

Bankruptcy Prediction Analysis with Altman, Springate, and Grover Method at PT Garuda Indonesia (Persero) Tbk

Belinda Sylvia Jaya^{1*}, I Wayan Karmana², I Made Dwi Jendra Sulastra³

¹ Managerial Accounting Undergraduate Study Program, Accounting Department, Bali State Polytechnic

² Managerial Accounting Undergraduate Study Program, Accounting Department, Bali State Polytechnic

³ Managerial Accounting Undergraduate Study Program, Accounting Department, Bali State Polytechnic

*Corresponding Author: belindasyvia79@gmail.com

Abstract: PT Garuda Indonesia (Persero) Tbk is a State-Owned Enterprise (BUMN) which is engaged in the aviation industry services. Five continuous years, from 2016-2020, the company faced a decrease in working capital caused by increasing trade payables and declining profits which continued to experience a deficit since 2017-2020. The increase in the price of avtur fuel, the decline in the rupiah exchange rate, and the declining income of airplane passengers during the Covid-19 were some of the causes of the company's decline in financial performance. This study was conducted to predict the bankruptcy of PT Garuda Indonesia (Persero) Tbk. In this study, the sample used is the financial statements of PT Garuda Indonesia (Persero) Tbk for 2016-2020. The data analysis technique applied in this research is descriptive quantitative analysis technique with the analysis method of bankruptcy prediction Altman (Z-Score), Springate (S-Score), and Grover (G-Score). The findings of this study indicate that the Altman (Z-Score) predicts PT Garuda Indonesia (Persero) Tbk during 2016-2020 in a potentially bankrupt condition with Z-Score an average -2,804, with the Springate (S-Score) predicting PT Garuda Indonesia (Persero) Tbk during 2016-2020 in a potentially bankrupt condition with S-Score an average -0,239, and with the Grover (G-Score) predicting PT Garuda Indonesia (Persero) Tbk in 2016-2020 in a potentially bankrupt condition with G-Score an average -1,049. The prediction of Bankruptcy at PT Garuda Indonesia (Persero) Tbk is due to the fact that during the five-year study period, the company's working capital has decreased due to current debt that continues to grow and the company's profit continues to run a deficit since 2017-2020.

Keywords: BUMN, Bankruptcy Analysis, Altman, Springate, Grover.

Introduction

BUMN are one of the economic actors who get their business capital either wholly or partly from separated state assets (Prasetyo, 2017). Therefore, BUMN in carrying out their business are not necessarily oriented to business profits alone, but have a very large role in providing excellent and professional services to the community. PT Garuda Indonesia (Persero) Tbk is a state-owned enterprise engaged in aviation industry services (Bilondatu et al., 2019). The company has won several international awards and was named the best airline in Indonesia. The financial data of PT Garuda Indonesia (Persero) Tbk is shown in Table 1.

Table 1. Financial Data of PT Garuda Indonesia (Persero) Tbk 2016-2020
(in million Rupiah)

Year	Working Capital	Retained Earning	Profit Before Interest and Tax	Net Profit	Equity	Sales
2016	-5.353.478,72	-2.970.293,89	1.331.560,52	125.826,23	13.568.979,03	51.915.650,15
2017	-12.668.796,04	-6.089.613,12	-1.032.103,60	-2.891.003,36	12.700.832,72	56.594.410,68
2018	-28.693.390,12	-9.859.582,84	-2.883.247,46	-3.314.549,20	9.265.038,74	62.709.117,00
2019	-31.443.911,45	-11.116.089,42	1.334.349,99	-619.533,25	8.098.423,43	63.564.265,85
2020	-53.010.143,21	-46.038.263,10	-31.074.167,03	-34.932.926,77	27.406.366,72	21.049.338,61

Source: Processed secondary data, in 2022

Financial data in Table 1 reveals that PT Garuda Indonesia (Persero) Tbk has experienced a working capital deficit and retained earnings for five consecutive years (Khotimah, 2019). Except for 2016 and 2019, the retained earnings before interest and taxes are negative. The resulting net profit balance also experienced a deficit except in 2016. The book value of equity and sales also fluctuated. This can be caused by soaring fuel prices, the effect of the weakening of the rupiah, and the decline in airline passengers during the Covid-19 pandemic, making it difficult for companies to make profits (Andriani et al., 2021). Therefore, it is important to conduct a bankruptcy prediction analysis to detect the potential for bankruptcy early in the Company (Ntawumenyumunsi and Maringa, 2022).

According to Gowri et al. (2022), Indriyanti and Gustiyana (2021), also Sari and Yunita (2019), as for the three methods of bankruptcy analysis used, namely the Altman, Springate, and Grover methods. Based on research conducted by Supitriyani et al. (2022), Fauzi et al. (2021), Tanjung (2020), Ayu Damayanti et al. (2019) and Pangkey et al. (2018) explained, the Altman method is the most accurate method for predicting bankruptcy. Meanwhile, according to Indriyanti and Gustiyana (2021), Idris (2019), Suparningsih and Chaeriah (2019), also Effendi (2018), the most accurate method for predicting bankruptcy is the Springate method. Unlike Hertina and Kusmayadi (2020), Sari and Yunita (2019), Sudrajat and Wijayanti (2019), also Aminian et al., (2016) have conducted research stating that the Grover method is the most accurate method for predicting bankruptcy. These three methods were chosen because if combined, they will produce bankruptcy predictions that can be assessed from various financial posts contained in the company's financial statements, namely from assets, equity, and company profit and loss.

The novelty of this research is the place, the method used, and the time of the research. This study analyzes the bankruptcy prediction of PT Garuda Indonesia (Persero) Tbk using the Altman, Springate, and Grover bankruptcy prediction methods.

Method

This research is a descriptive analysis, especially a quantitative research approach sourced from secondary data, namely the annual financial report of PT Garuda Indonesia (Persero) Tbk which is downloaded through the company's website (www.garuda-indonesia.com).

A. Population and Sample

Population used in this study is the entire annual financial report of PT Garuda Indonesia (Persero) Tbk.

The research sample was determined using the purposive sampling method, namely the 2016-2020 financial statements have been published and audited by public accountants.

B. Research Instruments and Definition

1. Altman Bankruptcy Prediction Method (Z-Score)

Based on Kadim and Sunardi (2018), each ratio in the Z-Score has a specific description related to the entity, namely:

$$X_1 = \frac{\text{Working Capital}}{\text{Total Assets}}$$

Ratio of working capital to total asset is useful to know liquidity. The result of this ratio shows the amount of working capital for each Rp1,00 of the entity's assets.

$$X_2 = \frac{\text{Retained Earnings}}{\text{Total Assets}}$$

The ratio of retained earnings to total assets aims to determine the entity's strength to create profits as long as the entity operates. The results of this ratio indicate that every Rp1,00 of the entity's assets is guaranteed by retained earnings.

$$X_3 = \frac{\text{Profit Before Interest and Tax}}{\text{Total Assets}}$$

The ratio of profit before deducting interest expense and taxes to total assets aims to determine the level of profit strength of the entity. The results of this ratio show that every Rp1,00 of total liabilities is used to finance share capital.

2. Springate Bankruptcy Prediction Method (S-Score)

Based on Kadim and Sunardi (2018), each ratio in the S-Score has a specific description of the entity, namely:

$$X_1 = \frac{\text{Working Capital}}{\text{Total Assets}}$$

Ratio of working capital to total useful assets know liquidity. The result of this ratio shows the amount of working capital for each Rp1,00 of the entity's assets.

$$X_2 = \frac{\text{Profit Before Interest and Tax}}{\text{Total Assets}}$$

The ratio of profit before deducting interest expense and taxes to total assets aims to determine the level of profit strength of the entity. The results of this ratio show that every Rp1,00 of total liabilities is used to finance share capital.

$$X_3 = \frac{\text{Profit Before Tax}}{\text{Current Debt}}$$

The ratio of profit before tax to current debt aims to assess the level of the entity's profit capability. This ratio shows the net profit before tax that can be obtained from each Rp1,00 of current debt owned by the company.

$$X_4 = \frac{\text{Sales}}{\text{Total Assets}}$$

The ratio of sales to total assets aims to determine the level of strength of assets owned to generate business sales. This ratio shows the sales that can be obtained from each Rp1,00 of the total assets owned by the entity.

3. Grover Bankruptcy Prediction Method (G-Score)

Based on Kadim and Sunardi (2018), each ratio in the G-Score has a specific description related to the entity, namely:

$$X_1 = \frac{\text{Working Capital}}{\text{Total Assets}}$$

Ratio of working capital to total useful assets know liquidity. The result of this ratio shows the amount of working capital for each Rp1,00 of the entity's assets.

$$X_2 = \frac{\text{Profit Before Interest and Tax}}{\text{Total Assets}}$$

The ratio of profit before deducting interest expense and taxes to total assets aims to determine the level of profit strength of the entity. The results of this ratio show that every Rp1,00 of total liabilities is used to finance share capital.

$$X_3 = \frac{\text{Net Profit}}{\text{Total Assets}}$$

The ratio of net income to total assets aims to find out the level of strength of net income that can be generated by the company. This ratio shows the net profit that can be achieved from each Rp1,00 of the entity's assets.

C. Data Analysis Techniques

Analysis technique used in this research is quantitative descriptive analysis technique. The three methods for predicting bankruptcy that will be used to answer quantitative research questions include:

1. Altman Bankruptcy Prediction Method (Z-Score)

Altman formula (Z-Score) used, namely Altman modification, is the third Altman formula (Z-Score) which includes:

$$Z = 6.56 X_1 + 3.26 X_2 + 6.72 X_3 + 1.05 X_4$$

The results of the Z-Score analysis can be classified into three groups, namely:

- If the Z-Score value > 2.60 then it is classified as an entity in healthy predictions.
- If the value is $1.10 < Z\text{-Score} < 2.60$, then the entity in the prediction is classified as being in the gray area (Grey Area).
- If the Z-Score < 1.10 is classified as an entity in the prediction that it has the potential for bankruptcy (Pratiwi et al., 2022).

2. Springate Bankruptcy Prediction Method (S-Score)

The Springate formula (S-Score) used in this study is:

$$S = 1.03 X_1 + 3.07 X_2 + 0.66 X_3 + 0.4 X_4$$

Results of S-Score analysis can be divided into two groups, namely:

- If the S-Score value > 0.862 , it means that it is classified as an entity in healthy predictions.
- If the S-Score value < 0.862 means that it is classified as an entity in the prediction that it has the potential for bankruptcy (Indriyanti and Gustiyana, 2021).

3. Grover Bankruptcy Prediction Method (G-Score)

The Grover formula (G-Score) uses a formula consisting of three financial ratios, namely:

$$G = 1.650 X_1 + 3.404 X_2 - 0.016 X_3 + 0.057$$

The results of the G-Score analysis can be classified into two namely:

- If the G-Score value is 0.01 , it means that the entity is classified in a healthy prediction.
- If the G-Score -0.02 , it means that the entity is classified as an entity in the prediction of potential bankruptcy (Sari and Yunita, 2019).

Result and Discussion

The calculation of the bankruptcy analysis of PT Garuda Indonesia (Persero) Tbk using the Altman (Z-Score), Springate (S-Score), and Grover (G-Score) method using financial report data for the 2016-2020 period can be seen in Table 2.

Table 2. Bankruptcy prediction analysis

Year	2016	2017	2018	2019	2020	Average
Altman (Z-Score)	-0,325	-1,807	-3,793	-3,613	-4,483	-2,804
Prediction	Potentially Bankrupt	Potentially Bankrupt	Potentially Bankrupt	Potentially Bankrupt	Potentially Bankrupt	Potentially Bankrupt
Springate (S-Score)	0,393	0,072	-0,283	-0,046	-1,329	-0,239
Prediction	Potentially Bankrupt	Potentially Bankrupt	Potentially Bankrupt	Potentially Bankrupt	Potentially Bankrupt	Potentially Bankrupt
Grover (G-Score)	-0,034	-2,110	-1,340	-0,093	-1,671	-1,049
Prediction	Potentially Bankrupt	Potentially Bankrupt	Potentially Bankrupt	Potentially Bankrupt	Potentially Bankrupt	Potentially Bankrupt

Source: Processed secondary data, in 2022

Table 2 shows that the use of the Altman (Z-Score), Springate (S-Score), and Grover (G-Score) methods show the same results, namely the period 2016- 2020 PT Garuda Indonesia (Persero) Tbk has the potential to go bankrupt. This can be caused by several things, such as in 2016 there was an increase in the price of aircraft fuel, namely avtur up to 165%. In 2018 followed by the weak exchange rate of the rupiah against the United States dollar, where the value of the rupiah reached Rp15.200,00/US dollar, this caused the price of aircraft to increase by 40%-120% so that the company could make a profit. Furthermore, in 2020 there was a decline in passenger income of the air aviation service industry by up to 69% which made it difficult for companies to make profits while aircraft maintenance and other operational costs still had to run. PT Garuda Indonesia (Persero) Tbk will receive funding assistance of Rp7,5 trillion to help improve the company's performance. This fund comes from investment financing reserves for the 2022 State Revenue and Expenditure Budget (APBN) which is a decision of the Garuda Indonesia Rescue Working Committee (Panja) Commission VI DPR. The funds will be disbursed if PT Garuda Indonesia (Persero) Tbk has agreed to make peace with creditors in the trial of

Suspension of Debt Payment Obligations (PKPU). The results of the PKPU trial were ratified on Monday, June 27, 2022. The company stated that this assistance fund would be used for company operations not to pay debts, this was done because the company urgently needed the restoration of its fleet of which currently only 29 fleets remained to support the company's performance.

Conclusion

In accordance with the findings of the data analysis and the discussion that has been described previously, the conclusions that can be drawn are based on the results of the analysis of the bankruptcy predictions of Altman (Z-Score), Springate (S-Score), and Grover (G-Score) at PT Garuda Indonesia (Persero) Tbk using the 2016-2020 financial statements shows the company is in a potentially bankrupt condition. This can happen because the company's working capital continues to decline due to the increasing current debt and the company continues to experience losses in net income.

Acknowledgment

Acknowledgments are conveyed to the supervisors, the company, and also all those who have supported the author in completing this research.

Reference

- Aminian, A., Mousazade, H., & Khoshkho, O. I. (2016). Investigate the Ability of Bankruptcy Prediction Models of Altman and Springate and Zmijewski and Grover in Tehran Stock Exchange. *Mediterranean Journal of Social Sciences*, 7(4), 208–214. <https://doi.org/10.5901/mjss.2016.v7n4s1p208>
- Andriani, I., Mai, M. U., & Ruhadi, R. (2021). Prediksi Financial Distress dan Kebangkrutan (Studi Kasus pada Perusahaan Maskapai Penerbangan). *Indonesian Journal of Economics and Management*, 2(1), 81–94. <https://doi.org/10.35313/ijem.v2i1.3100>
- Ayu Damayanti, N., Nurhayati, N., & Prasetyaningtyas, S. (2019). Analisis Perbandingan Model Prediksi Kebangkrutan Altman Z-Score dan Zmijewski di BEI Periode 2011-2015 (Comparative Analysis of Altman Z-Score and Zmijewski Bankruptcy Prediction Models in BEI Period. *E-Journal Ekonomi Bisnis Dan Akuntansi*, VI(1), 171–174.
- Bilondatu, D. N., Dungga, M. F., & Selvi, S. (2019). Analisis Model Altman Z-Score, Springate, dan Zmijewski sebagai Metode dalam Memprediksi Kondisi Kebangkrutan pada PT. Garuda Indonesia, Tbk Periode 2014-2018. *JAMIN: Jurnal Aplikasi Manajemen Dan Inovasi Bisnis*, 2(1), 40–52. <https://doi.org/10.47201/jamin.v2i1.35>
- Effendi, R. (2018). Analisis Prediksi Kebangkrutan Dengan Metode Altman, Springate, Zmijewski, Foster, Dan Grover Pada Emiten Jasa Transportasi. *Jurnal Parsimonia*, 4(3), 307–318.
- Fauzi, S. E., Sudjono, S., & Saluy, A. B. (2021). Comparative Analysis of Financial Sustainability Using the Altman Z-Score, Springate, Zmijewski and Grover Models for Companies Listed at Indonesia Stock Exchange Sub-Sector Telecommunication Period 2014 – 2019. *Journal of Economics and Business*, 4(1). <https://doi.org/10.31014/aior.1992.04.01.321>
- Gowri, M., Sugirtham, S. G., & Asmitha, P. (2022). Altman Z-Score Analysis of Indian Aviation Sector. *Gedrag & Organisatie Review*, 35(01), 56–67. <http://lemma-tijdschriften.com/>
- 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.
- Idris, A. (2019). Prediksi Kebangkrutan Menggunakan Model Altman, Zmijewski, Dan Springate Pada Perusahaan Penerbangan Terdaftar Di Bursa Efek Indonesia. *Stability: Journal of Management and Business*, 2(1), 91–100. <https://doi.org/10.26877/sta.v2i1.4054>
- Indriyanti, N. D., & Gustiyana, T. T. (2021). Analysis of Bankruptcy Prediction Using Altman Z-Score , Springate Grover , Zmijewski and Zavgren in Retail Trade Sub Sectors Registered in Indonesia Stock Exchange Period 2015-2019. *International Journal of Advanced Research in Economics and Finance*, 3(1), 21–31. myjms.mohe.gov.my/index.php/ijaref
- Kadim, A., & Sunardi, N. (2018). Analisis Altman Z-Score untuk Memprediksi Kebangkrutan pada Bank Pemerintah (BUMN) di Indonesia Tahun 2012-2016. *Sekuritas (Saham, Ekonomi Keuangan, Dan Investasi)*,

- 1(3), 142–156. <https://doi.org/http://dx.doi.org/10.32493/skt.v1i3.1095>
- Khotimah, L. K. (2019). Analisis Prediksi Kebangkrutan Suatu Perusahaan dengan Menggunakan Metode Altman Z-Score studi Kasus Pada PT. Garuda Indonesia Persero Tbk Periode 2008-2017. *Science of Management and Students Research*, 1(8), 284–290. <https://doi.org/10.33087/sms.v1i8.37>
- Ntawumenyumunsi, A., & Maringa, E. K. (2022). Application of Edward Altman Z Score Model on Measuring Financial Distress of Commercial Banks Listed on Rwanda Stock Exchange (2015-2019). *The Strategic Journal of Business & Change Management*, 9(1), 130–146.
- Pangkey, P. C., Saerang, I. S., & Maramis, J. B. (2018). Analisis Prediksi Kebangkrutan Dengan Menggunakan Metode Altman Dan Metode Zmijewski Pada Perusahaan Bangkrut Yang Pernah Go Public Di Bursa Efek Indonesia. *Jurnal EMBA*, 6(4), 3178–3187.
- Prasetyo, W. (2017). Ekonomi Kerakyatan: Dari, Oleh, dan Untuk Nasionalisme. *LSP-Jurnal Ilmiah Dosen*. <http://repository.unej.ac.id/handle/123456789/80194>
- Pratiwi, A. S., Satoto, S. H., & Suprpti, S. B. W. (2022). The Effect of Financial Ratio in the Altman Z-Score on Financial Distress. *International Journal of Economics, Business and Accounting Research (IJEBAR)*, 6(1), 413–420. <https://jurnal.stie-aas.ac.id/index.php/IJEBAR>
- Sari, M. P., & Yunita, I. (2019). Analisis Prediksi Kebangkrutan dan Tingkat Akurasi Model Springate, Zmijewski, dan Grover pada Perusahaan Sub Sektor Logam dan Mineral Lainnya yang Terdaftar di Bursa Efek Infonesia Tahun 2012-2016. *JIM UPB (Jurnal Ilmiah Manajemen Universitas Putera Batam)*, 7(1), 69–77. <https://doi.org/10.33884/jimupb.v7i1.907>
- Sudrajat, M. A., & Wijayanti, E. (2019). Analisis Prediksi Kebangkrutan (Financial Distress) dengan Perbandingan Model Altman, Zmijewski dan Grover. *Inventory: Jurnal Akuntansi*, 3(2), 116–129. <https://doi.org/10.25273/inventory.v3i2.5240>
- Suparningsih, B., & Chaeriah, E. S. (2019). Perbandingan Prediksi Kebangkrutan Menggunakan Model Altman Modifikasi, Springate, Zmijewski Dan Grover Pt Ratu Prabu Energi Tbk. *Jurnal Manajemen Bisnis Krisnadwipayana*, 7(3). <https://doi.org/10.35137/jmbk.v7i3.346>
- Supitriyani, S., Astuti, A., & Azwar, K. (2022). Implementasi Model Springate, Altman , Grover dan Zmijewski dalam Mengukur Financial Distress. *Jurnal Internasional Tren Penelitian Akuntansi*, 3(1), 214–221.
- Tanjung, P. R. S. (2020). Comparative Analysis of Altman Z-Score, Springate, Zmijewski and Ohlson Models in Predicting Financial Distress. *EPRA International Journal of Multidisciplinary Research (IJMR)-Peer Reviewed Journal*, 6(3), 126–137. <https://doi.org/10.36713/epra2013>