

Financial distress predictions with Altman, Springate, Zmijewski, Taffler and Grover models

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ABSTRACT

Several models have been developed to predict financial difficulties and corporate bankruptcy. In this research various models were employed, including the Altman model (referred to as the Z-Score), the Springate model (known as the S-Score), the Zmijewski model (designated as the X-Score), and the Grover model (referred to as the G-Score). These techniques serve the purpose of evaluating the likelihood of encountering financial difficulties, which in turn determines the probability of PT Garuda Indonesia (Persero) Tbk going bankrupt. The study utilized secondary data sourced from financial statements spanning the years from 2020 to 2022. The application of the Altman model for bankruptcy prediction revealed that PT Garuda Indonesia (Persero), Tbk experienced financial distress throughout the period from 2020 to 2022. According to the Springate model, the company was in a state of distress and declared bankruptcy in 2020 and 2022, while 2021 fell into a grey area. The Zmijewski model indicated that the company was on the brink of bankruptcy, with financial difficulties and a potential risk of bankruptcy within the next three years. Grover's model predicted bankruptcy for the company in 2020 and 2022, but indicated safety in 2021. Notably, the Taffler model emerged as the most accurate in forecasting bankruptcy, boasting a 100% accuracy rate with no errors. Meanwhile, the Zmijewski model achieved an 81.25% accuracy rate with an error rate of 18.75%, and the Springate model exhibited the lowest accuracy in bankruptcy prediction, scoring only 12.50% accuracy with an error rate of 87.50%.

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1. Introduction

The company's short-term goal is to maximize current profits, while its long-term goal is to increase the company's value (Setiawati, 2018). If the company's goals do not run smoothly and are not well coordinated, the financial sector will suffer. Due to financial difficulties, some companies operating within a specific time period are forced to fail to fulfil their obligations or be liquidated (Permana et al., 2017). Bankruptcy is an issue that may occur within a business when the company struggles to sustain the consistency of its operational performance. Bankruptcy is a condition in which a company lacks sufficient funds to operate (YunaWinaya et al., 2020). In most cases, the initial process of bankruptcy in a business occurs when financial performance declines or when financial difficulties arise. Some indicators of financial difficulties in the company that can be observed by an external party include a decrease in the amount of dividends distributed to shareholders for several consecutive periods (Martini, Omega, & Faridah, 2020). Financial failure refers to a situation in which a company is encountering financial hardships, In both monetary terms and with regards to operational funds. Companies that face long-term financial difficulties are more likely to go bankrupt. The impact of bankruptcy is the cessation of activities carried out by the company, resulting in the company not obtaining business profits. Insolvency may

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result in the company's closure or liquidation (Bahri, 2015). Insolvency also has an impact on the company's losses as a result of default or claim costs from parties who still have rights to the company. The company must pay close attention to its condition and performance in order to survive and grow. A proper analysis is also required to know exactly how the company's condition and performance are. Pt. Garuda Indonesia is an Indonesian state-owned airline with the Full-Service Airlines concept. PT. Garuda Indonesia's profit data has decreased, and the company has even suffered losses, according to its financial statements. From 2015 to 2019, the company's total assets increased year after year, while its debt increased. The company's total debt exceeds its total equity, indicating that the majority of management activities are financed through debt. Under no circumstances should the company's debt exceed the amount of its own capital, or in other words, the guaranteed capital (debt) should be greater than the capital that serves as its collateral (own capital) (Wangsawinangun, 2014).

Garuda Indonesia is one of the world's largest national airline icons and the only state-owned airline that still exists in the air transportation sector today, despite the fact that pt Garuda Indonesia (Persero) Tbk's shares experienced a drop in support some time ago. Losses in the first and third quarters of 2019 totalled US\$ 99.1 million and US\$ 221.9 million, respectively, or approximately Rp. 3 trillion (Embu, 2018). Due to intense competition in the aviation industry, several other private airlines have closed due to inability to compete and poor financial performance. PT Garuda Indonesia had total corporate debt of USD 3.46 billion in 2018, an increase from total debt of USD 2.83 billion in 2017. PT Garuda Indonesia settled its 'avtur' debt with Pertamina for IDR 2 trillion (Rahma, 2020). If the income is slightly higher, the large debt will make it difficult for the company to pay the interest expense.

The reality on the ground at PT. Garuda Indonesia is that profits decline year after year. PT. Garuda Indonesia (Persero) Tbk earned a net profit of Rp 1.06 trillion in 2017. The following year, PT. Garuda Indonesia earned a net profit of approximately Rp 125.9 billion. This revenue was 88% lower than the net profit in 2017. Then, in 2019, PT. Garuda Indonesia suffered a Rp 2.2 trillion loss. Then, in 2020, PT. Garuda Indonesia lost another Rp 2.4 trillion. According to what "Garuda Indonesia" wrote, the decrease in net profit of PT. Garuda Indonesia is caused by an increase in total expenses, which include an increase in fuel costs, extraordinary costs, and legal fines. The total expenditure increased by 13% from Rp 49.95 trillion to Rp 57.375 trillion in the second financial news. The most significant increase was in fuel prices, which increased by 25% from Rp 12.4 trillion to Rp 15.5 trillion (Sugianto, 2018). The increase in spending was caused by an increase in fuel prices as well as an increase in aircraft production, which resulted in an increase in fuel volume. Furthermore, Garuda Indonesia had to incur Rp 1.96 trillion in extraordinary costs in 2019, including tax amnesty payments and legal fines in Australian courts. In 2020, the business landscape, especially in Indonesia, faced significant challenges as a result of the emergence of a highly contagious and perilous novel virus called SARS-CoV-2, commonly known as Covid-19 (Pratiwi, 2022).

The Covid-19 pandemic has affected every facet of the economy, with a notable impact on revenue generated by the aviation industry. This impact has been especially significant due to the industry's contraction during the pandemic and the implementation of PSBB regulations, which have restricted people's ability to travel by air (Pratiwi, 2022). Evidently, income within the aviation sector has declined by over IDR 200 billion. The combination of limited air travel options and the closure of various tourist destinations in Indonesia has prevented both domestic and international tourists from visiting the country (Pratiwi, 2022). Furthermore, Garuda Indonesia has many different types of aircraft, making management ineffective in managing them, and the aircraft rental prices set by the lessor are quite high (Ramalan, 2021). Garuda Indonesia currently operates 142 aircraft, including the Boeing 777-300ER, Boeing 737-800NG, Airbus A330-200, A330-300, A330-900neo, and ATR 72-600. Our fleet's average age as of September 30, 2018 was 6.62 years (Garuda Indonesia, 2022). This assumption is based on the performance of Garuda, which has begun to deteriorate since the passenger rate dropped dramatically during the Covid-19 pandemic. Some of the 36 lessors who became Garuda's partners raised their aircraft rental prices, while others were involved in previous corruption cases (Ramalan, 2021).

The Central Statistics Agency (BPS) revealed that in May 2020, there was a substantial decline of 90% in the number of airline passengers. The decrease in numbers was noticeable at various significant airports, such as Ngurah Rai - Denpasar (with a reduction of 94.56%), Juanda - Surabaya (showing a decrease of 94.48%), Kualanamu - Medan (experiencing an 87.76% decline), and Hasanuddin - Makassar (which had an 86.33% reduction when calculated in terms of the US dollar), as reported by Widyastuti in 2020. The adverse effect was evident in the financial reports released to the public on the Indonesia Stock Exchange (IDX) for the third quarter of 2020. This stands in stark contrast to the financial results for the same period in 2019, when PT Garuda Indonesia Tbk reported a net profit of US\$ 122.42 million, equivalent to approximately Rp. 1.7 trillion.

Looking at a company's financial performance is one of the parameters for assessing its capabilities. Reports can be used to measure and monitor an organization's financial performance. Bankruptcy risk can be predicted by measuring financial statements and analyzing financial ratios to determine the company's financial position (Sulistiyowati, 2015). Financial statement analysis activities are one of the media for gathering more, better, and more accurate information that can be used in decision-making. Financial statement analysis is a critical tool for obtaining information about the company's state and the results obtained in connection with the determination of the company's strategy. The benefit of knowing the factors of bankruptcy early on is that a company can plan ahead of time to minimize what is gained from bankruptcy. Bankruptcy will not occur suddenly, but rather gradually.

The study employs the Altman model, also known as the Z-Score, to investigate potential bankruptcies within airline companies. This method, introduced by Tambunan, Dwiatmanto, and Endang in 2019, is straightforward to apply and boasts a 95% accuracy rate. Additionally, the Springate model, referred to as the S-Score, is utilized to evaluate and distinguish between healthy and distressed businesses, encompassing both insolvent and non-bankrupt companies. This model, developed by Sumendap et al. in 2019, forecasts a company's survival by amalgamating various financial ratios and assigning varying weights to these ratios. The Zmijewski model was initially validated using a sample of 40 bankrupt and 800 non-bankrupt companies, demonstrating an impressive 99% accuracy rate for the estimation sample, as reported by Avenhuis in 2013. Meanwhile, in the consumer goods industry, Grover's model asserts its position as the preeminent predictor of Financial Distress. Financial managers can rely on Grover's model to evaluate their company's performance. Despite the fact that all four models employ nearly identical ratios and are frequently employed to forecast financial distress.

Similar research has been conducted in the context of the Indonesian aviation industry (Afandi, 2019; Bilondatu, Dunga, & Selvi, 2019; Fitriyah, 2020). The objective of this study is to present a comprehensive examination of the utilization of the Altman model, the Springate model, the Zmijewski model (X-Score), and the Grover model (G-Score). In predicting the level of financial performance or potential bankruptcy of Indonesian aviation companies. Based on the measurements used, these models predict bankruptcy with varying degrees of accuracy. This study will provide an overview of the use of the Altman model, the Springate model, the Zmijewski model (X-Score), and the Grover model (G-Score) in predicting the level of financial performance or potential bankruptcy of Indonesian aviation companies. These models predict bankruptcy with varying degrees of accuracy depending on the measurements used (Purnajaya & Merkusiwati, 2014). Before making an investment decision in a business, it is necessary to predict bankruptcy as an early warning. This research can also be used by investors to determine whether the company will go bankrupt or not, allowing them to plan for the possibility of bankruptcy right away. The main issue was that PT Garuda Indonesia (Persero) Tbk. experienced a decrease in profit and loss from 2018 to 2020. Here are the specifics of the issue: (1). In 2018, fuel prices (avtur) increased, as did the cost of aircraft leases, causing the company to bear a greater operational burden; (2). The company's revenue in 2020 decreased significantly to a loss of IDR 15.2 trillion due to the covid-19 virus pandemic in 2020, which required the government to implement PSBB and the closure of various tourist attractions in Indonesia, resulting in a decrease in the number of aircraft passenger departures of up to 2,246 million, or a negative 50.6% compared to the previous year.

The aforementioned issues are of concern to investors considering investing in airline stock. Furthermore, research that predicts the company's bankruptcy is required in order to prepare and improve performance through a quick and appropriate strategy for business continuity and Soekarno Hatta - Banten 85.60% (Putra, 2020). This event had an impact on the profitability of several airlines, including PT Garuda Indonesia (Persero) Tbk. According to Tempo.co (<https://bisnis.tempo.co>), the airline PT Garuda Indonesia (Persero) Tbk lost up to US \$ 1.07 billion, or approximately Rp. 15.2 trillion (14,227 exchange rate).

2. Literature Review and Hypothesis Development

Bankruptcy occurs when a company is unable to meet its obligations or when its financial condition deteriorates. If the company is experiencing minor difficulties (such as liquidity problems) and up to more serious difficulties, namely solvable (debt exceeds assets), the company is said to be bankrupt (Hanafi, 2010; Tambunan et al, 2015). Insolvency or bankruptcy is defined by Law No. 4 of 1998 as a state in which a court decision declares an institution if the debtor has two or more creditors and fails to pay at least one matured and collectible debt.

2.1. Model Altman (Z-Score)

The Z-Score serves as a tool for predicting the likelihood of a company going bankrupt by evaluating various ratios and plugging them into a discriminant equation (Korry, Dewi, & Ningsih, 2019). In 1968, Edward I. Altman developed the Altman model, which not only assesses a company's risk of bankruptcy but can also be utilized as an indicator of its overall financial performance (Sari, 2016). Altman's Z-Score formula, designed to gauge a company's financial well-being, is a complex equation involving multiple variables (Martini, Rachma Sari, Ardiani, & Gumayu, 2015). Altman tailored his model to be applicable across various business sectors, including manufacturing, non-manufacturing, and bond issuers. The following represents the modified Z-Score equation (Altman, 1995), often referred to as the Altman (Z-Score) modification:

$$Z \text{ Score} = 6,56 X1 + 3,26 X2 + 6,72 X3 + 1,05 X4$$

Info:

X1 = Working Capital/Total Assets X2 = Retained Earnings/Total Assets

X3 = Earnings Before Interest and Taxes/Total Assets X4 = Market Value Equity/Book Value of Total Debt

The classification of healthy and insolvent companies is based on the Z-Score value of the Altman Mod model namely:

1. If the value of $Z < 1,11$ = Zone "distress" (The company is going through financial difficulties and is in a precarious situation, with a significant likelihood of facing bankruptcy).

2. If the value of $1.11 < Z < 2.6$ = “gray” zone (The company is facing financial difficulties that require effective management. If these challenges are not addressed in a timely and appropriate manner, the company could encounter obstacles. Consequently, there is a potential for the company to either go bankrupt or successfully navigate through this period of financial distress).
3. If the value of $Z > 2.6$ = “safe” zone (the company is in a healthy state so it is unlikely that bankruptcy will occur).

2.2. Model Springate (S-Score)

In 1978, Springate developed a model for predicting bankruptcy. Springate employs the Multiple Discriminant Analysis (MDA) method in its formulation. With the following formulation, the model can predict bankruptcy with an accuracy rate of 92.5%:

$$\text{S-Score} = 1.03 X_1 + 3.07 X_2 + 0.66 X_3 + 0.4X_4$$

Info:

X_1 = The ratio of working capital to total assets

X_2 = The ratio of profit before interest and tax to total assets

X_3 = The ratio of profit before tax to current debt

X_4 = Ratio of sales to total assets

The applicable cutoff value is 0.862 (Rahayu (2017) with assessment criteria if:

1. If the value of $S < 0.862$ = “distress” zone (The company is in a state of financial insolvency and faces a significant likelihood of going bankrupt).
2. If the value is $0.862 < S < 1.062$ = “grey” zone (The company is currently facing financial insolvency that requires effective management. If the situation is not addressed promptly and managed appropriately, the company may ultimately go into bankruptcy).
3. If the value of $S > 1.062$ = “safe” zone (The company is in good financial health, hence the likelihood of bankruptcy is minimal).

2.3. Model Zmijewski (X-Score)

Zmijewski utilizes ratio analysis to evaluate the company's performance, leverage, and liquidity. In this model, particular emphasis is placed on the significance of the level of debt as the most influential factor in bankruptcy (Rudianto, 2013:264). Zmijewski formulas for various types of businesses, including:

$$\text{X-Score} = -4.3 - 4.5 X_1 + 5.7 X_2 - 0.004 X_3$$

Info :

X_1 = Earning after Taxes to Total Assets

X_2 = Total Debt to Total Assets

X_3 = Current Asset to Current Liabilities

The higher the Zm value, as per the evaluation standards, the higher the likelihood of the company experiencing bankruptcy (Fanny and Saputra, 2000) in (Peter & Yoseph, 2011). If the calculation using this model produces a positive value, the company may go bankrupt. On the other hand, if it generates a negative value, the company is unlikely to go bankrupt (Rudianto, 2013).

2.4. Model Grover (G-Score)

The Grover model was created through a process of revamping and reassessing the Altman model. In 1968, Jeffrey S. Grover used an Altman model sample, adding thirteen new financial ratios. From 1982 to 1996, The sample comprised 70 companies, with half of them (35) experiencing bankruptcy, while the other half (35) were not bankrupt. (Jeffrey S. Grover, 2001) yields the following result:

$$\text{G-Score} = 1.650 X_1 + 3.404 X_2 - 0.016 X_3 + 0.057$$

Info:

X_1 = Working capital/Total assets

X_2 = Earnings before interest and taxes/Total assets

X_3 = Net income/Total assets

Grover's model classifies bankrupt companies with a score of less than or equal to -0.02 ($Z \leq -0.02$), whereas companies classified as non-bankrupt have a value of greater than or equal to 0.01 ($Z \geq 0.01$).

2.5 Taffler Prediction Model

In 1983, Taffler unveiled the Taffler model, with the goal of predicting the probability of manufacturing companies facing bankruptcy on the London Stock Exchange between 1969 and 1976, as cited by Widiastara and Rahayu in (2019). The Taffler model comprises four essential financial ratio factors: pre-tax earnings concerning current obligations, the ratio of current assets to total liabilities, the percentage of total assets represented by current liabilities, and post-tax net income as a portion of total assets. According to Prakoso et al. (2022), this model boasts an impressive 95.7% accuracy rate in predicting companies that are likely to go bankrupt, achieving a perfect 100% accuracy rate for those not expected to face bankruptcy. Comparatively, in a study by Prakoso et al. (2022), the Taffler model outperforms other prediction models such as Altman, Springate, and Grover, boasting a 96% accuracy rate and a mere 4% error rate. The Taffler model's formula is presented in the following manner:

$$Z_{\text{Taffler}} = 3,20 + 12,18 X_1 + 2,50 X_2 - 10,68 X_3 + 0,0289 X_4$$

Within the framework of the Taffler approach, when the T value is less than 0.2, the company falls into the distress zone and is at risk of bankruptcy. Conversely, when the T value exceeds 0.2, the company is classified as financially sound and is not at risk of bankruptcy.

3. Research Method and Materials

This study is characterized by its quantitative approach. Currently, the analysis requires objective data (Suwarno et al., 2020). The author utilizes the documentation method, gathering data and information from sources such as books, archives, written documents, numerical records, and visual materials like reports and journals, along with other relevant supporting references (Soenyono & Basrowi, 2020). These documents can encompass written materials, photographs, or significant works created by individuals (Sugiyono, 2015). For the period spanning 2020 to 2022, the data utilized consists of secondary data, specifically the financial position statement and comprehensive income statement of PT Garuda Indonesia (Persero), Tbk., belonging to the group of airline industry firms that are publicly traded on the Indonesia Stock Exchange (IDX) (Marwanto et al., 2020).

4. Findings and Analysis

The utilization of the Altman model (Fig. 1) for forecasting potential insolvency suggests that the company was situated in the "distress" category from 2020 to 2022. This indicates that the company is displaying indicators of financial distress, leading to its declaration of a potentially insolvent condition.

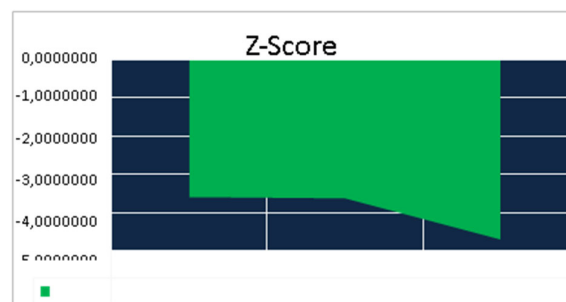


Fig. 1. Altman Model Bankruptcy Prediction (Z-Score)

With the Springate Model, in 2020 the company was declared in the "distress" zone which was indicated by the value of $S < 0.862$ so that it had a high potential for bankruptcy. This mirrors the company's current financial situation, characterized by a significant risk of bankruptcy (Mustofa et al., 2023). The main causes of this condition can be seen in the low level of liquidity, the income received continues to decline, as well as the result of working capital that is not proportional to total assets in the last three years. In 2021 the company was declared in the "grey area" zone (Suseno & Basrowi, 2023). This vulnerable condition or gray area reflects that the company is starting to experience financial difficulties that require prompt and appropriate handling so that these problems can be prevented and not get worse which can lead to

bankruptcy (Suseno et al., 2018). So, in this gray zone, the company can still survive the possibility of bankruptcy, which means the company is experiencing high-risk financial difficulties and can go bankrupt.

In 2022, once again, the company found itself in a precarious situation, as indicated by an S value of less than 0.862. The calculations and analysis of the four financial ratios conducted by Altman and Springate both concur that the company has been facing financial challenges with a substantial risk of bankruptcy spanning from 2020 to 2022. These difficulties stem from the company's rising general and administrative expenses, as well as an uptick in fuel prices, resulting in PT GIAA shouldering higher costs for goods sold. Moreover, the reduced number of flight schedules and decreased sales volume have also taken a toll on the company's financial performance. Unless the company's management promptly and effectively addresses this situation, it is conceivable that the company may incur losses leading to financial troubles in the future.

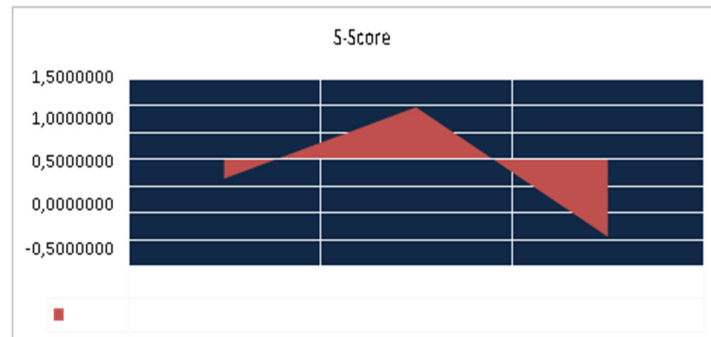


Fig. 2. Springate Model Bankruptcy Prediction (S-Score)

The prediction with the Zmijewski Model is depicted in Fig. 3. In 2020 the company was declared to be potentially bankrupt as indicated by the value $X > 0$. This reflects the condition of being in a state of Financial Distress. The main cause is the condition of low liquidity, the income received continues to decline, as well as the result of working capital that is not proportional to total assets in the last three years. In 2021 the company was again declared in a potentially bankrupt condition indicated by the value $X > 0$. This is because the amount of operating income continues to decline and is not proportional to its total assets, the company experienced a decrease in operating income, then there was an increase in the number of short-term liabilities to be exact. increase in third party trade payables, accounts payable to related parties, long-term liabilities on finance leases and other liabilities. In 2022 the company has a value of $X = -0.01$ so that it is classified as not potentially bankrupt as seen from the value of $X < 0$. This is because the increase in assets is precisely in the increase in fixed assets which makes the Return of Assets increase even though there is a decrease in X_2 due to the increase in the company's total liabilities.

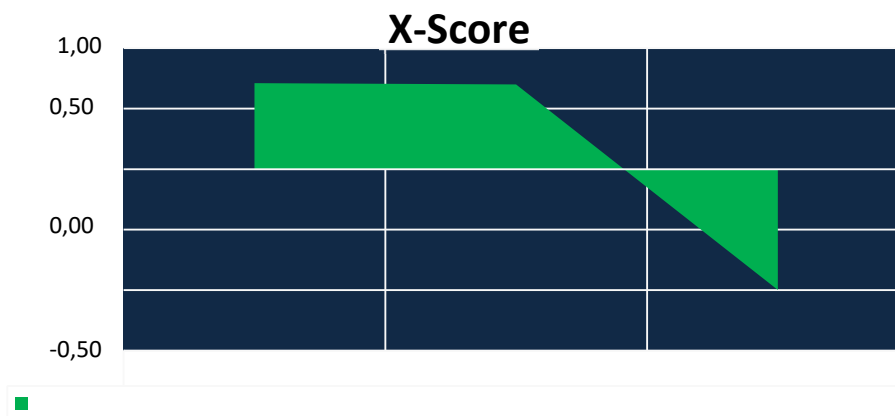


Fig. 3. Zmijewski Model Bankruptcy Prediction (X-Score)

Prediction of potential bankruptcy with the Grover model, in 2020 the company was declared in the "distress" zone, reflecting that high-risk conditions lead to bankruptcy. The main causes of this condition can be seen in the low level of liquidity, the income received continues to decline, as well as the result of working capital that is not proportional to total assets in the last three years. In 2021 the company is in the "safe" zone. Characterized by an increase in operating income and an increase in total assets although accompanied by an increase in operating expenses. In 2022 the company is again classified as a company that has the potential to go bankrupt or the "bankrupt" zone. This is due to a decrease in X_2 . The decrease was caused by an increase in operating expenses, financial expenses and other expenses followed by a decrease in the company's profit and not proportional to its total assets so that it experienced a higher loss than in 2020. The overall comparison and calculation (Table 1) can be concluded that the four bankruptcy prediction models provide an overview of

companies in the category of experiencing “distress” conditions. It really requires appropriate action in improving financial performance in order to become better and in order to rise from adversity for the sake of survival. This is in line with news about the decline in net profit to PT GIAA's loss and the condition of the domestic aviation industry facing challenges with The global health crisis caused by the Covid-19 outbreak and causing a decline in the interest of airplane passengers.

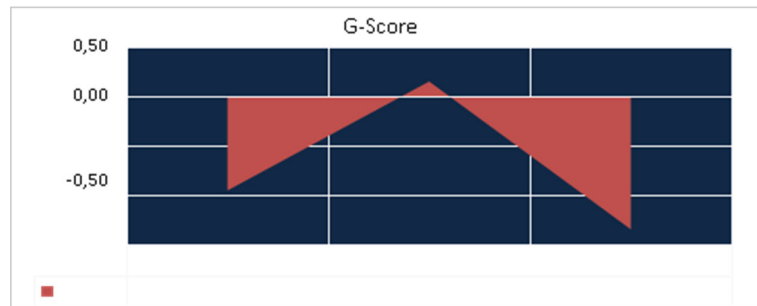


Fig. 4. Grover's Model Bankruptcy Prediction (G-Score)

Table 1
Bankruptcy Prediction Comparison

Category	Percentage Comparison of Four Models			
	Altman	Springate	Zmijewski	Grover
Bankrupt	100%	67%	67%	67%
Safe	0%	0%	33%	33%
GreyArea	0%	33%	0%	0%

Source: Data processed by the author (2022)

The company's capacity to engage in competition primarily hinges on its performance. Companies that cannot effectively compete to sustain their performance will find themselves isolated from their industry and may face financial insolvency. In order for the survival of a company to be maintained, the management must be able to maintain or even encourage the company to always make improvements and the company is required to have added value in order to compete in the global market, the added value is not only the financial aspect in the form of increased profits, but also non-financial in the form of credibility in the eyes of investors (Martini et al., 2021; Sari et al., 2022). Basically, The primary goal in forming a company is to generate profits and optimize the financial well-being of the company's owner. Company management is required to perform optimally in all company activities, especially financial condition issues so as to avoid losses and bankruptcy conditions. Performance improvement needs to be continuously maintained and improved by each company to maintain continuity so that financial conditions remain stable and not problematic. In general, the performance of a company is shown in published financial reports (Coal, 2012).

Investors are interested in investing in companies whose operating profits continue to increase. Increased operating profit has an impact on retained earnings. The increase in retained earnings and working capital has implications for an increase in total sales. On the other hand, if working capital continues to decline, it will result in a decrease in profits. This phenomenon will lead to financial difficulties, and if it continues can lead to bankruptcy. Good working capital management can maintain business liquidity (Martini et al., 2021). To increase earnings, it is necessary to increase sales and income, operational cost efficiency, and accounts receivable must be managed optimally. This anticipation is expected to ensure the availability of working capital.

5. Conclusion

The results of calculations and analysis at PT Garuda Indonesia (Persero) Tbk using the Altman, Springate, Zmijewski, and Grover models provide a diverse picture. In 2020, all four models produced the same results, indicating that the company was “bankrupt”, while in 2021, the Altman and Zmijewski models produced “bankrupt” results, while the Springate “grey area” and Grover models produced “safe” results. Furthermore, in 2020, all three models indicated “bankrupt”, with the exception of the Zmijewski model, which indicated “safe”. The four models conclude that the company is in financial trouble or is on the verge of bankruptcy. This demonstrates that increases in fuel and aircraft rental prices, as well as a decrease in flight demand, have an impact on the results of the company's bankruptcy analysis. Under these circumstances, the company is responsible for the cost of goods sold, general and administrative expenses, and larger operating expenses. This is demonstrated by the increase in fuel prices in 2020 and the Covid-19 pandemic in 2022, both of which have an impact on the performance of Indonesia's aviation industry.

PT Garuda Indonesia (Persero) Tbk is classified as insolvent based on the results of a bankruptcy prediction analysis using the Altman, Springate, Zmijewski, and Grover models. This is due to the company's very significant decline in profits from 2015 to 2020, which resulted in losses. Because the company's working capital is negative, the profit it generates will be

minimal. As a result, the company will face financial difficulties, and if the situation persists, it will go bankrupt. The company should include the results of its analysis of bankruptcy predictions in its annual financial statements so that stakeholders, investors, and creditors understand the company's current state. The company can make efforts such as optimizing revenue and cost efficiency. Management is also expected to implement new policies in order to overcome financial difficulties, as PT Garuda Indonesia is a state-owned company that serves as a supporter of the country's economy and a source of revenue for the country's economy.

The outcomes of the financial hardship analysis may not be entirely suitable for forecasting bankruptcy. However, the results of the analysis are still important to carry out and are regarded as early warnings in the event of corporate bankruptcy. Managers are expected to develop and implement appropriate steps if the company encounters financial difficulties in order to avoid bankruptcy. It is suggested that for future research, the number of calculation models or predictive models used be increased so that the calculation results obtained are more accurate and valid, such as using the Fulmer and Ohlson models.

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