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Financial Distress Analysis of Coal Mining Companies

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***Abstract*—A new problem in 2019 apart from the absence of a new location for coal reserves was the limitation of coal production by the Minister of Energy and Mineral Resources of the Republic of Indonesia. These problems indicate that there are not only external problems with the company. However, internal company problems will also arise, particularly financial distress in coal mining companies. Financial distress is a financial condition before bankruptcy or liquidation characterized by the company's inability to fulfill its obligations. The purpose of this study is to determine the level of financial distress in coal mining companies listed on the Indonesia Stock Exchange for the period 2016-2020. Companies can use several models for bankruptcy analysis. In this study, the analytical model used is Altman, Springate, and Grover. The study results showed that one company experienced financial distress during the research period, and ten other companies were predicted to be safe or in safe zone status.**

Keywords—bankruptcy; financial distress; coal mining companies;

I. INTRODUCTION

Natural resources are everything that comes from nature and can be used to meet the needs of human life. Natural resources include biotic components (such as plants, animals, and micro-organisms) and abiotic components (such as natural gas, water, soil, petroleum, and various metals). Technological innovation, the progress of civilization, the human population, and the industrial revolution are facts that bring humans to the era of exploitation of natural resources so that their supplies are reduced.

Indonesia is rich in natural resources, especially coal. Coal contributes many benefits to the country, including providing jobs, increasing regional and state income, and advancing transportation and communication. However, coal reserves will depend on exploration and exploitation activities. If there are no discoveries, there will be no additional coal reserves and will experience shortages if they continue to be exploited. With this activity, it is estimated that the age of Indonesian coal can last up to 56 years if no new reserves are found.

The problem that occurred in 2019, apart from the fact that new coal reserves had not been found, was the limitation of coal production by the Minister of Energy and Mineral Resources. The policy was issued because of the rise of rogue entrepreneurs who do not have official permits or exceed the coal production limit. The impact of these conditions will occur externally and internal problems, especially the occurrence of financial distress in coal mining companies.

Financial distress is a company condition when the company's operating results do not meet the company's obligations. The occurrence of financial distress will certainly harm many parties, both internal and external parties related to the company. Therefore, it is necessary to make efforts to prevent financial distress conditions.

The research findings [1] confirmed that companies could monitor financial conditions using financial statement analysis methods to overcome and minimize bankruptcies. Based on these results, the

company's financial condition and development, weaknesses, and potential for bankruptcy can be seen. It is reinforced by [2] that financial statements can be used as information on the company's financial position and management achievements in a certain period and can be used as a reference in decision making.

The purpose of this study is to analyze financial distress in coal mining sector companies to determine whether the company is indicated for bankruptcy or not. If there are findings of indications of rapid bankruptcy, then it is good for the company to make improvements. Companies can anticipate or prepare strategies to easily face bankruptcy that will befall the company by conducting bankruptcy analysis.

II. Literature Reviews

Accounting is defined as the process of identifying, measuring, and reporting financial information to enable precise and unambiguous judgments and decisions for those who use the information (American Accounting Association). Another definition of accounting stated by The American Institute of Certified Public Accountants is the art of recording, classifying, and summarizing in a certain way and monetary terms, transactions, and events that are generally financial and including interpreting the results thereof [3]. The result of the accounting process is an accounting report, which various types depend on the needs of the parties who will use the report. One of the main types of accounting reports is financial statements.

In general, the purpose of financial statements is to provide a company's financial information at a specific time or in a certain period. The other purposes of preparing financial statements are to provide information about the types and amounts of assets, liabilities, and capital owned by the company, to provide information about the types and amounts of income earned and costs incurred by the company in a certain period, to provide information about the company's management performance in a period, and to provide information about notes to financial statements and others financial information [4]. Financial statements can also provide information for economic decision-making, including useful information for creditors and investors to decide on investment and credit [3].

The process of dissecting financial statements into their elements to further examine each of these elements to obtain a good and proper understanding of the financial statements is a financial statements analysis activity [3]. Analyzing financial statements means assessing the performance of companies, both internal companies and other companies in the same industry. It is useful for the direction of the company's development by knowing how effectively its operations have been running. Financial statement analysis is very useful for internal companies, investors, and other stakeholders because it helps decision-makers. In addition, financial statements analysis can help management identify any deficiencies or weaknesses and make rational decisions to improve company performance so that company goals can be achieved.

During its operational activities, a company can face a process of declining performance in financial conditions that occurs before the occurrence of bankruptcy or liquidation [5]. Financial distress can be described between two extreme points covering short-term financial distress (liquidity) to long-term financial distress, which is not solvable or debt is more significant than assets [6]. In this condition, the company can go bankrupt, so the company can conduct a bankruptcy analysis to anticipate or make necessary improvements. Financial distress can also describe a situation where the company cannot meet its current obligations due to insufficient operating cash flow, and the company is forced to take corrective action [7].

Several researchers have studied financial distress in various companies in various types of industries. These researchers also use various methods to predict the financial distress faced by each company

Research examining the effect of financial ratios interaction after implementing the Malaysian Code on Corporate Governance (MCCG) showed that the level of company liquidity and performance has a significant and robust effect on the level of company's financial distress after two years of implementing MCCG. It is essential for creditors, investors, and external regulators to monitoring companies, so they are not classified in companies that are experiencing financial distress ([8], [9]).

The leverage can be used as a reference to predict the occurrence of financial distress in the company. Several researchers ([9], [10]) found that companies with high leverage increase their likelihood of facing financial distress.

The company's profitability ratio provides important information to creditors, investors and regulators, in determining the financial distress level ([8], [11]). Companies that have lower profitability are more likely to experience higher financial distress.

The companies with poor performance will have a higher probability of financial distress. Poor corporate performance can increase the risk of bankruptcy and insolvency of the companies ([12], [13]).

III. Research Method

This study investigated the financial condition of coal mining companies listed on the Indonesia Stock Exchange (IDX) using the Altman, Springate, and Grover Models. The Altman, Springate, and Grover

model is a financial performance research model that aims to predict the potential for financial distress by using financial ratios in its calculations.

The type of data used in this study is quantitative data, collected from the financial report of coal mining companies listed on the IDX from 2016 to 2020. The research data obtained from www.idx.co.id.

The financial ratios used by each financial distress analysis consist of:

1) Working Capital/Total Assets. This ratio shows the company's ability to generate working capital from its total assets. This ratio is used in the Altman, Springate, and Grover methods.

2) Retained Earnings/Total Assets. This ratio shows the ability of the company's total assets to generate retained earnings. This ratio is used in the Altman method.

3) EBIT/Total Assets. This ratio shows the ability of the company's total assets to generate profit before interest and tax payments. This ratio is used in the Altman, Springate, and Grover methods.

4) Book Value of Equity/Book Value of Debt. This ratio shows the ability of the company's equity market value to meet obligations. The market value of equity is obtained by multiplying the stock price by the number of shares outsstanding. This ratio is used in the Altman method.

5) Return on Assets. This ratio describes the utilization of the company's total assets to get a profit. This ratio is used in the Grover method.

6) EBT/Current Liabilities. This ratio describes the company's ability to generate profit before tax from the company's current debt. This ratio is used in the Springate method.

7) Sales/Total Assets. This ratio describes how the company utilizes its total assets to generate sales/company revenues. This ratio is used in the Springate method.

IV. Research Result

Data analysis in this study used financial ratios from each method. The comparison of each method of financial distress analysis which aims to determine the overall condition of the financial ratios and to find out which method is the most accurate for financial distress analysis in predicting the bankruptcy of coal mining companies listed on the IDX.

4.1 Altman Method of Financial Distress Analysis Calculation Results

Altman method formula is

$$Z = 6.56X_1 + 3.26X_2 + 6.72X_3 + 1{,}05X_4 \quad (1)$$

Where Z is bankruptcy index, X_1 is working capital/total asset, X_2 is retained earnings/total asset, X_3 is EBIT/total asset, and X_4 is the book value of equity/book value of total debt.

From the calculation results of the modified Altman model, the Z-Score value is obtained, which is divided into three categories:

1) The company is categorized not bankruptcy if the Z value > 2.60

2) The company cannot be judged to be bankrupt or not if the value is 1.10 < 2.60

3) The company is categorized as bankrupt if the Z value < 1.10

After calculating using the Altman method, using the annual report of coal mining companies for five consecutive years, the following results were obtained:

TABLE I. Altman Method Calculation Result

Company	Year					Average	Prediction Status
	2016	2017	2018	2019	2020		
ADRO	3.78	4.60	5.20	4.79	4.79	4.63	NB
BSSR	4.90	9.36	5.53	4.98	6.14	6.18	NB
BYAN	1.13	5.39	7.65	3.50	6.59	4.85	NB
PTBA	6.08	7.28	8.08	7.81	6.73	7.20	NB
DEWA	1.85	1.46	1.32	(0.75)	0.97	0.97	B
GEMS	4.93	7.55	3.19	3.09	2.98	4.35	NB
HRUM	11.50	13.70	10.41	14.45	16.33	13.28	NB
ITMG	7.28	7.97	6.93	6.58	5.83	6.92	NB
MBAP	10.18	11.12	9.63	10.36	10.02	10.26	NB
MYOH	8.63	8.33	9.94	9.93	13.70	10.11	NB
TOBA	2.43	4.46	3.06	1.97	1.41	2.67	NB

[a.] Source: Processed Data

*Where: NB is not bankrupt, B is bankrupt, GA is a grey area

Based on the results of calculating using the Altman method, one company is predicted bankrupt, no company is predicted a grey area condition (cannot be determined whether it is bankrupt or not), and ten companies are predicted not to go bankrupt.

4.2 Springate Method of Financial Distress Analysis Calculation Results

Springate method formula is:

$$S = 1.03A + 3.07B + 0.66C + 0.4D \quad (2)$$

S is bankruptcy index, A is working capital/total asset, B is EBIT/total asset, C is EBT/current liabilities, and D is sales/total asset.

The value obtained from the formula calculation above can be compared with the cut-off value for the category S > 0.862 which is predicted not to go bankrupt, and S<0.862 is predicted to experience bankruptcy.

After calculating using the Springate method formula, using the annual report of coal mining companies for five consecutive years, the following results were obtained:

TABLE II. SPRINGATE METHOD CALCULATION RESULT

Company	Year					Average	Prediction Status
	2016	2017	2018	2019	2020		
ADRO	1.12	1.59	1.34	0.95	0.49	1.10	NB
BSSR	1.67	3.85	2.59	1.65	1.56	2.26	NB
BYAN	0.77	2.86	3.68	1.49	2.68	2.30	NB
PTBA	1.28	2.40	2.40	2.02	1.44	1.91	NB
DEWA	0.32	0.32	0.28	(0.04)	0.26	0.23	B
GEMS	1.37	3.07	1.64	1.32	1.35	1.75	NB
HRUM	1.33	2.18	1.58	1.56	2.70	1.87	NB
ITMG	1.73	2.40	2.23	1.77	1.02	1.83	NB
MBAP	3.15	4.14	3.28	2.70	2.33	3.12	NB
MYOH	2.58	1.73	2.90	2.51	2.76	2.49	NB
TOBA	0.93	1.59	1.55	1.07	0.59	1.15	NB

[b.] Source: Processed Data

*where NB is not bankrupt, B is bankrupt

Based on the results of calculating using the Springate method, one company is predicted bankrupt and ten companies are predicted not to go bankrupt.

4.3 Grover Method of Financial Distress Analysis Calculation Results

Grover method formula is

$$Z = 1.650X_1 + 3.404X_2 - 0.016X_3 + 0.057 \quad (3)$$

Where G is bankruptcy index, X_1 is working capital/total asset, X_2 is EBIT/total asset, and X_3 is net income/total asset.

If the score obtained by a company from the bankruptcy prediction model is greater than or equal to 0.01 ($G \geq 0.01$) then the company is predicted not to go bankrupt. Meanwhile, if the company's score from the bankruptcy prediction model is less than or equal to -0.02 ($G \leq -0.02$), the company is predicted to experience bankruptcy.

After calculating using the Grover method formula, using the annual report of coal mining companies for five consecutive years, the following results were obtained:

TABLE III. GROVER METHOD CALCULATION RESULT

Company	Year					Average	Prediction Status
	2016	2017	2018	2019	2020		
ADRO	0.58	0.81	0.63	0.57	0.33	0.58	NB
BSSR	0.78	2.05	1.36	0.70	0.80	1.14	NB
BYAN	0.45	1.67	2.25	0.80	1.49	1.33	NB
PTBA	0.84	1.49	1.45	1.21	0.82	1.16	NB
DEWA	0.10	0.05	0.00	(0,45)	0.13	(0.03)	B
GEMS	0.76	2.29	0.86	0.68	0.74	1.07	NB
HRUM	1.16	1.52	1.25	1.20	1.24	1.27	NB
ITMG	1.00	1.53	1.35	0.91	0.57	1.07	NB
MBAP	1.87	2.48	2.02	1.73	1.59	1.94	NB
MYOH	1.46	1.16	1.78	1.66	1.77	1.57	NB
TOBA	0.38	0.81	0.80	0.37	0.19	0.51	NB

[c.] Source: Processed Data

*Where NB is not bankrupt, B is bankrupt

Based on the results of calculating using the Grover method, one company is predicted bankrupt, and ten companies are predicted not to go bankrupt.

The comparison of the bankruptcy prediction results from the calculations that have been done using the Altman Z-Score, Springate S-Score, and Grover G-Score models are presented as follows:

TABLE IV. BANKRUPTCY PREDICTION RESULTS

Prediction	Altman	Springate	Grover
Financial Distress	1	1	1
Safe Zone	10	10	10
Total	11	11	11

[d.] Source: Processed Data

The results of the prediction of the bankruptcy of coal mining companies show that the Altman, Springate, and Grover models predicted one company experiencing financial distress and ten companies in the safe zone.

4.4 Discussion

The Z-Score value from the Altman model for coal mining companies listed on the IDX for the 2016-2020 period shows that there is one company that will experience a deficit (bankrupt) because the cut-off value is below the value of 1.1 while companies that are considered healthy have a cut-off value above or equal to 2.6. Companies that are predicted to experience financial distress (bankruptcy) occur because the value of working capital tends to be negative where current debt is greater than current assets. Working capital is essential for the company as an assessment of management performance. Working capital is used to pay current debts and helps the company's productivity as a reserve fund in case of internal company problems.

The S-Score value from the Springate model for coal mining companies listed on the IDX for the 2016-2020 period shows that there is one company that is not healthy because the cut-off value is below 0.862. Ten companies are considered healthy because the cut-off value is above 1.062. From one company that is predicted to experience financial distress (bankruptcy) due to working capital to total assets, the result is below the cut-off value where current debt is greater than current assets. The adequacy of the value of the company's working capital is a separate assessment of the company's performance.

The value of the G-Score predicts one company experiencing a deficit (bankruptcy) out of eleven coal mining companies listed the IDX for the 2016-2020 period with profit status every year. Companies that are categorized as experiencing financial distress have a cut-off value below -0.03. It is caused by the use of the Return on Assets (ROA) ratio. If the ROA value is positive, it means that the total assets used for the company's operations can generate profits. If the ROA value is negative, then the use of the company's total assets does not provide benefits for the company. Based on the value generated by the Grover model, companies that have a positive ROA value are indeed categorized as healthy companies, even though the value of their working capital tends to be negative.

V. CONCLUSION

Based on the calculation results of the three methods used in predicting bankruptcy in coal mining companies listed on the IDX in 2016-2020 using the Altman, Springate, and Grover models, the number of the company experiencing financial during the research period is one, and there are ten companies predicted to be safe or in safe zone status. Each model gives different results because the cut-off value in each model is different. Based on the conclusions above, it is stated that the Altman, Springate, and Grover models can predict bankruptcy in coal mining companies that earn profits every year.

For further researchers, it is hoped that other bankruptcy prediction models such as Zmijewski, Zavgren, and Ohlson can be used as comparisons in predicting bankruptcy.

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