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ASSESSING FINANCIAL DISTRESS OF AIRLINE COMPANIES IN INDONESIA

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Abstract

The airline industry in Indonesia has experienced significant financial stress during the COVID-19 pandemic, with many companies facing the risk of Financial Distress that could lead to bankruptcy. This study aims to analyze the financial health of airlines listed on the Indonesia Stock Exchange in the 2019-2023 period, using three Financial Distress prediction models: Altman Z-Score, Grover (G-Score), and Zmijewski (X-Score). These three models assess financial conditions based on aspects of liquidity, profitability, and solvency to provide a comprehensive picture of the company's level of financial health in the face of post-pandemic economic challenges. This study uses airline financial statement data to calculate the scores of each model. The results of the analysis show that there is significant variation in each model's ability to identify Financial Distress, with some airlines showing signs of recovery while others are still struggling to survive. The study also uncovered key factors affecting airlines' financial sustainability, including regulatory policy changes, operational strategy adjustments, as well as to post-pandemic shifts in consumer preferences. By providing in-depth insight into the financial condition of the airline industry, this study contributes to company management in designing risk mitigation strategies, as well as to investors and policymakers in making data-driven decisions. The results of this study are expected to serve as a reference in improving the financial resilience of the Indonesian airline industry in the future.

Keywords: Financial Distress, Airline Industry, Altman Z-Score, Grover, Zmijewski

INTRODUCTION

Starting in early 2020, the COVID-19 pandemic has shaken the world and has significantly affected all sectors of the global economy, with the airline industry being one of the hardest hit. According to information from the International Air Transport Association (IATA), the global airline industry experienced a 65.9% decline in revenue in 2020 compared to the previous year (IATA, 2021). In Indonesia, the Statistics of Indonesia (BPS) recorded a 58.9% decrease in the number of domestic airplane passengers in 2020 compared to 2019. (Statistics Indonesia, 2021).

In the 2020 period, PT AirAsia Indonesia Tbk. experienced a severe decline in revenue due to the Covid-19 pandemic, recording a revenue of only Rp1.61 trillion, down 75.99% from Rp6.7 trillion in 2019. Although operating expenses remained high at IDR4.41 trillion, the company made a loss of IDR2.8 trillion, in contrast to the profit of IDR113.94 million earned in the previous year. (Rinaldy, 2021). Entering the third quarter of 2023, Indonesia AirAsia showed signs of recovery with revenue increasing 97% to IDR4.9 trillion compared to IDR2.5 trillion in 2019. This growth was supported by an increase in passenger numbers to 4.5 million and operational expansion with 23 aircraft and 35 flight routes. In addition, the company managed to improve EBITDA from a loss of Rp718 billion to a loss of Rp30 billion, and launched various new initiatives to strengthen their position in the domestic and international airline market. (Air Asia, 2023).

These conditions result in severe financial pressures on airline companies and increase the risk of financial distress. Financial Distress is a situation where a company is experiencing financial difficulties that can lead to bankruptcy if not handled properly (Altman & Hotchkiss, 2006). The period 2022-2023 is a crucial time span to observe, because it includes the post-COVID recovery phase. According to Sunarji et al. (2022), by mid-2022, Indonesia's airline sector began to show signs of recovery, but had not yet returned to pre-pandemic levels. Airlines will have to adjust to changes

in consumer, regulatory, and operational behavior during the post-pandemic recovery, which will be long and uncertain. However, this recovery has been uneven among all airline companies, with some airlines still struggling to recover their financial position.

Financial Distress analysis becomes very important in this context, not only to assess the financial health of the company, but it is also important to anticipate potential bankruptcy and assist in strategic decision-making. Three models of Financial Distress testing have been developed by researchers, including the Altman Z-Score, Grover (G-Score), and Zmijewski (X-Score) models. Therefore, the application of these models can provide a more comprehensive and accurate picture of the company's financial condition. Financial Distress testing also plays an important role in corporate management decisions, investment decisions for investors, credit decisions for creditors, credit ratings of bank customers, and others.

LITERATURE REVIEW

Signaling Theory

In 1973, Michael Spence proposed signaling theory for the first time. According to Spence (1973), Signaling Theory is defined as the process by which information owners provide information to recipients so that they can make decisions. People who receive information will then change their activities based on how they understand the signal. Signaling theory is very important in the analysis of financial crises, especially in terms of how firms communicate their financial condition to shareholders, creditors, and other stakeholders. Companies often use a variety of actions and policies to send signals to the market about their future performance and viability when facing a financial crisis. These signals can indicate the potential risk of financial problems and influence investment decisions. Therefore, it is critical to manage signals carefully. Incorrect or misinterpreted signals can make things worse and lose investor confidence, which can accelerate financial problems.

Financial Distress

According to Octavera & Syafel (2022), the deteriorating financial condition of a company before bankruptcy or liquidation is called Financial Distress. This condition can disrupt operations; companies must pay attention and anticipate it. According to Fahma (2020), Financial Distress is a state of financial difficulty in which the financial performance of an organization decreases, which is characterized by a decrease in operating income and the inability to pay current and long-term liabilities, known as Financial Distress.

Ashraf et al. (2019) found that companies fail to pay under one of the following four conditions :

(i) not paying dividends or bonuses for five consecutive years;
(ii) not holding a General Meeting of Shareholders for three consecutive years; or
(iii) not paying annual registration fees for 2 consecutive years.

Altman Z-Score Model

The Altman Z-Score model is one of the most well-known models for analyzing corporate financial distress or financial stress. Altman Z-Score is a bankruptcy prediction model developed by Edward Altman, according to Brigham and Weston (2005). According to Farooq et al. (2021), Z-Score is a discriminant used to predict the bankruptcy of a company, a higher Z-Score is associated with the possibility of Financial Distress. Edward I. Altman changed the formula of the Altman model in 1983, and he made changes once again in 1995. The Modified Z-Score is intended for non-manufacturing companies, such as airlines. So, the modified Altman Z-Score model equation is as follows (Yuliana, 2018):

Z"=6,56 X1+3,26 X2+6,72 X3+1,05 X4

Explanation :

Z” : Index Bankruptcy

X1 : Working Capital / Total Assets

X2 : Retained Earnings / Total Assets
X3 : Earnings Before Interest and Taxes / Total Assets
X4 : Market Value to Equity / Book Value to Total Liabilities

Description :
Net Working Capital : Current Assets - Current Liabilities
Market Value to Equity : Share Price x Number of Shares in Circulation

Table 1. Calculation Results of the Altman Z-Score Model

Result	Description
Z" > 2.60	Safe Zone
1.10 < Z" < 2.60	Gray Zone
Z" < 1.10	Distress Zone

Grover Model (G-Score)

The Altman Z-Score financial distress analysis model created by Altman in 1968 was further developed by Jeffrey S. Grover. Initially, Grover modified and re-evaluated the Altman Z-Score model, adding 13 new financial ratios. However, in 2001, he limited the number of financial ratios used in the bankruptcy prediction model. In addition, the weighted weight of each ratio was changed, with cutoff values of 0.01 and -0.02. Companies with a G-Score greater than or equal to 0.01 are predicted not to go bankrupt. Conversely, companies with a G-Score lower or equal to -0.02 are predicted to go bankrupt. (Irfani, 2020). Assuming the company has complete data related to its financial statements, the model developed by Grover can be used to analyze business health. G-Score is intended for non-manufacturing companies, such as airline. The Grover model equation is as follows:

G=1,650 X1+3,404 X2+0,016 X3+0,057

Explanation :
G = Index Bankruptcy
X1 = Working Capital / Total Assets
X2 = Earnings Before Interest and Taxes / Total Assets
X3 = Net Income / Total Assets

Table 2 Grover Model Calculation Results (G-Score)

Result	Description
G ≥ 0.01	Safe Zone
-0.02 < G < 0.01	Gray Zone
G ≤ 1.10	Distress Zone

Zmijewski Model (X-Score)

The Zmijewski model, developed by Mark E. Zmijewski in 1984. The Zmijewski bankruptcy method uses financial ratios to predict financial problems. These ratios measure a company's performance, leverage, and liquidity. The lower the X-Score value of a company, the less likely the company will go bankrupt. According to the assessment criteria of the Zmijewski method, the

company is declared healthy if Z < 0 which means it is in the non-bankrupt zone, Z = 0 which means it is in the gray zone, and Z > 0 which means it is in the bankrupt zone. Z-Score is intended for non-manufacturing companies, such as airlines. According to Yoseph (2011), the following formula was used in this study:

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

Explanation :

X = Index Bankruptcy
X1 = Profit After Tax / Total Asset Total Assets
X2 = Total Liabilities / Total Assets
X3 = Current Assets / Current Liabilities

Table 3. Zmijewski Model Calculation Results (X-Score)

Result	Description
X < 0	Safe Zone
X = 0	Gray Zone
X > 0	Distress Zone

RESEARCH METHODS

This study uses descriptive quantitative research. The research subjects used in this study are Airline Industry Companies listed on the Indonesia Stock Exchange (IDX) in 2019 to 2023. While the object of this research is the financial reports of Airline Industry Companies in 2019 to 2023 listed on the official website of the Indonesia Stock Exchange, namely www.idx.co.id.

The sample of this study uses a purposive sampling technique, with the following criteria:

1. Airline companies listed on the IDX during the 2019–2023 period.
2. Companies that consistently published complete financial statements during the research period.
3. Companies that experienced the impact of the COVID-19 pandemic, as indicated by a decline in profit (loss).
4. Companies whose financial statements include complete data required for the financial distress prediction models.

Based on these criteria, the selected sample includes three companies: Air Asia Indonesia Tbk (CMPP), Garuda Indonesia Tbk (GIAA), and Jaya Trishindo Tbk (HELI). The type of data in this study is using secondary data from the company's financial reports. The secondary data used are financial reports sourced from the company's official website and the Indonesia Stock Exchange www.idx.id.

This study collects data through a documentary study. Documentation study is a method of collecting data to study data related to research problems, namely financial statements and profit and loss statements for the period 2019 to 2023. This study uses a descriptive testing method, namely Altman Z-Score, Grover (G-Score), and Zmijewski (X-Score) which predict financial difficulties in the company and draw conclusions.

RESULTS AND DISCUSSION

The following are the results of the Financial Distress analysis of Indonesian airline sector companies listed on the Indonesia Stock Exchange (IDX) for the period 2019 to 2023, namely, PT Air Asia Indonesia Tbk (CMPP), PT Garuda Indonesia Tbk (GIAA), and PT Jaya Trishindo Tbk (HELI) using the Altman Z-Score, Zmijewski (X-Score) and Grover (G-Score) methods.

1. Altman Z-Score Method

The following are the results of the Financial Distress analysis using the Altman Z-Score method:

Table 4. Results of Financial Distress Analysis Using the Altman Z-Score

No	Company	Code	Year	Z-Score	Description
1	PT. Air Asia Indonesia, Tbk	CPP	2019	-9,81	Distress Zone
			2020	-13,29	Distress Zone
			2021	-17,90	Distress Zone
			2022	-18,71	Distress Zone
			2023	-17,54	Distress Zone
2	PT. Garuda Indonesia, Tbk	GIAA	2019	-3,66	Distress Zone
			2020	-4,83	Distress Zone
			2021	-12,55	Distress Zone
			2022	1,57	Grey Zone
			2023	-1,87	Distress Zone
3	PT. Jaya Trishindo, Tbk	HELI	2019	5,52	Safe Zone
			2020	1,82	Grey Zone
			2021	2,51	Grey Zone
			2022	-3,33	Distress Zone
			2023	-1,45	Distress Zone

Based on the results of the Financial Distress analysis using the Altman Z-Score method on airline sector companies in Indonesia listed on the Indonesia Stock Exchange (IDX) for the period 2019 to 2023, it was found that PT Air Asia Indonesia Tbk consistently remained in the bankrupt zone ($Z < 1.10$) throughout the five-year period. This indicates that the company experienced persistent financial difficulties and was in a vulnerable financial condition year after year.

PT Garuda Indonesia Tbk also remained in the bankrupt zone ($Z < 1.10$) from 2019 to 2021, indicating continuous financial distress during that time. The company showed a brief improvement in 2022 by moving into the gray zone ($1.10 < Z < 2.60$), which suggests a moderate financial condition with potential risks. However, in 2023, PT Garuda Indonesia Tbk returned to the bankrupt zone, reflecting a setback in its financial recovery. PT Jaya Trishindo Tbk initially demonstrated a strong financial position, being in the non-bankrupt zone ($Z > 2.60$) in 2019. However, in 2020 and 2021, the company shifted into the gray zone ($1.10 < Z < 2.60$), indicating that while it was not in financial distress, it needed to be cautious. In 2022 and 2023, PT Jaya Trishindo Tbk fell into the bankrupt zone ($Z < 1.10$), showing a significant decline in its financial health.

Overall, the results of the Altman Z-Score analysis reflect the volatile nature of the Indonesian airline industry over the five-year period. While some companies managed to maintain or improve their financial health, others showed signs of prolonged or emerging distress. These trends are influenced by both internal financial management and external pressures, such as economic disruptions, industry competition, and the long-term impact of the COVID-19 pandemic.

Grover Method

The following are the results of the Financial Distress analysis using the Grover Method (G-Score) :

Table 5. Results of Financial Distress Analysis Using the Grover Method

No	Company	Code	Year	G-Score	Description
1	PT. Air Asia Indonesia, Tbk	CPP	2019	-0,68	Distress Zone
			2020	-2,97	Distress Zone
			2021	-3,30	Distress Zone
			2022	-3,20	Distress Zone

			2023	-2,76	Distress Zone
2	PT. Garuda Indonesia, Tbk	GIAA	2019	-0,78	Distress Zone
			2020	-1,34	Distress Zone
			2021	-3,35	Distress Zone
			2022	1,98	Safe Zone
			2023	0,05	Safe Zone
3	PT. Jaya Trishindo, Tbk	HELI	2019	0,85	Safe Zone
			2020	0,21	Safe Zone
			2021	0,13	Safe Zone
			2022	-1,67	Distress Zone
			2023	-,077	Distress Zone

Based on the results of the Financial Distress analysis using the Grover (G-Score) method on airline sector companies in Indonesia listed on the Indonesia Stock Exchange (IDX) for the period 2019 to 2023, it was found that PT Air Asia Indonesia Tbk consistently remained in the bankrupt zone (G ≤ -0.02) throughout the five-year period. This indicates that the company experienced ongoing financial difficulties.

PT Garuda Indonesia Tbk was also in the bankrupt zone from 2019 to 2021, but showed improvement by exiting the bankrupt zone and entering the non-bankrupt zone (G ≥ 0.01) starting in 2022 and continuing into 2023. This improvement reflects a significant recovery in the company's financial condition. Meanwhile, PT Jaya Trishindo Tbk was initially in a healthy financial condition (G ≥ 0.01) from 2019 to 2021. However, starting in 2022 until 2023, the company entered the bankrupt zone (G ≤ -0.02), indicating a decline in its financial performance and the emergence of potential financial distress.

Overall, the results of the analysis using the Grover method illustrate the fluctuating dynamics within the airline industry, where some companies have shown signs of recovery while others have experienced a downturn. These changes are closely related to external factors such as the COVID-19 pandemic, fuel price volatility, and the internal financial strategies adopted by each company.

Zmijewski Method (X-Score)

The following are the results of the Financial Distress analysis using the Zmijewski Method (X-Score) :

Table 6 Results of Financial Distress Analysis Using the Zmijewski Method

No	Company	Code	Year	X-Score	Description
1	PT. Air Asia Indonesia, Tbk	CPP	2019	1	Distress Zone
			2020	6	Distress Zone
			2021	9	Distress Zone
			2022	10	Distress Zone
			2023	10	Distress Zone
2	PT. Garuda Indonesia, Tbk	GIAA	2019	1	Distress Zone
			2020	3	Distress Zone
			2021	9	Distress Zone
			2022	0	Grey Zone
			2023	2	Distress Zone
3	PT. Jaya Trishindo, Tbk	HELI	2019	-3	Safe Zone
			2020	-1	Safe Zone
			2021	-1	Safe Zone

			2022	2	Distress Zone
			2023	0	Grey Zone

Based on the results of the Financial Distress analysis using the Zmijewski (X-Score) method on airline sector companies in Indonesia listed on the Indonesia Stock Exchange (IDX) for the period 2019 to 2023, it was found that PT Air Asia Indonesia Tbk consistently remained in the bankrupt zone (X > 0) throughout the five-year period. This indicates ongoing financial difficulties and persistent vulnerability in the company's financial condition.

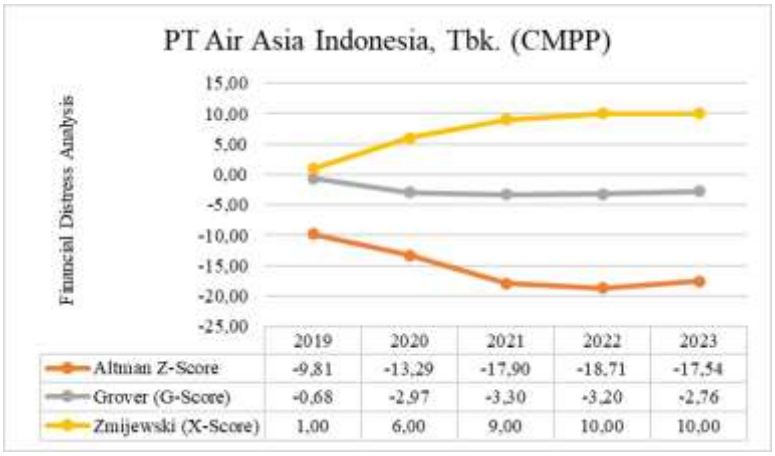
PT Garuda Indonesia Tbk was also in the bankrupt zone (X > 0) from 2019 to 2021, reflecting continuous financial distress during those years. In 2022, the company showed improvement by entering the gray zone (X = 0), which suggests a more stable but still fragile financial condition. However, in 2023, PT Garuda Indonesia Tbk returned to the bankrupt zone (X > 0), indicating a regression in its recovery process. PT Jaya Trishindo Tbk maintained a healthy financial condition from 2019 to 2021, as shown by its position in the non-bankrupt zone (X < 0). However, the company experienced a financial decline in 2022, entering the bankrupt zone (X > 0). In 2023, it transitioned to the gray zone (X = 0), which indicates a neutral position—neither financially distressed nor fully stable.

Overall, the results of the Zmijewski method analysis illustrate the fluctuating financial health of Indonesian airline companies during the 2019–2023 period. The shifts between bankrupt, gray, and non-bankrupt zones reflect the significant challenges faced by the industry in the aftermath of the COVID-19 pandemic. Factors such as volatile fuel prices, shifting government policies, and unpredictable passenger demand have greatly influenced the financial sustainability of airline companies in Indonesia.

Comparison the Result of Financial Distress Method

1. PT. Air Asia Indonesia Tbk. (CMPP)

Based on picture 1, it can be seen that the trend of the results of the calculation of Financial Distress of PT Air Asia Indonesia Tbk (CMPP) during the period 2019 to 2023 using three methods, namely Altman Z-Score, Grover (G-Score), and Zmijewski (X-Score). From 2019 to 2023, PT Air Asia Indonesia Tbk (CMPP) consistently experienced financial distress, as indicated by negative results from the Altman Z-Score, Grover G-Score, and Zmijewski X-Score methods. The company's financial condition deteriorated sharply during the COVID-19 pandemic due to a collapse in passenger traffic and persistently high operating costs, leading to declining financial ratios and increased debt. Although there were slight improvements in 2022–2023 through internal efforts such as debt restructuring, lease renegotiations, fleet reduction, and diversification into logistics and digital services, all three indicators still signaled financial instability. Despite receiving government support and a partial industry recovery, the company's financial health had not yet stabilized by the end of 2023, leaving its long-term viability dependent on the success of ongoing recovery strategies and broader improvements in the aviation sector.

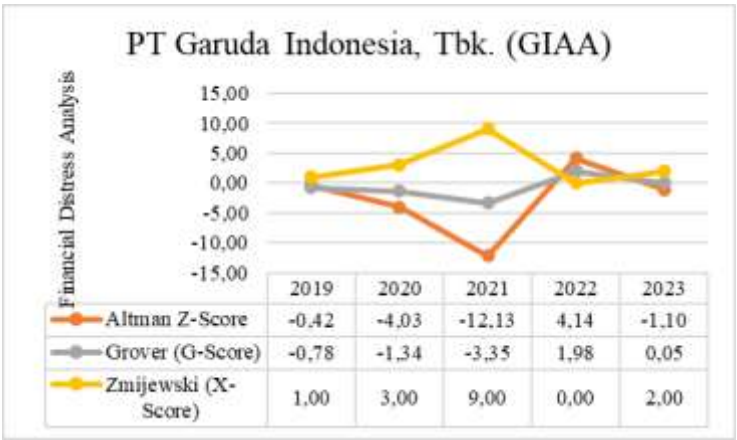


	2019	2020	2021	2022	2023
Altman Z-Score	-9,81	-13,29	-17,90	-18,71	-17,54
Grover (G-Score)	-0,68	-2,97	-3,30	-3,20	-2,76
Zmijewski (X-Score)	1,00	6,00	9,00	10,00	10,00

Figure 1. Financial Condition of PT. Air Asia Indonesia Tbk

2. PT. Garuda Indonesia Tbk. (GIAA)

Based on Graph 4.5, we can see the results of the Financial Distress analysis of PT Garuda Indonesia Tbk (GIAA) during the period from 2019 to 2023, the financial condition of PT Garuda Indonesia Tbk (GIAA) experienced significant fluctuations based on the analysis using the Altman Z-Score, Grover G-Score, and Zmijewski X-Score methods. The company had already shown signs of financial distress in 2019, which worsened in 2020–2021 due to the COVID-19 pandemic, resulting in a sharp decline in passenger numbers and revenue while operational costs remained high—leading to increased debt and accumulated deficits. In 2022, the company recorded a strong recovery through debt restructuring, operational efficiency, revenue diversification, digital transformation, and government support, reflected by a positive Z-Score and an X-Score of zero. However, in 2023, Garuda's financial performance declined again due to post-restructuring challenges, such as maturing debt obligations and rising operational costs. Although passenger numbers increased, profitability remained low amid intense industry competition. This indicates that the company's recovery is not yet stable and still requires a stronger long-term strategy focused on operational efficiency, revenue diversification, and effective debt management to achieve sustainable financial stability.



	2019	2020	2021	2022	2023
Altman Z-Score	-0,42	-4,03	-12,13	4,14	-1,10
Grover (G-Score)	-0,78	-1,34	-3,35	1,98	0,05
Zmijewski (X-Score)	1,00	3,00	9,00	0,00	2,00

Figure 2. Financial Condition of PT. Garuda Indonesia Tbk

3. PT. Jaya Trishindo Tbk. (HELI)

Based on Graph 4.6, we can see the results of the Financial Distress analysis of PT Jaya Trishindo Tbk (HELI) during the period 2019 to 2023 using the Altman Z-Score, Grover (G-Score), and Zmijewski (X-Score) methods. From 2019 to 2023, PT Jaya Trishindo Tbk (HELI) experienced significant fluctuations in its financial condition based on the Altman Z-Score, Grover G-Score,

and Zmijewski X-Score analyses. The company was financially healthy in 2019, but began showing signs of decline in 2020–2021, entering a critical phase of financial distress in 2022 marked by negative Z and G-Scores and a high X-Score, indicating a high bankruptcy risk. Although 2023 showed slight improvements, the company remained in financial distress. In response, PT Jaya Trishindo implemented various recovery strategies including operational efficiency, fleet and service diversification, and digital transformation. Moving forward, the company aims to stabilize its finances through market expansion, revenue diversification, technology-driven cost control, and debt restructuring to achieve long-term sustainable growth.

	2019	2020	2021	2022	2023
Altman Z-Score	5,52	1,82	2,51	-3,33	-1,45
Grover (G-Score)	0,85	0,21	0,13	-1,67	-0,77
Zmijewski (X-Score)	-3	-1	-1	2	0

Figure 3. Financial Condition of PT. Jaya Trishindo Tbk

CONCLUSION

The conclusion that can be given based on the results of this study is as follows based on the research findings, it can be concluded that most airline companies in Indonesia experienced financial distress during the 2019–2023 period. The Altman Z-Score method showed that no companies were in the safe zone in 2023, with PT AirAsia Indonesia Tbk and PT Garuda Indonesia Tbk consistently in the bankruptcy zone, while PT Jaya Trishindo Tbk showed more fluctuating results. The Grover (G-Score) method demonstrated better stability, with PT Jaya Trishindo Tbk remaining in the safe zone, although the other two companies consistently remained in the bankrupt zone. Meanwhile, according to the Zmijewski (X-Score) method, AirAsia and Garuda have been in the bankruptcy zone since 2022, while Jaya Trishindo was in the gray zone. These differences reflect the distinct analytical focuses of each method—Altman emphasizes profitability, Grover combines leverage, liquidity, and profitability, while Zmijewski focuses on the efficiency of asset utilization. The main contributing factor to financial distress, particularly for AirAsia and Garuda, is their consistently low ability to generate profits.

The suggestions that can be given based on the results of this study are as follows Based on the research findings, several recommendations can be made for both companies and external stakeholders. Companies are encouraged to maintain liquidity to ensure their ability to meet short-term obligations, especially when facing vulnerable financial conditions. Additionally, optimizing asset utilization through operational efficiency and business diversification is essential to increase revenue. Innovation also plays a crucial role in enhancing competitiveness, preserving the company's reputation, and maintaining consumer trust amidst the intense competition in the airline industry. This research can also serve as a reference for companies to assess their financial condition and

detect potential financial distress early, allowing them to take preventive measures. For investors, the findings provide valuable insight to support more informed investment decisions and minimize risk. Future research is recommended to extend the study period, incorporate additional financial distress analysis methods, and include other industry sectors to gain more comprehensive and relevant results.

BIBLIOGRAPHY

Alexander, D., Jorissen, A., Hoogendoorn, M. N., Kirwan, C., & Mourik, C. V. (2020). International Financial Reporting & Analysis (8th ed.). UK: Cengage Learning. ISBN:978-1-4737-6685-3

Altman, E. I., Hotchkiss, E., & Wang, W. (2019). Corporate Financial Distress, Restructuring, and Bankruptcy: Analyzing Finance with Leverage, Distressed Debt, and Bankruptcy (4th ed.). New Jersey: Wiley. ISBN 978-1-119-48181-2

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

Central Bureau of Statistics. (2021) Air Transportation Statistics 2020. Indonesia Central Bureau of Statistics.

Balasubramanian, S. A., S, R. G., P, S., & Natarajan, T. (2019). Modeling Corporate Financial Distress using financial and non-financial variables. The case of companies listed in India. International Journal of Law and Management, 61(3/4), 457-4884. https://doi.org/10.1108/IJLMA-04-2018-0078

Chandra, M.I., Suyanto, S., Widyastuti, T., & Ahmar, N,. THE BATTLE OF ALTMAN, SPRINGATE, ZMIJEWSKI AND GROVER MODELS TO PREDICT FINANCIAL DISTRESS OF SERVICE COMPANIES. Indonesian Journal of Social Technology, 2(7), 1183-1196.

Ciptawan, C., & Frandjaja, B.O. (2022). The Effect of Current Ratio and Gross Profit Margin on Financial Distress in Technology Sector Companies Listed on the Indonesia Stock Exchange for the 2016-2020 Period. Journal

Dubey, U. K. B., & Kothari, D. P. (2022). Research Methodology: Techniques and Trends (1st ed.). CRC Press, Taylor & Francis Group. ISBN: 9781315167138

Fahma, Y. T. (2020). Financial Distress Analysis with the Altman Z-Score Method, Zmijewski, Grover, Springate, Ohlson, Zavgren to Predict Bankruptcy in Retail Companies Listed on the IDX for the 2015-2018 Period. Malang: etheses.uin-malang.ac.id

Farooq, M., Noor, A., & Qureshi, S. F. (2021). The Impact of Corporate Social Responsibility on Financial Distress Empirical Evidence. Emerald Journal Vol. 18, Issue 4.

Farooq, M., Noor, A., Qureshi, S. F. & Bhutta, Z., M. (2021): Evidence from Emerging Markets. Emerald Journal Vol. 33, Issue 4.

Farooq, U., Qamar, M. A. J., & Haque, A. (2018). A three-stage dynamic model of Financial Distress. Managerial Finance, 44(9), 1101-1116. https://doi.org/10.1108/MF-07-2017-0244

Goh, T. S. (2023). MONOGRAF: FINANCIAL DIFFICULTIES. Sidoarjo: Indomedia Pustaka.

Grover, J., & Lavin, A. (2001). Financial ratios, discriminant analysis and corporate bankruptcy prediction: a service industry extension of Altman's Z-Score bankruptcy prediction model. Southern Finance Association Annual Meeting.

Hanafi, M. M., & Halim, A. (2018). Financial Statement Analysis. Yogyakarta: UPP STIM YKPN. ISBN: 978-602-1286-61-6

Hery (2018). Financial Statement Analysis: Integrated and Comprehensive Edition (3rd ed.). Jakarta: Gramedia Widiasarana Indonesia. ISBN: 978-602-375-540-0

Indriyanti, M. (2019). The Accuracy of the Financial Distress Prediction Model: Empirical Study on the 25 Largest Technology Companies in the World in 2015-2016 Forbes Version. ICEEBA: International Conference on Economics, Education, Business and Accounting. Accounting, KnE Social Sciences, pages 442-450. DOI 10.18502/kss.v3i11.4025

International Air Transport Association. (2021). Financial Impact of COVID-19 on Airline. IATA.

Irawan, J. L. (2023). Advanced Corporate Financial Management. Banten: Sada Kurnia Pustaka. ISBN: 978-623-09-1940-4

Irfani, A. S. (2020). FINANCIAL AND BUSINESS MANAGEMENT; Theory and Application. Jakarta: Gramedia Pustaka Utama. https://www.google.co.id/books/edition/MANAJEMEN_KEUANGAN_DAN_BISNIS_Theory_and/qln8DwAAQBAJ?hl=id&gbpv=1&dq=Management+of+Finance+and+Business:+Theory+and+Application&printsec=facepage

Kisman, Z., & Krisandi, D. (2019). How to Predict Financial Distress in the Wholesale Sector: Lessons from the Indonesia Stock Exchange. Journal of Economics and Business, 2(3), 569-585. 10.31014/aior.1992.02.03.109

Kristanti, F. T. (2019). Financial Distress Theory and Its Development in the Indonesian Context (1st ed.). Malang: Inteligensia Media. ISBN: 978-623-7374-15-2

Lessambo, F. I. (2022). Financial Reporting: Analysis, Reporting, and Valuation (2nd ed.). Switzerland: Springer International https://doi.org/10.1007/978-3-031-15663-2 Publishing.

Liew, K. F., Lam, W. S., & Lam, W. H. (2023). Financial Distress Analysis of Technology Companies Using the Grover Model. Proceeding Paper: Computer Science & Mathematics, 7(1), 6. https://doi.org/10.3390/IOCMA2023- 14405

Business Market. (June 4, 2021). Air Asia Indonesia (CMPP) Financial Performance Crashes Due to Pandemic. Jakarta, Indonesia. https://market.bisnis.com/read/20210604/192/1401560/hancurnya-kinerja-keuangan-airasia-indonesia-cmpp-akibat-pandemi

Melville, A. (2022). International Financial Reporting (8th ed.). UK: Pearson Education. ISBN: 978-1-292-43944-0

Nawirah, Permatasari, D., & Wahidah, M. (2022). FINANCIAL DISTRESS ANALYSIS IN BANKING: WHICH METHOD IS THE MOST ACCURATE? Proceedings of the International Conference on Islamic Economics and Business, 8(1), 231-244.

Air Asia Newsroom (November 16, 2023). Indonesia Air Asia Achieves Positive Performance After Pandemic Recovery, Indonesia's Airline Industry Starts to Recover in 2023. Jakarta, Indonesia. https://market.bisnis.com/read/20210604/192/1401560/hancurnya-kinerja-keuangan-airasia-indonesia-cmpp-akibat-pandemi

Octavera, S., & Syafel, A. (2022). analysis of Financial Distress Prediction Accuracy. Dharma Andalas Journal of Economics and Business, 24(1), 194-204.

Pakdaman, H. (2018). Investigation of the Ability of Altman and Grover Models in Predicting Bankruptcy of Companies Listed on the Tehran Stock Exchange. Dutch Journal of Finance and Management, 2(2), 51.

Patunrui, K. I. A., & Yati, S. (2017). Analysis of Financial Distress Assessment Using the Altman Model (Z-Score) in Pharmaceutical Companies Listed on the Indonesia Stock Exchange for the Period 2013-2015. Journal of Accounting, Economics and Business Management, 5(1), 55-71. https://doi.org/10.30871/jaemb.v5i1.275

Pramesti, A. W., & Yuniningsih, Y. (2023). Comparative Analysis of the Accuracy Level of the Zmijewski, Springate, and Grover Models to Predict Financial Distress. Journal of Humanities and Social Science Research, 7(6), 164-172.

Pribadi, K. A., & Sampurno, R. D. (2012). Analysis of the effect of cash position, firm size, growth opportunity, ownership, and return on assets on dividend payout ratio. Diponegoro Journal of Management, 1(1), 201-211.

Septarini, D. F., & Bulan, S. H. (2022). Financial Distress Prediction on Property and Real Estate in Indonesia. International Journal of Current Science Research and Review (IJCSRR), V(7), 2765-2774.

Spence, M. (1973). Job Market Signalling. The Quartely Journal of Economics, LXXXVII(3), 355-374.

Sunarji, A., Sufyati, S., & Kurniawan, A. (2022). Analysis of the financial performance of airline companies listed on the IDX during the COVID-19 pandemic. Journal of Applied Managerial Accounting, 6(1), 27-40.

Susilowati, Y., Puspitasari, E., Basukiyanto, & Fauziyah, N. A. (2020). Determinants of Financial Distress: An Empirical Investigation of Indonesian Companies. UJI Engineering & Management, LXXXIII, 9237- 9250.

Verlekar, R. P., & Kamat, M. S. (2019). Recalibration and Application of Springate, Zmijewski and Grover Bankruptcy Models in Indian Banking Sector. International Journal of Business Analytics and Intelligence, 7(2), 19-27.

Wahyuni, S. F., & Rubiyah. (2021). Financial Distress Analysis Using the Altman Z-Score, Springate, Zmijeski and Grover Methods in Plantation Sector Companies Listed on the Indonesia Stock Exchange. Scientific Journal of Master of Management: MANEGGIO, IV (1).

Wulandari, N. D., & Aprilia, W. K. (2023). Potential Bankruptcy of Digital Companies in Indonesia; Analysis of Market Aspects and Financial Aspects Using the Springate and Grover Methods. Review of Economics, Business, Accounting & Society, 2(1), 20-32.

Yolanda, R., & Mulyana, R. A. (2023). DETERMINANTS OF FINANCIAL DISTRESS IN MANUFACTURING COMPANIES IN INDONESIA. E-Journal of TSM Accounting, III(1), 217-228.

Yoseph, & Peter. (2011). Bankruptcy Analysis with the Altman Z-Score, Springate, and Zmijewski Methods at PT.Indofood Sukses Makmur Tbk for the 2005-2009 Period. Accurate Accounting Scientific Journal, 2 (04).

Yuliana, I. (2018). Prediction of company bankruptcy from financial aspects with various models. Malang: UIN-Maliki Press.

Zmijewski, M. E. (1984). Methodological issues related to the estimation of Financial Distress prediction models. Journal of Accounting Research, 22, 59-82