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Financial Health of Leading SOEs: Altman Z-Score Analysis on LQ45 Issuers

Ayub Usman Rasid[1*], Fahrudin Zain Oliliingo[1], Hasanuddin[2], Roydah Gani[2]
[1]State University of Gorontalo, Gorontalo City, Gorontalo 96128, Indonesia
[2]Universitas Gorontalo, Limboto, Gorontalo 96211, Indonesia
*Corresponding Email: ayublpmug@gmail.com

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ABSTRACT

This study aims to evaluate the financial health of selected state-owned enterprises (SOEs) listed in the LQ45 index during the 2019–2023 period using the Altman Z-Score method. This approach combines five key financial ratios to assess the bankruptcy potential of firms. Secondary data were collected from annual financial reports and analyzed longitudinally and cross-sectorally. The results reveal that only PT Bukit Asam (PTBA) and PT Telkom Indonesia (TLKM) consistently remained in the safe zone (Z > 2.99), while most other companies, particularly in the banking and infrastructure sectors, were classified in the grey or distress zones, indicating a significant bankruptcy risk. These findings highlight the financial resilience disparities across sectors within SOEs, despite structural support from the government. The study concludes that the Altman Z-Score model serves as an effective early warning tool for assessing financial risk, although sector-specific interpretation, especially for the financial services industry, is necessary. The implications suggest that corporate management should enhance operational efficiency, strengthen capital structure, and establish early warning systems based on financial ratios to improve long-term financial resilience.

Keywords: Altman Z-Score; Financial Health; Financial Resilience; LQ45 Index; Risk of Bankruptcy; SOEs

INTRODUCTION

The financial health of a company is a crucial aspect that reflects the ability of business entities to survive, develop, and provide long-term added value for their stakeholders. In an increasingly competitive and volatile business context, measuring potential bankruptcy and financial resilience is becoming increasingly relevant as a basis for investment decision-making and managerial policy. One of the most widely used bankruptcy prediction models is the Altman Z-Score, which is considered an early diagnostic method for detecting the symptoms of a company's financial failure (Altman, 2018).

The Altman Z-Score model combines five key financial ratios that reflect working capital, retained earnings, operating profitability, market solvency, and asset efficiency. The reliability of this model in detecting financial distress has been proven in various industrial and economic contexts, including in developing countries such as Indonesia (Wahyuni & Rubiyah, 2021). Amid post-pandemic global challenges, digital disruption, and geopolitical uncertainty, it is important for stakeholders to have predictive indicators that are able to read the company's potential financial crisis earlier and accurately.

Indonesia's capital market displays a considerable diversity of industrial sectors, ranging from banking, mining, infrastructure, energy, to telecommunications. Each sector has a unique financial structure so that the approach to financial valuation cannot be equalized. Previous studies have focused on specific sectors or time periods so that they tend not to provide a comprehensive picture of cross-sectoral dynamics in the medium term (Hamzah & Annisa, 2022), (Aini et al., 2022), (Utami & Hardana, 2022), (Sumolang et al., 2021). Therefore, a study is needed that is able to see the development of the Altman score over time and compare between issuers to identify more comprehensive financial health trends.

The main motivation of this research is the practical need of investors, regulators, and company management to obtain relevant, accurate, and predictive information related to the financial health of corporations. What's more, in the context of the digital economy and green economy, investment decisions are increasingly determined by non-traditional indicators that include long-term resilience and systemic risks (Surachman et al. 2024). By integrating financial indicators such as the Z-Score with cross-sector observations, this study is expected to provide a stronger analytical basis for strategic decision-making.

Explicitly, the main purpose of this study is to evaluate and compare the financial health levels of ten leading public issuers in Indonesia based on the Altman Z-Score model during the period 2019 to 2023. The significance of this research lies in its ability to provide predictive information that can be used by investors, financial managers, regulators, and academics in assessing the risk of bankruptcy and the financial resilience of companies. The novelty of the research arises from a cross-sectoral and longitudinal approach that has not been widely raised in previous studies in the Indonesian context. The main contribution of this research is to provide a data-based analytical basis that can be used in strengthening risk management strategies and investment decision-making in the national capital market.

LITERATURE REVIEW

Financial Performance

Suwadji et al. in (Apriono et al., 2023) explain that financial performance reflects the overall output of the implementation of a company's strategy and activities carried out

over a certain period of time. This performance information is presented comprehensively in the company's financial statements which are published periodically, both quarterly and annually and are subject to in-depth evaluation, both through audited and unaudited reports. Financial statements include various types of reports, such as income statements, cash flow statements, balance sheets, equity change reports, as well as additional records that support these financial statements (Pradnyawati, et al., 2024). This aspect includes fundraising activities and the use of funds which are generally evaluated through indicators of capital adequacy, liquidity level, and profit-making ability (Ilahude et al., 2021). Financial performance assessment has a strategic role because it is the basis for economic decision-making, both by internal management and external stakeholders such as investors and creditors.

Financial performance is the result of a systematic evaluation of the company's effectiveness in managing and implementing financial principles in accordance with applicable standards and regulations. This analysis aims to assess the extent to which the company's financial activities are carried out optimally, accountably, and in line with sound financial management practices (Damayanti & Andriyani, 2022). Evaluation of financial ratios such as Return on Assets (ROA), Return on Equity (ROE), Current Ratio (CR), and Debt to Equity Ratio (DER) is often used to measure how efficient and healthy a company's financial condition is. The selection of such indicators depends on the purpose of the analysis, the nature of the industry, and the complexity of the company's operations.

Performance measurement is a systematic approach that aims to assess the level of efficiency and effectiveness of a company in generating profits and managing its cash position optimally (Munda et al., 2021). Evaluation of financial performance is carried out through a comprehensive analysis of financial statements in one or several specific periods, in order to identify development trends and dynamics of the company's financial condition over time.

Financial Ratio Analysis

Financial ratio analysis is an evaluative method used to assess the financial condition and performance of a business entity through a numerical comparison between certain items in the financial statements. The main objective of this analysis is to identify the strengths, weaknesses, operational efficiency, solvency, liquidity, and profitability of the company in a given period. Financial ratios allow financial managers, investors, creditors, and other stakeholders to assess the financial stability and growth potential of a company in a systematic, quantitative, and easy way compared between periods and between entities (Catherina et al., 2021).

Investing in the capital market inherently involves complex and diverse risks. Like other investment instruments, activities in the capital market are inseparable from the potential liquidity risks, inflationary pressures, the possibility of bankruptcy, and instability stemming from the political dynamics of a country. Therefore, from a financial management perspective, an in-depth and systematic analysis is needed so that investment decisions are able to produce optimal returns and minimize potential losses. In this context, accounting information, especially financial statements, is an important instrument that provides a quantitative database for investors. Through the financial ratio analysis approach, financial managers and investors can objectively evaluate the company's performance, financial position, and prospects as a basis for rational and risk-based decision-making (Pradnyawati et al., 2024).

Financial Distress and Financial Resilience

Altman, as cited in Hamzah and Annisa (2022), defines financial distress as a multidimensional condition that reflects various forms of financial hardship experienced by companies. This situation is generally characterized by a failure to meet financial obligations. inability to pay debts (insolvency), default payments, and leading to bankruptcy. When a company shows symptoms of weakness in its financial structure, it can lower the level of trust of stakeholders, especially creditors and investors. Such declining trust can prompt them to withdraw their support or relinquish their ownership of the company. If management is unable to take corrective steps against this condition, then the situation is a strong warning signal that the company is in a phase of serious financial difficulty.

Financial resilience can be understood as the capacity to withstand events that can affect household income and/or wealth. Further, financial resilience also reflects the ability to recover quickly from disruptions affecting financial conditions (Pandin et al., 2023). This financial resilience is formed through five main elements, namely sturdiness, city capacity, awareness, flexibility, and the ability to recover (Sari et al., 2023).

Bankruptcy Prediction Model: Altman Z-Score

The Z-Score model was first introduced by Edward I. Altman in 1968 as a result of his empirical study of predicting corporate bankruptcy. In his research, Altman evaluated 22 financial ratios and identified five of the most relevant ratios to distinguish between companies that are potentially bankrupt and those that are not. This model specifically emphasizes that profitability is the dominant factor that affects the likelihood of bankruptcy (Wahyuni & Rubiyah. 2021).

According to Elewa (2022), the Altman Z-Score model is a statistical method based on discriminant analysis, designed to project a company's likelihood of bankruptcy by calculating Z-Score values. This value is obtained from a combination of several financial ratios that are systematically calculated into one predictive indicator to assess the probability of a company's financial failure. In this context, Z-Score analysis serves as an initial diagnostic tool that can identify early signals of potential financial health of the company. This model integrates five key financial ratios that are considered to have a significant effect on the stability and financial performance of the company. that is:

X1 = Working Capital / Total Assets

X2 = Retained Earnings / Total Assets

X3 = Operating Profit / Total Assets

X4 = Equity Market Value / Liability Book Value

X5 = Sales / Total Assets

Conceptual Framework

The study framework model is depicted in Figure 1.

Figure 1. Research Framework

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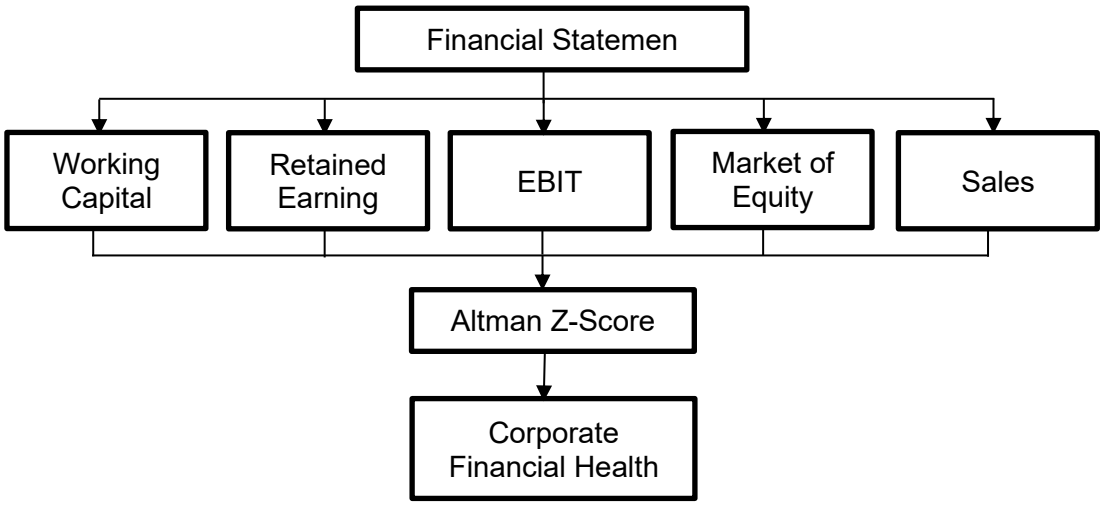

RESEARCH METHOD

Sampling

This research was conducted within the context of the Indonesian capital market, specifically focusing on issuers listed on the Indonesia Stock Exchange (IDX). The target population consisted of all public companies from both financial and non-financial sectors that were included in the LQ45 index in 2024. The sampling technique employed in this study was purposive sampling, where the selection of samples was based on specific criteria to ensure their relevance to the research objectives (Sugiyono, 2021).

To be selected as a sample, companies had to meet the following requirements: they must have been actively listed and operating on the IDX during the 2019–2023 period; they must have published complete and accessible annual financial reports; and they must have provided sufficient data to enable the calculation of all financial ratios required in the Altman Z-Score model.

After applying these criteria, a total of ten issuers were selected as the final research sample.

Table 1. Research Sample

No	Issue Code	Company Name
1	ANTM	Aneka Tambang (Persero) Tbk
2	BBNI	Bank Negara Indonesia Tbk
3	BBRI	PT. Bank Rakyat Indonesia (Persero) Tbk
4	BBTN	Bank Tabungan Negara Tbk
5	BMRI	Bank Mandiri Tbk
6	JSMR	Jasa Marga Tbk
7	PGAS	Perusahaan Gas Negara (Persero) Tbk
8	PTBA	Tambang Batu Bara Bukit Asam Tbk
9	SMGR	Semen Indonesia Tbk
10	TLKM	PT. Telkom Indonesia (Persero) Tbk

Data Collection

This study relies on secondary data obtained from publicly available and credible sources. The primary sources include annual financial statements of the selected companies, which were accessed through the official website of the Indonesia Stock Exchange (IDX) at https://www.idx.co.id, as well as the official websites of the respective issuers. Additionally, market-related data, such as equity market values, were gathered from annual reports and reputable stock market information platforms.

To support the development of the theoretical framework and to strengthen the empirical analysis, relevant academic literature and scientific publications were also consulted. The data collection covered the period from 2019 to 2023, allowing for a longitudinal analysis and comparison across different years.

Measures

The measurement in this study is based on the original version of the Altman Z-Score model used to assess the risk of bankruptcy of public companies. The Z score is calculated using the following formula:

$$Z = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4 + 0.999X_5$$

The Z score is then classified into three categories for interpretation:

$Z > 2.99$ = Safe Zone (company in sound financial condition)
$1.81 < Z < 2.99$ = Grey Zone (company on alert)
$Z < 1.81$ = Distress Zone (company at high risk of bankruptcy)

RESULTS

Ratio Analysis

Working Capital to Total Assets (X1)

Table 2. Working Capital to Total Assets Ratio (%) For 2019 – 2023

No	Issuers	Period				
		2019	2020	2021	2022	2023
1	ANTM	0.079	0.050	-0.011	0.053	0.196
2	BBNI	0.947	0.943	0.820	0.821	0.819
3	BBRI	0.955	0.936	0.931	0.924	0.919
4	BBTN	0.956	0.937	0.937	0.936	0.934
5	BMRI	0.946	0.943	0.946	0.947	0.946
6	JSMR	-0.300	-0.041	-0.016	0.003	-0.115
7	PGAS	0.147	0.109	0.174	0.170	0.065
8	PTBA	0.268	0.187	0.297	0.303	0.134
9	SMGR	0.055	0.047	0.019	0.070	0.045
10	TLKM	-0.075	-0.091	-0.028	-0.056	-0.056

Based on the interpreted data, issuers from the banking sector such as BBNI, BBRI, BBTN, and BMRI showed a consistently high working capital to total assets ratio during the 2019–2023 period, with values ranging from 0.819 to 0.956. This reflects that the financial sector tends to have a strong current asset structure and disciplined cash management. so that the risk of short-term payment failure is relatively low. The stability of this ratio also indicates the existence of prudent financial governance and efficiency in the company's operations (Khoiruddin, 2023).

On the other hand, issuers such as JSMR and TLKM have experienced negative ratios for several years which reflects a working capital deficit. In this context, a negative ratio

indicates that short-term liabilities are greater than current assets, so it can trigger the company's inability to meet short-term financial obligations in a timely manner (Omodara, 2023). This condition risks lowering investor and creditors' trust in the company.

Companies such as ANTM and PTBA show more volatile ratio dynamics. ANTM experienced a significant improvement from negative values in 2021 to positive in 2023, indicating improvements in liquidity management. The same thing also happened to PTBA, which although it had reached the highest score in 2022 (0.303), it actually decreased in 2023 (0.134). This change can be caused by an increase in current liabilities or a decrease in cash reserves and lancer assets that affect the working capital position.

Meanwhile, issuers such as PGAS and SMGR showed positive ratios but were in the low range and relatively volatile. This shows that companies have limited working capital margins, making them more vulnerable to liquidity shocks in the event of disruptions in operating cash flow. In the context of financial risk, this condition can increase the likelihood of slipping into the financial distress zone if not handled strategically.

Overall, the results of this analysis show that working capital management is one of the crucial elements in shaping the company's financial resilience. Issuers that consistently maintain a healthy working capital ratio show a tendency to have a higher Altman Z-Score value, so they tend to be in the financially safe zone. In contrast, ratios that are negative or fluctuate significantly increase exposure to liquidity and bankruptcy risks. especially if it is not accompanied by an effective mitigation strategy.

Retained Earnings to Total Assets (X2)

Table 3. Ratio Of Retained Earnings to Total Assets (%) For 2019 – 2023

No	Issuers	Period				
		2019	2020	2021	2022	2023
1	ANTM	0.262	0.277	0.312	0.391	0.336
2	BBNI	0.098	0.075	0.081	0.091	0.099
3	BBRI	0.128	0.104	0.110	0.108	0.109
4	BBTN	0.043	0.024	0.030	0.035	0.038
5	BMRI	0.098	0.078	0.083	0.084	0.091
6	JSMR	0.118	0.116	0.135	0.180	0.175
7	PGAS	0.018	-0.028	0.047	0.054	0.059
8	PTBA	0.155	0.100	0.222	0.282	0.162
9	SMGR	0.373	0.385	0.403	0.413	0.425
10	TLKM	0.414	0.383	0.378	0.407	0.413

Based on the results of observations in the period 2019 to 2023, TLKM and SMGR occupy the highest position in the ratio of retained earnings to total assets. TLKM shows consistency with a ratio that is in the range of 0.378 to 0.414, while SMGR is in the range of 0.373 to 0.425. This consistency reflects stable profitability accumulation as well as efficient profit management. This is in line with the findings (Putri & Willim, 2024) which stated that companies with high levels of retained earnings generally have healthier capital structures and greater financial flexibility.

ANTM also showed a significant upward trend from 0.262 in 2019 to its peak in 2022 (0.391), although it decreased slightly in 2023 (0.336). This indicates an improvement in profit performance that has been successfully maintained for reinvestment, thereby increasing the company's internal financial resilience. Patterns like this reflect the success of growth strategies based on long-term profit accumulation.

In contrast, PGAS showed a volatile and relatively low performance. Even in 2020, PGAS recorded a negative ratio (-0.028), which indicates that there was an accumulation of losses or deficits in retained earnings that year. Although the ratio is starting to show improvement to reach 0.059 in 2023, this position still shows that companies have limitations in relying on internal funding for growth financing or repayment of liabilities.

The banking sector such as BBNI, BBRI, BBTN, and BMRI showed relatively stable but lower ratios compared to non-financial sector issuers. The average ratio is in the range of 0.024 to 0.128. This can be explained by the characteristics of the banking industry that more often distributes dividends as well as business models that rely on leverage rather than accumulated retained profits as the main source of financing.

PTBA showed significant spikes in 2021 and 2022 (0.222 and 0.282), reflecting a significant increase in accumulated profits, likely as a result of rising commodity prices or improved operational efficiency. However, a sharp decline to 0.162 in 2023 is worth noting because it can signal an increase in operating costs, a larger dividend distribution, or a decrease in net profit.

Meanwhile, JSMR experienced a positive trend from 0.118 in 2019 to 0.175 in 2023. This increase shows a gradual strengthening in profit accumulation, although the value is still relatively moderate. This condition indicates that there is a gradual financial recovery process that the company is undergoing.

Overall, the ratio of retained earnings to total assets is a reflection of long-term financial health. Companies with high ratios indicate greater capacity to finance expansion from internal sources, as well as potentially have a lower risk of bankruptcy as reflected in the Altman Z score (Idi & Borolla, 2021).

EBIT to Total Assets (X3)

Table 4. EBIT to Total Assets Ratio (%) For 2019 – 2023

No	Issuers	Period				
		2019	2020	2021	2022	2023
1	ANTM	0.023	0.052	0.092	0.115	0.090
2	BBNI	0.023	0.006	0.013	0.022	0.024
3	BBRI	0.031	0.018	0.025	0.029	0.039
4	BBTN	0.001	0.006	0.008	0.010	0.010
5	BMRI	0.026	0.016	0.022	0.028	0.034
6	JSMR	0.031	0.007	0.020	0.041	0.061
7	PGAS	0.038	-0.023	0.062	0.075	0.079
8	PTBA	0.209	0.134	0.287	0.357	0.210
9	SMGR	0.040	0.042	0.042	0.040	0.040
10	TLKM	0.171	0.157	0.158	0.132	0.142

The results of the analysis show that PTBA consistently recorded a very high EBIT to total assets ratio compared to other issuers, with the highest value of 0.357 in 2022. This outstanding performance reflects the company's ability to efficiently manage operations with relatively low leverage on assets. This positive performance is very likely influenced by the increase in coal commodity prices during the period, as well as the cost efficiency carried out by the company. Although in 2023 there was a decrease to 0.210, this value is still relatively high.

TLKM also showed a strong and stable performance with an EBIT ratio ranging from 0.132 to 0.171. This consistency reflects the company's effectiveness in generating profits from long-term assets and demonstrates the stability of operations in the telecommunications sector. This efficiency indicates optimal asset utilization and a solid operational structure.

This is different with issuers such as SMGR, which shows a very stable EBIT ratio but tends to be flat (around 0.040 annually). This indicates consistency of performance, but it can also reflect limitations in improving asset efficiency or low operating margin growth over time.

Meanwhile, PGAS showed significant fluctuations with a negative ratio in 2020 (-0.023), reflecting operational losses or revenues that were unable to cover operating expenses. But. The ratio improved again in 2021 to 2023 (rising to 0.079), indicating a recovery in operational performance, although these fluctuations still indicate the instability of efficient asset management.

JSMR issuers showed an attractive positive growth trend, from a very low ratio (0.007) in 2020 to 0.061 in 2023. This shows significant improvements in the management of operating expenses and the potential recovery from previous financial stresses. This trend is important to observe in the context of operational sustainability and the long-term outlook.

ANTM also showed an increasing trend of EBIT to total assets from 2019 (0.023) to 2022 (0.115), although it decreased slightly in 2023 (0.090). This increase indicates improved efficiency in utilizing assets to generate profits before interest and taxes.

The banking sector represented by BBNI, BBRI, BBTN, and BMRI showed a generally low EBIT to total assets ratio, ranging from 0.006 to 0.039. This is quite reasonable considering the characteristics of the banking industry that operates on the basis of interest margins and financial assets, so that the structure of income and expenses is not fully reflected through conventional EBIT calculations (Nosita & Jusman, 2019). Nonetheless, the positive growth of the ratio over time still points to a healthy recovery direction.

Overall, the ratio of EBIT to total assets is an important indicator in assessing operational efficiency across sectors. Issuers such as PTBA, TLKM, and ANTM showed high efficiency in their operations, which contributed to a higher Altman Z score and reflected the strength of the financial structure. Instead. Companies with low or fluctuating ratios such as PGAS, BBTN, and BBNI need to further evaluate their asset management and operating expenses strategies so that operational performance can be improved sustainably.

Equity Market Value to Book Value of Liabilities

Table 5. Ratio of Equity Market Value to Total Liabilities (%) For 2019 – 2023

No	Issuers	Period				
		2019	2020	2021	2022	2023
1	ANTM	0.132	0.290	0.354	0.380	0.277
2	BBNI	0.213	0.154	0.150	0.193	0.108
3	BBRI	0.449	0.392	0.449	0.479	0.526
4	BBTN	0.083	0.057	0.056	0.054	0.046
5	BMRI	0.341	0.249	0.247	0.300	0.340
6	JSMR	0.491	0.424	0.373	0.330	0.391

No	Issuers	Period				
		2019	2020	2021	2022	2023
7	PGAS	0.914	0.621	0.552	0.723	0.581
8	PTBA	3.878	4.415	2.623	2.578	1.629
9	SMGR	1.621	1.727	1.159	1.334	1.360
10	TLKM	3.783	2.601	3.037	2.950	2.999

From the data presented, PTBA consistently shows the highest ratio among all issuers, with a peak in 2020 of 4,415. This very high ratio indicates that the market value of the company far exceeds the total amount of its liabilities, reflecting very high investor confidence and a very strong capital structure. Although in 2023 there was a decrease to 1,629, this figure still shows an excellent level of solvency.

Similarly, TLKM has maintained a high and relatively stable ratio in the range of 2,601 to 3,783 over the past five years. This performance reflects the market's positive perception of the company's long-term prospects as well as its ability to manage debt well. This consistency indicates fundamental strength in the capital structure and corporate governance.

SMGR also showed a fairly good performance with the ratio being above 1.0 throughout the period. This means that the company's market value is always greater than its total liabilities, which is a positive signal in the context of bankruptcy risk.

In contrast to these companies, BBTN shows the lowest ratio and decreases every year, from 0.083 (2019) to 0.046 (2023). This figure indicates that the market value of the company's equity is almost insufficient to cover its liabilities which can be a serious concern regarding risk perception by investors and creditors. This low value can also reflect limitations in the ability to generate attractive returns in the eyes of the market.

PGAS recorded significant fluctuations in the ratio, from a very high value in 2019 (0.914) which then decreased in 2021 (0.552) before rising again in 2022 (0.723). These fluctuations indicate the instability of market perception of the company's solvency. It is likely to be affected by energy sector volatility, profit performance, or other external factors.

Issuers in the banking sector such as BBNI, BBRI, and BMRI showed a more moderate performance. BBRI stands out with a ratio that tends to increase from 0.449 in 2019 to 0.526 in 2023, indicating a sustained strengthening of market position. Meanwhile, BBNI experienced a sharp decline to 0.108 in 2023. which indicates a weakening of market perception of the company's capital strength. BMRI maintained stability with slight fluctuations remaining in the intermediate zone.

JSMR showed a downward trend until 2022 (0.330) but strengthened again to 0.391 in 2023. This reflects a recovery in market perception of the company's solvency capacity which may be related to improved performance or debt restructuring.

Overall, companies with high ratios such as PTBA, TLKM, and SMGR have very strong solvency positions, reflecting market confidence in their long-term prospects and internal financial strength. On the other hand, companies with low ratios such as BBTN and BBNI need to evaluate their capital strategies and liability management in order to improve investor perception and reduce inherent financial risks. In the framework of the Altman Z-Score, this ratio is the main determinant in classifying a company in a safe zone or distress zone.

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Sales to Total Assets

Table 6. Total Revenue to Total Assets Ratio (%) For 2019 – 2023

No	Issuers	Period				
		2019	2020	2021	2022	2023
1	ANTM	1.084	0.863	1.168	1.365	0.985
2	BBNI	0.018	0.017	0.018	0.020	0.020
3	BBRI	0.106	0.108	0.110	0.103	0.114
4	BBTN	0.036	0.032	0.041	0.042	0.039
5	BMRI	0.062	0.060	0.060	0.063	0.064
6	JSMR	0.264	0.132	0.150	0.182	0.165
7	PGAS	0.522	0.383	0.404	0.496	0.553
8	PTBA	0.835	0.720	0.810	0.940	0.993
9	SMGR	0.506	0.423	0.449	0.439	0.472
10	TLKM	0.613	0.553	0.517	0.535	0.520

ANTM issuers showed a fairly strong and volatile performance with the highest ratio in 2022 of 1,365. This indicates excellent operational efficiency in generating income from the assets owned. Although in 2023 there was a decrease to 0.985, the figure still reflects relatively high efficiency. This change in ratio is likely influenced by fluctuations in the price of metal commodities that greatly impact the volume and value of sales.

Similarly, PTBA showed a stable upward trend from 0.720 (2020) to 0.993 (2023), with the best performance in 2022 (0.940). This trend shows solid revenue growth and efficient asset management. These efficiencies are likely to be influenced by rising global coal prices and a more consolidated production strategy.

PGAS, SMGR, and TLKM also recorded relatively high ratios compared to other sectors with their respective values in the range of 0.4 to 0.6. PGAS even showed an improvement in the ratio from 0.383 (2020) to 0.553 (2023), which signaled a recovery in efficiency after operational pressures during the pandemic. TLKM maintained stability in the range of 0.5 to 0.6, reflecting the consistency of operational performance in the capital-intensive telecommunications sector.

In contrast, the banking sector such as BBNI, BBRI, BBTN, and BMRI, which recorded a very low ratio of income to assets. This is natural considering that the business model of the banking sector generates revenue, mainly from interest margins, so the value of the ratio does not fully reflect the productivity of physical assets as in the real sector. However, BBRI showed a gradual increase from 0.106 (2019) to 0.114 (2023), reflecting stable operating income growth. BBNI and BBTN, although showing a slight improvement, remain below the optimal efficiency threshold.

JSMR recorded a sharp decline from 0.264 (2019) to 0.132 (2020), which was most likely influenced by mobility restrictions during the COVID-19 pandemic. However, the ratio rose again to 0.165 in 2023, indicating a recovery in revenue in line with the recovery of traffic activity and infrastructure investment.

Overall, the ratio of total revenue to total assets describes the efficiency of asset management in generating revenue. Issuers such as ANTM, PTBA, and PGAS show high levels of efficiency and positive trends, reflecting operational strength and effective business strategies. In contrast, the financial and infrastructure sectors such as BBTN, BBNI, and JSMR show low or volatile ratios, which indicates the need for asset optimization or business model transformation to increase asset productivity.

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Altman Z-Score Analysis

Table 7. Altman Z-Score For 2019 – 2023

No	Issuers	Period					Average
		2019	2020	2021	2022	2023	
1	ANTM	1.70	1.65	2.11	2.71	2.12	2.06
2	BBNI	1.49	1.37	1.25	1.32	1.28	1.34
3	BBRI	1.80	1.67	1.73	1.75	1.81	1.75
4	BBTN	1.30	1.25	1.27	1.28	1.27	1.27
5	BMRI	1.63	1.50	1.53	1.59	1.64	1.58
6	JSMR	0.47	0.52	0.61	0.77	0.71	0.62
7	PGAS	1.40	0.77	1.22	1.46	1.32	1.23
8	PTBA	4.39	4.18	4.00	4.42	3.05	4.01
9	SMGR	2.20	2.19	1.87	2.03	2.07	2.07
10	TLKM	3.94	3.06	3.35	3.24	3.30	3.38

Based on the classification of the Altman model, the Z score is divided into three main categories:

Safe Zone (Z > 2.99)

Of the ten issuers analyzed, only two companies, namely PTBA and TLKM, are consistently in the safe zone category (Z > 2.99). These two companies not only demonstrate long-term financial resilience, but also affirm the effectiveness of their operational strategies and cash flow management in creating value for shareholders.

PTBA, as an entity engaged in the coal mining sector, showed the dominance of the highest score (average Z = 4.01), reflecting strong profitability, high accumulated retained earnings, as well as a significant equity market value to its liabilities. This performance is very likely influenced by the supportive global commodity price cycle, as well as disciplined cost efficiency policies. TLKM, on the other hand, reflects the strength of the telecommunications sector which is based on technology-dense assets and relatively stable cash flow. The average Z-Score of 3.38 indicates that Telkom has managed operational and financial risks well, making it a benchmark in corporate governance in the public services sector.

Grey Zone (1.81 < Z < 2.99)

companies such as ANTM and SMGR that are in the transition zone (grey zone) show potential improvement but are still overshadowed by volatility in financial performance. ANTM, with an average Z score of 2.06, showed improvement during the observation period but was inconsistent. This reflects sensitivity to fluctuations in commodity prices and global market conditions. SMGR, with an average score of 2.07, is relatively more stable, but is below the threshold of the safe zone, which indicates the challenge of sustaining growth and operational efficiency.

Danger Zone (Z < 1.81)

On the other hand, banking sector issuers such as BBNI, BBRI, BBTN, and BMRI consistently show a Z score that is below the safe threshold. These values reflect the specific characteristics of the banking industry that have a non-ideal asset and liability structure profile when measured with a book value-based approach such as the Altman Z-Score. Nonetheless, a low score remains an important indicator for risk management, as it reflects pressures on the company's asset efficiency, profit margins, and capital structure. In this case, the Altman Z approach is still relevant to be used as an early warning system, although the interpretation of the financial sector needs to be done contextually.

JSMR occupies the most vulnerable position, with an average Z score of only 0.62. This is an indication of considerable pressure on business continuity, which can come from high leverage, low profitability, and interest expense that suppresses operating cash flow. As a toll road infrastructure manager, JSMR's financing structure, which is dominated by long-term debt, is one of the causes of the low equity market value compared to total liabilities. The sustainability of a long-term project that does not immediately generate cash flow can be a crucial factor in explaining a very low Z score.

DISCUSSION

The main results show that of the ten issuers analyzed, only two companies, PTBA and TLKM, are consistently included in the safe zone category. In contrast, the majority of issuers, including the banking sector such as BBRI, BBNI, BBTN, and BMRI, are in the distress zone, which indicates a fairly high risk of bankruptcy theoretically according to the Z-Score model. Issuers such as ANTM and SMGR are in the grey zone, which reflects the potential for recovery but still needs strategic attention. These findings directly answer the purpose of the research and confirm the hypothesis regarding the inequality of financial health levels across sectors within SOEs.

The results of this study are in line with the findings of Altman et al. (2018), which show that a Z score is effective in detecting early symptoms of financial distress, especially in the non-financial sector. On the other hand, low scores in the banking sector are also in line with previous literature stating that the Altman Z-Score model is less than optimally applied to the financial services sector due to its unique asset and income structure (Nofitasari & Nurulrahmatia, 2021). The consistency of high scores in PTBA and TLKM also corroborates research by Rubunda et al. (2019) which emphasizes the role of retained earnings and equity market value in maintaining long-term financial structure.

One unexpected result is the low Z score of BBRI and BMRI, the two largest and most stable banks in Indonesia empirically. A possible explanation is that the ratio components in the Z model, especially EBIT to total assets and the market value of equity to liabilities, do not accurately reflect the quality of the productive assets of the banking sector based on financial instruments and interest income. Thus, the interpretation of the Z-score in this sector must be understood contextually, and its use is suggested as a complement rather than the only measuring tool.

CONCLUSION

These findings confirm that although state-owned enterprises (SOEs) benefit from structural support provided by the government, not all of them are in a strong financial position. The varying performance among issuers reflects the differences in sectoral risks as well as the effectiveness of each company's management in handling capital, assets, and liabilities. The generally low Altman Z-scores observed in most issuers serve as a critical signal for both policymakers and company management to take proactive steps in enhancing efficiency, reinforcing capital structures, and ensuring long-term financial sustainability.

Strategically, these findings suggest several important directions for SOE management. Companies categorized in the distress zone need to re-evaluate their capital structures, enhance asset utilization, and increase their retained earnings to build resilience. Furthermore, the development of an early warning system based on key financial ratio indicators is crucial for enabling management to identify and respond to financial distress

signals at an early stage. Meanwhile, issuers situated in the grey zone should adopt more adaptive resource allocation strategies to stabilize their operational performance and improve market perception.

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ABOUT THE AUTHOR(S)

1st Author
Ayub Usman Rasid is a lecturer at the Department of Management, Faculty of Economics and Business, Universitas Gorontalo, Indonesia. He earned his Bachelor's degree in Economics from Universitas Gorontalo in 2012 and obtained his Master's

degree in Management from Universitas Muslim Indonesia in 2016. Currently holding the academic rank of Lektor (Assistant Professor), he is a permanent faculty member with an active study permit (Ijin Belajar) status. His research interests span financial management, stock market analysis, and community-based economic development. Among his notable studies are those examining the profitability of Indonesian corporations, macroeconomic factors affecting stock prices, and the development of marine ecotourism in Gorontalo.
Email: ayublpmug@gmail.com
ORCID ID: https://orcid.org/0009-0003-8990-5737

2nd Author
Fahrudin Zain Olilingo is a Professor in the Department of Economics, Faculty of Economics, Universitas Negeri Gorontalo, Indonesia. He completed his Bachelor's degree in Economics at Universitas Hasanuddin in 1984, followed by a Master of Science in Economics from Universitas Padjadjaran in 1995, and earned his Doctoral degree from the same institution in 2002. As a full-time and active academic staff member, he holds the highest academic rank of Professor and has contributed extensively to research in regional development, Islamic social finance, food security, and sustainable economic empowerment. His recent projects include developing Islamic social finance models for coastal community empowerment and market chain analysis of key commodities in Gorontalo in support of the new capital city development.

3rd Author
Hasanuddin is a senior lecturer at the Department of Management, Faculty of Economics and Business, Universitas Gorontalo, Indonesia. He obtained his Bachelor of Economics from Sekolah Tinggi Ilmu Ekonomi Makassar Bongaya in 2003, his Master of Science from Universitas Hasanuddin in 2009, and completed his Doctoral degree in Management at Universitas Muslim Indonesia in 2020. Holding the academic position of Lektor (Assistant Professor), he is a permanent and active faculty member committed to teaching and research in the field of management. His academic interests include sustainable business practices, community development, and corporate social responsibility. One of his notable research projects focused on mangrove cultivation in self-reliant village areas supported by PT Vale Indonesia Tbk.

4th Author
Roydah Gani is a permanent lecturer at the Department of Management, Faculty of Economics and Business, Universitas Gorontalo, Indonesia. She earned her Bachelor's degree (Doktoranda) in Economics from Universitas Sam Ratulangi in 1989 and completed her Master’s degree in Management at Universitas Muslim Indonesia in 2010. Currently active in academic teaching and research, her scholarly interests include financial performance analysis, corporate liquidity and solvency, and human resource development. Among her recent studies are financial performance evaluations of major Indonesian companies such as PT Astra International Tbk and PT Indofood Sukses Makmur Tbk, as well as research on employee work ethics and career development.