Table 2. Descriptive Statistical Analysis

	Altman	Zmijewski	Springate
N	168	168	168
Mean	18.2810	-2.1347	0.1772
Median	2.9946	-2.1650	0.0718
Deviation	74.9839	1.2845	0.8592
Range	729.1048	5.8197	6.6157
Minimum	-3.2770	-4.8577	-1.7633
Maximum	722.8278	0.9620	4.8524

This table shows the results of descriptive statistical analysis consisting of the mean, standard deviation (SD), minimal (min.), maximum (max.), the mean of each variable.

Kurtosis and Skewness Test

Based on the Skewness and Kurtosis test on Table 3, it can be concluded that overall, the data collected has not been normally distributed. This is due to the extreme values in the data, both high and low extremes. Therefore, researchers need to perform data outliers to overcome abnormalities in the data. The researcher then retested after the outliers were done. It aims to determine whether the data is normally distributed or not. After the outlier is done, the amount of data is automatically reduced. The data which was originally 168 data was reduced to 138 data. Here are the test results after the outliers.

Table 3. Skewness and Kurtosis Test

		Skewness and Kurtosis Test Before Outlier			Skewness and Kurtosis Test After Outlier		
		Altman	Zmijewski	Springate	Altman	Zmijewski	Springate
N	N	150	150	150	138	138	138
Skewness	Skewness	35.187	0.657	14.096	2.572	1.451	1.606
Kurtosis	Kurtosis	137.855	-1.273	35.967	0.020	-1.807	0.417

Test Level of Accuracy

The accuracy level test aims to measure the level of accuracy and error rate and prove the hypothesis in this study, namely, is there a difference in the level of accuracy in the three models used, namely Altman, Zmijewski, and Springate. Referring to the sample criteria, the criteria were then divided into two categories using a dummy variable technique, namely 0 (distress) and 1 (non-distress). Companies in the distressed category are companies that have negative net income. Meanwhile, companies in the non-distress category are companies that are included in the same sub-sector list and in the same period as the list of distressed companies; and do not have negative net income. The category is determined based on the theory which states that negative net income is one of the characteristics of financial distress and is the beginning of financial problems. This category is assumed to be the actual financial condition of the company which is then used as material for comparison of the level of accuracy test. The accuracy level test in this study begins with calculating the score for each model and then using the formula for comparing the number of accuracy/error values with the number of samples then multiplied by 100%. Value/score and accuracy are calculated using Microsoft Excel software by considering distress/non-distress companies based on the cut-off value of each model.

Based on the results of the accuracy test of the three models, there are differences in the level of accuracy in each model. The modified Altman model has the highest accuracy value, which is 72.7%, followed by Springate with an accuracy value of 59.1%, and then Zmijewski with a value of 49.2%. These results are in accordance with proprietary research (Alfiyanti et al., 2020), (Nakamura, 2021) and (Rasool et al., 2020) which Altman has the highest accuracy rate and lowest error rate when compared to other models in predicting financial distress.

Table 4. Summary of Accuracy and Error Level Calculation Results

Result	Model		
	Altman	Zmijewski	Springate
Accuracy Level	72..5%	45%	62.3%
Error Type I	10.9%	0.7%	37.7%
Error Type II	16.6%	54.3%	0

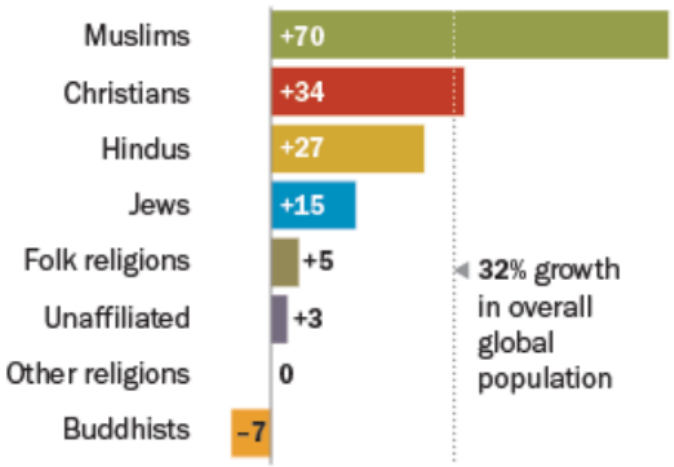
DISCUSSION

Altman model prediction results show that there are 8 companies in the red zone or in other words are companies experiencing financial distress, namely companies with codes CLAY, DFAM, IKAI, MAPB, PANR, PDES, PJAA and SOTS. while companies with codes FAST, INPP, JSPT, PZZA, and SHID are in gray condition. The prediction results of the Zmijewski model in predicting financial distress show that the DFAM company is in the red zone or in a state of financial distress (financial distress). This means that the other 20 companies are in good health. The springate model shows that there are 19 companies experiencing financial distress, namely companies with the code ARTA, BAYU, CLAY, DFAM, ICON, FAST, IKAI, INPP, JIHD, JSPT, KPIG, MAPB, PANR, PDES, PJAA, PSKT, PZZA, SHID , SOTS. While the other 3 companies are in good health. Companies with DFAM code are the only companies that are declared to be in financial distress by the three calculation models. So it is a big warning for DFAM companies to review their company finances. Based on the results of the accuracy test of the three models, there are differences in the level of accuracy in each model. Where the modified Altman model has the highest accuracy value, which is 72.7%, followed by Springate with an accuracy value of 59.1% and then Zmijewski with a value of 49.2%. These results are in accordance with proprietary research (Alfiyanti et al., 2020), (Nakamura, 2021) and (Rasool et al., 2020) where Altman has the highest accuracy rate and lowest error rate when compared to other models in predicting financial distress.

The difference in accuracy between the three models answers the hypothesis in this study, namely that there is a difference in the level of accuracy between the Altman, Zmijewski and Springate models in analyzing financial distress in halal hotel, restaurant & tourism sub-sector companies during the Covid-19 Pandemic. In other words, the hypothesis is accepted.

Analysis of the bankruptcy model in the halal hotel, restaurant & tourism industry is needed, considering the opportunities and challenges in the halal tourism industry. As stated by Kim et al. (2015), 30 percent of the population worldwide are Muslims. In addition, the Pew Research Center also predicts that the Muslim population is expected to continue to grow yearly and is a higher population increase than followers of other religions (Pew Research Center, 2017). A predicted increase of 70 per cent from 2015 to 2060. By 2020, Muslim tourists are expected to increase by 30 per cent and increase the value of spending to 200 billion USD (Mastercard and Crescent Rating, 2016). Meanwhile, at the world level, the increase will reach 32 per cent in 2060 with a population of 9.6 billion. This prediction result reflects the fast growth among the world's Muslim tourists.

The increasing number of Muslim tourists is a breath of fresh air for halal tourism, thus providing a great opportunity. This was also responded very quickly by several countries with a majority Muslim population or countries with a relatively large Muslim population and also countries that focus on developing halal tourism, including Japan, South Korea, Thailand, Australia and Indonesia. Thus, Muslim tourists have high hopes for the performance of the tourism industry, such as tourist attractions, hotels, restaurants, airlines, and travel agents. Prominent companies involved in the tourism industry should strive to maintain financial stability and always provide tourist facilities for tourists worldwide so that the detection of financial difficulties and bankruptcy of tourist companies is a priority (Battour and Ismail, 2016).



Source: Pew Research Center

Figure 1. Population Growth Projection Based on Religion, 2015-2060

Statistical data shows that the number of halal restaurants and sharia hotels in various countries is still limited even though the country has a Muslim majority community. In addition, there is a lack of understanding of human resources in the halal restaurant and sharia hotel industry regarding the urgency of maintaining the financial stability of halal tourism companies. El-Gohury, 2016; Mohsin et al., 2016; Han et al., 2018 state that this impacts the lack of early detection of the financial difficulties of halal tourism companies , especially during the covid pandemic. Therefore, it is necessary to educate about the financial stability of halal restaurant companies and sharia hotels and audit halal restaurant companies and sharia hotels so that this can be an

opportunity for academics (colleges and researchers) as well as study centers that focus on handling industrial health and halal restaurant companies and sharia hotels to conduct training and supervision.

In addition, we are observing the standardization of financial health needed in halal tourism companies and the existence of mandatory halal certification in restaurants, hotels, and others. The challenge in managing a halal tourism company is the consistency of revenue as the primary support for the company's operations and attracting domestic and foreign investors to strengthen the capital of halal tourism companies. In terms of marketing, it must also be intensified to influence Muslim tourists to visit tourism by paying attention to the attributes offered in advertisements so that the goal is to increase the profitability of tourism companies (Battour et al., 2011; Battour and Ismail, 2016).

CONCLUSION

This study aims to analyze differences in the level of accuracy and error in the Altman, Zmijewski, and Springate models in predicting financial distress. The sample used is quarterly reports from 1-4 companies listed in the halal hotel, restaurant & tourism sub sector list for the 2020-2021 period. The sample was taken based on the topic raised, namely the period in which the covid-19 pandemic occurred.

Financial distress that occurs is not only triggered by the company's internal conditions, but the company's external conditions can also affect the company's financial condition. To prevent financial difficulties, companies can implement an early warning system or early prevention efforts as one of the predictive steps for a crisis. The results of the analysis of the three prediction models in this study are a form of early warning system for the company. Although the prediction results are only an indicator and not absolute, this early warning system is expected to be a sign for the company about the potential for bankruptcy. The three models used, namely Altman, Zmijewski, and Springate, have different accuracy values, where Altman is the model with the highest accuracy value, followed by Springate and Zmijewski in the last rank. The difference in the accuracy value automatically supports the hypothesis in this study.

Based on the calculation results of the Altman model, companies that are in the red zone or experiencing financial distress are companies with codes CLAY, DFAM, IKAI, MAPB, PANR, PDES, PJAA, and SOTS. Meanwhile, companies in the red zone according to the results of Zmijewski's calculations are companies with the DFAM code. The Springate results show that companies in the red zone are ARTA, BAYU, CLAY, DFAM, ICON, FAST, IKAI, INPP, JIHD, JSPT, KPIG, MAPB, PANR, PDES, PJAA, PSKT, PZZA, SHID, and SOTS. The results of this calculation need to be considered by related companies to be aware of their financial condition.

The contribution of this research is that it can practically assist company management in understanding financial distress analysis and help investors, both individual and institutional investors, to see the potential for company bankruptcy as a consideration in investing. Meanwhile, the limitations of this study lie in the short research year, the use of three models of calculating financial distress, and the research object that only focuses on one subsector.

REFERENCES

Alfiyanti, M. H., Damayanti, C. R., & Nurlaily, F. (2020). Analisis Financial Distress Dengan Menggunakan Metode Altman Z-Score dan Springate S-Score (Studi pada Emiten Sektor Industri Barang Konsumsi Sub Sektor Food & Beverages yang Terdaftar di Bursa Efek Indonesia Tahun 2014-2018). *Jurnal Administrasi Bisnis (JAB)*, *78*(1), 76–85.

Andriani, F., & Sihombing, P. (2021). Comparative Analysis of Bankruption Prediction Models in Property and Real Estate Sector Companies Listed on the IDX 2017 - 2019. *European Journal of Business and Management Research*, *6*(1), 170–173.

Arini, S. A., Samrotun, Y. C., & Masitoh, E. (2021). Determinant of Financial Ratio Analysis to Financial Distress. *Jambura Science of Management*, *3*(1), 26–35. https://doi.org/10.37479/jsm.v3i1.6962

Ashraf, S., G. S. Félix, E., & Serrasqueiro, Z. (2019). Do Traditional Financial Distress Prediction Models Predict the Early Warning Signs of Financial Distress? *Journal of Risk and Financial Management*, *12*(2), 55. https://doi.org/10.3390/jrfm12020055

Astuti, E., Sahroni, S., & Wardani, A. (2021). *A Comparative Analysis of Financial Distress at PT. Semen Baturaja Tbk. and PT. Semen Indonesia Tbk. from the Period Year of 2012 - 2018*. https://doi.org/10.4108/eai.17-7-2020.2303090

Boubaker, S., Cellier, A., Manita, R., & Saeed, A. (2020). Does corporate social responsibility reduce financial distress risk? *Economic Modelling*, *91*, 835–851. https://doi.org/10.1016/j.econmod.2020.05.012

Curry, K., & Banjarnahor, E. (2018). Financial Distress Pada Perusahaan Sektor Properti Go. *Seminar Nasional Pakar Ke 1*, 207–221.

Elvama, A., Fitriadi, A., Nasyaroeka, J., & Oktarina, K. (2021). *Model Analisis Altman, Springate, Grover, Ohlson & Zmijewski Sebagai Early Warning System Terhadap Prediksi Financial Distress*. *11*(1).

Fadrul, F., & Ridawati, R. (2020). Analysis of Method Used to Predict Financial Distress Potential in Pulp and Paper Companies of Indonesia. *International Journal of Economics Development Research (IJEDR)*, *1*(1), 57–69. https://doi.org/10.37385/ijedr.v1i1.29

Greenwood, R., Iverson, B., & Thesmar, D. (2020). Sizing Up Corporate Restructuring in the COVID crisis. *Brookings Papers on Economic Activity*, *September*, 1–48.

Gunawan, B., & Putra, H. C. (2021). Determinant of Financial Distress (Empirical Study of Manufacturing Companies Listed on the Indonesia Stock Exchange and Malaysia Stock Exchange Period 2017-2018). *Advances in Engineering Research*, *201*(ICoSIAMS 2020), 113–120.

Gunawan, R. A. (2020). Hubungan Antara Pandemi Covid-19 Dan Harga Saham Perusahaan Sub Sektor Halal hotel, Restoran Dan Pariwisata yang Terdaftar di BEI. *Prosiding Working Papers Series in Management*, *12*(2), 55–70.

Gupita, N., Soemoedipiro, S. W., & Soebroto, N. W. (2020). Analisis Perbandingan Model Altman Z-score, Springate, Zmijewski dan Grover dalam Memprediksi Financial Distress(Studi pada Perusahaan Sektor Infrastruktur yang Terdaftar di BEI Periode 2015-2019). *Jurnal Aktual Akuntansi Keuangan Bisnis Terapan*, *3*(1), 145–162.

Hertina, D., & Kusmayadi, D. (2020). Comparative Analysis Of The Altman, Springate, Grover, And Zmijewski Models As Predicting Financial Distress. *Journal Of Archaeology of Egypt*, *17*(5), 552–561.

Lesáková, Ľ., Gundová, P., & Vinczeová, I. (2020). The practice of use of models predicting financial distress in Slovak companies. *Journal of Eastern European and Central Asian Research*, *7*(1), 123–136. https://doi.org/10.15549/jeecar.v7i1.369

M. Noor Salim, & Ismudjoko, D. (2021). An Analysis of Financial Distress Accuracy Models in Indonesia Coal Mining Industry: An Altman, Springate, Zmijewski, Ohlson and Grover Approaches. *Journal of Economics, Finance and Accounting Studies*, *3*(2), 01–12. https://doi.org/10.32996/jefas.2021.3.2.1

Manalu, S., Octavianus, R. J. N., & Kalmadara, G. S. S. (2017). Financial Distress Analysis With Altman Z-Score Approach and Zmijewski X-Score on Shipping Service Company. *Jurnal Aplikasi Manajemen*, *15*(4), 677–682. https://doi.org/10.21776/ub.jam.2017.015.04.15

Nakamura, T. M. (2021). *Analisis Financial Distress Saat Krisis Keuangan Global : Studi Empiris Pada Bumn Non Keuangan*. *2*(2), 80–91.

Rasool, N., Sohail, M., Usman, M., & Hussain, M. M. (2020). Financial Distress and Forewarning Bankruptcy: An Empirical Analysis of Textile Sector in Pakistan. *Review of Applied Management and Social Sciences*, *3*(3), 493–506. https://doi.org/10.47067/ramss.v3i3.92

Sandi, R. K., & Rahmah, A. H. (2020). Studi Prediksi Financial Distress Menggunakan The Zmijewski Model, The Altman Model, dan The Springate Model (Studi Kasus: Laporan Keuangan PT Hero Supermarket Tbk yang Terdaftar di BEI Periode 2012-2018). *Borneo Student Research, Vol. 2, No. 1, 2020*, *2*(1), 672–680.

Sari, E. R., & Yulianto, M. R. (2018). Akurasi Pengukuran Financial Distress Menggunakan Metode Springate dan Zmijewski pada Perusahaan Property dan Real Estate di Bursa Efek Indonesia Periode 2013-2015. *Jurnal Manajemen Dan Bisnis Indonesia*, *5*(2), 276–285. https://doi.org/10.31843/jmbi.v5i2.167

Setyawan, A. R. (2020). *Early Warning System Dan Krisis Keuangan Sistemik Pada Perekonomian Di In Donesia (Pendekatan Logit) Periode 1990-2019*. 1–10.

Shanmugavel, K. and, & Muruganandam, S. . (2021). a Study on Financial Statement Analysis of Titan Company Limited. *EPRA International Journal of Research and Development (IJRD)*, *6*(4), 296–303.

Sidik, N. D., & Indah, N. P. (2021). Analisis Financial Distress Pada Perusahaan Sub Sektor Rokok Yang Terdaftar Di Bursa Efek Indonesia (Bei) Periode Tahun 2015-2018, JIMEA | Jurnal Ilmiah MEA (Manajemen , Ekonomi , dan Akuntansi). *Jurnal Ilmiah MEA (Manajemen, Ekonomi Dan Akuntansi)*, *5*(1), 614–624.

Silaen, M. F., Butarbutar, M., & Nainggolan, C. D. (2020). Analisis Perbandingan Financial Distress Metode Altman dan Springate Sebagai Peringatan Dini Kesulitan Keuangan. *Jurnal Penelitian Ilmu Manajemen (JPIM)*, *5*(2), 138–148.

Thorik, S. H. (2020). Efektivitas Pembatasan Sosial Berskala Besar Di Indonesia Dalam Penanggulangan Pandemi Covid-19. *Jurnal Adalah : Buletin Hukum Dan Keadilan*, *4*(1), 115–120.

Wulandari, E. Y., & Maslichah. (2021). Penggunaan Model Springate, Ohlson, Altman Z-Score, dan Grover Score Untuk Memprediksi Financial Distress pada Masa Pandemi COVID-19 (Studi pada Perusahaan Manufaktur yang Terdaftar di Bursa Efek Indonesia). *E-Jra*, *10*(05), 90–103. http://riset.unisma.ac.id/index.php/jra/article/view/10620