



## Financial distress analysis using modified altman z-score model on PT.PLN (Persero) during the Covid-19 pandemic

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### ABSTRACT

During the Covid 19 Pandemic, many companies experienced financial problems and had the potential to go bankrupt. Companies feel this private and state-owned condition, one of which is PT. PLN. As a form of anticipation of bankruptcy, a system is needed that can provide an early warning—financial distress analysis at PT. PLN during the Covid-19 Pandemic can be done by analyzing the Modified Z-Score Model. From the calculation of Z-Score in 2019, it is 3,688. Where  $Z > 2.60$  indicates that PT PLN's financial condition is in the safe zone. Where, PT. PLN in 2019 is in good health and has a tiny possibility of bankruptcy. In 2020, the calculation of Z-Score 2020 was more than 2.60, which is 3.4971. So in 2020, the financial condition of PT. PLN is also in the safe zone and less likely to go bankrupt. Meanwhile, based on the results of the Z-Score calculation in 2021, PT. PLN is 1.6727, where the Z-Score is  $1.10 < Z < 2.6$ . Based on these values, PT. PLN is in a gray zone, where the company is vulnerable. In this condition, the company experiences financial problems that must be handled appropriately.

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## 1. INTRODUCTION

Companies in Indonesia from various sectors were affected during the Covid-19 Pandemic. During the Covid 19 Pandemic, many companies in various fields experienced financial problems and faced potential losses (Pratiwi & Christian, 2021). This condition is felt by many private and state-owned companies, one of which is PT. PLN (State Electricity Company). PT PLN is an electricity company owned by Indonesia. PT. PLN is the only state-owned electricity company. This is a challenge for PLN to survive and provide excellent service during the Covid-19 Pandemic. PT. PLN has developed from time to time. PLN has a considerable role in the Indonesian economy to realize the welfare of the Indonesian people (Reisando, 2022). PT. PLN as the only electricity supplier in Indonesia, causes many companies to depend on PT. PLN. However, during the Covid-19 Pandemic, many companies went out of business and stopped their operations, which

also impacted PT. PLN. During the Covid pandemic, with limited economic activities, of course, it affected the activities carried out by PT. PLN.

BPS (Badan Pusat Statistik) recorded that in August 2020, the open unemployment rate was 7.07%. There are 29.12 million people (14.28 percent) of the working-age population affected by Covid-19, consisting of the unemployed due to Covid-19 (2.56 million people), Non-Work Force (BAK) due to Covid-19 (0.76 million people), temporarily unemployed due to Covid-19 (1.77 million people), and working residents experiencing reduced working hours due to Covid-19 (24.03 million people). With so many companies experiencing losses during the Covid-19 pandemic, it also caused a decline in the Indonesian economy. Based on BPS (Badan Pusat Statistik) data, current prices' Gross Domestic Product (GDP) reached IDR 15,434.2 trillion, and GDP per capita reached IDR 56.9 million or US\$3,911.7. Indonesia's economic growth decreased in 2020, namely 2.07%.

The limited community activities during the Covid-19 pandemic naturally raised concerns and financial difficulties for the company. Therefore, to anticipate the company's financial difficulties, a system is needed to provide an early warning about potential financial difficulties. Early warning functions as a tool that can detect financial problems that threaten the company's continuity so that the company can detect potential bankruptcy that can occur at any time. Apart from internal aspects, financial distress is also caused by external factors where in recent years, the condition of the world economy is still vulnerable and full of risks (Samsi, 2022)

Financial distress occurs before bankruptcy. Bankruptcy is usually defined as a State or situation where companies fail or can no longer meet the debtor's obligations because the company is experiencing a shortage and the insufficiency of funds. (Ningsih & Fitri Permatasari, 2018). Bankruptcy (Rudianto, 2013) is a failure in running a business company to achieve its goals. According to Indri (2013), Financial distress is when the company's operating cash flow is inadequate to pay off current liabilities (such as trade payables or interest expenses) and is forced to take corrective actions. Financial distress occurs when the company cannot meet its payment schedule or when cash flow projections indicate that it will soon be unable to meet its obligations (Bringham & Daves, 2014).

Ten signs that can indicate financial distress are cash flow problems, default on bills, extended terms, high-interest payments, falling margins, increased overhead costs, decreased sales, unusually high accounts receivable, high turnover, and moral decline. (Steel) Potential bankruptcy detected quickly allows the company's management to take appropriate actions tailored to the company's conditions. The company's bankruptcy risk can be seen and measured through financial reports using ratio analysis of the company's financial statements. Ratio analysis is an essential tool to find out the company's financial position and the results that have been achieved to select the company's strategy that has been implemented. (Kurniawati & Kholis, 2016) . Financial statement analysis is an essential tool to find out the company's financial position and the results achieved related to the selection of company strategies that have been carried out. (Sagho & Merkusiwati, 2015). Companies must prepare financial statements that will be audited. Auditors should disclose the problems regarding the viability (going concern) client company if there is a firm indication of the bankruptcy of the company (Khaddafi, Heikal, & Nandari, 2017)

Based on the financial report data of PT. PLN (Persero) in 2019, 2020 and 2021, it is known that current assets in 2019 are Rp. 151,366,673.00, in 2020 Rp. 97,228,505.00, and in 2021, namely 85,911,375.00, this shows that current assets from 2019 to 2020 have decreased by Rp. 54,138,168.00, and a percentage of 35.77%. Current assets from 2020 to 2021 have decreased by Rp. 11,317,130.00 and a percentage of 11.64%. Even though the decrease from 2020 to 2021 is not as big as the decrease in current assets from 2019 to 2020, this decline still needs to be anticipated.

Apart from assets, it is known that the current debt of PT. PLN (Persero) in 2019 is Rp. 159,298,153, in 2020, it is Rp. 149,629,528.00, and in 2021 that is Rp. 146,538,480.00. In contrast to the current assets in 2019, 2020 and 2021, the current debt of PT. PLN shows different conditions. Where is the current debt at PT. PLN from 2019 to 2020 has decreased by 6.1%, namely Rp. 9,668,625.00, and from 2020 to 2021, it decreased by 2.1%, Rp. 3,091,048.00. Based on the financial statements of PT. PLN, working capital of PT. PLN from 2019 to 2021 tends to decline. Based on the financial reports in the first quarter of 2020, PT PLN (Persero)'s net profit was IDR 251.6 billion. Despite experiencing a profit, the total profit decreased by 96% from the previous year, Rp. 7.3 Trillion. Profit does not guarantee whether a company is healthy and does not experience the potential for bankruptcy because changes in the economy always occur, and trends in consumer needs are increasingly varied, coupled with unpredictable conditions.

Based on the general condition of PT. PLN, described above, is essential for us to know the financial distress at PT. PLN during the Covid-19 Pandemic. This is done as a form of early warning to determine the financial difficulties at PT. PLN. Financial distress at PT. PLN during the Covid-19 Pandemic can be done by conducting a financial ratio analysis using the Z-Score model analysis. In financial statement analysis, a financial ratio is a tool that can describe any post that needs more attention. Many users have used the financial ratio. However, the financial ratio has limitations. Z-score is a method that can eliminate the limitation. Z-score was invented by Altman. Z-score is the bankruptcy prediction method. (Ariesta, Suhadak, & Nuzula, 2015). Model Altman Z-score is a multivariate analysis model that predicts corporate bankruptcy with relatively reliable precision and accuracy. This study aims to improve the company's financial performance and bankruptcy prediction based on the discriminant analysis results using a model of Altman (Khaddafi et al., 2017). Z-Score Model (Sartono, 2010) is used in predicting the bankruptcy rate of a company by entering the ratio value into an equation. Where later, the value of "Z" will describe how the condition of the company, the ratio values entered are values that are considered to have the most critical influence on the condition of the company (Putri, Setiawan, Akuntansi, Bandung, & Barnas, 2020)

At first, According to Altman (Altman, 1968), Altman invented a method to predict the company condition by combining several ratios in 1968. The Altman Z-Score method has undergone three changes, namely the Altman Z-Score model First (1968) can be done only in public manufacturing companies, then the Altman Z-Score Revision (1983) is a development of the previous formula so that it can be used in manufacturing companies in both the form of going public and private and the last change, the Altman Z-Score Modification (1995) is used by various types of industries that are going public and private (Tania, Pratiwi, & Laksana, 2021)

## 2. RESEARCH METHOD

The type of research used in this study is quantitative descriptive. Descriptive research is a study that tells and interprets data that occurs during the research and presents it as it is (Subana, 2009). Meanwhile, According to Listiani (Listiani, 2017), descriptive research quantitative is describing, researching, and explaining what something is learned existence and concluding observable phenomena using numbers. Quantitative descriptive research is a quantitative descriptive research method that aims to describe a phenomenon, event, symptom, and event that occurs factually, systematically, and accurately. Phenomena can be in the form of forms, activities, relationships, characteristics, and similarities or differences between phenomena (Sugiyono, 2015). Quantitative descriptive research describes the contents of a variable in research, not intended to test specific hypotheses (Marlina, 2020). Thus, this research does not test a particular hypothesis but instead describes the variables in this study.

This study will illustrate how the level of financial distress of PT. PLN during the Covid-19 Pandemic. This study used quantitative data. Quantitative data (Sugiyono, 2019) is numerical or qualitative data numbered/scoring). The quantitative data used in this study is the financial statements of PT. PLN. The financial statements of PT. PLN was obtained from the IDX (Indonesia Stock Exchange) website. The financial reports used are financial reports during the Covid19 Pandemic, namely the financial statements for 2019, 2020 and 2021.

The data analysis method used in this study is descriptive quantitative data analysis. Descriptive quantitative data analysis is carried out by processing data obtained in such a way and then describing a phenomenon from the results of data processing as the conditions that exist in the data obtained. The data obtained will be analyzed with the Altman Z-Score Modification formula.

Several components in the financial statements are used to determine financial distress. They are working capital, total assets, retained earnings, earnings before interest and tax, book value of equity, and book value of liability. According to Juliawan, (Juliawan et al.,2020), working capital is all current assets owned by the company, or it can also be intended as funds that must be available to finance the company's daily operations. Working capital is an essential thing in the company's operations. In addition to working capital, total assets determine the company's condition. Total assets are all assets owned by the company, both current assets, tangible assets, and intangible assets. According to Purnama (Purnama, Harjadi, & Juwita, 2021), Total Assets measure how large and small a company is on financial statements.

Retained earnings also affect the company's condition; according to Dahmash (Dahmash, Alshurafat, Hendawi, & Alzoubi, 2023), retained earnings are accumulated portions of previous net profits undistributed to the shareholders. Retained earnings significantly impact the likelihood of dividend payout compared to profitability, growth opportunities, and firm size (Yusra, Hadya, & Fatmasari, 2019). Besides retained earnings, earning before interest and taxes is essential for the company too. EBIT shows how much profit the company generates from its operational activities without including elements of interest costs or taxes. In other words, this indicator, often called operating profit, is a tool to measure company performance and profitability (Bani, 2022)

The components of the financial statements above are part of the calculation of financial distress, where data processing by calculating the four company's financial ratios is contained in the Altman Z Score model. These financial ratios include the following: (a) Working capital to total assets (X1): The ratio is used to determine the ability of all assets to obtain working capital, namely the difference between current assets and current debt.; (b) Retained earnings to total assets (X2): This ratio determines the ability of all company assets to generate profits that are not distributed to owners. (c) Earnings before interest and taxes on total assets (X3): This ratio determines the ability of all company assets to generate profits that are not distributed to owners.; (d) Book Value of equity to book value of liability (X4): This ratio is helpful to determine if the company's equity can meet the obligations the company must repay. (Nirmalasari, 2018)

The formula of the Altman Z Score Modified method with the following formula:

$$Z = 6.56X1 + 3.26X2 + 6.72X3 + 1.05X4$$

Information:

$$\begin{aligned}
 X1 &= \frac{\text{Working Capital}}{\text{Total Assets}} \\
 X2 &= \frac{\text{Retained Earning}}{\text{Total Assets}} \\
 X3 &= \frac{\text{Profit Before Interest and Tax}}{\text{Total Assets}} \\
 X4 &= \frac{\text{Book Value of Equity}}{\text{Book Value of Total Liability}}
 \end{aligned}$$

(Purnamasari & Kristiastuti, 2018)

The calculation with the formula above will produce a Z-Score, where later, the company will be grouped based on the Z-Score, and the value is used as a reference to find out whether there are indications of financial distress in the company. Here is the Z-Score table and indications of financial distress :

Table 1. Z-Score and indications of financial distress

Z score	Indication
<1.10	Dangerous zone, where the company is in bankruptcy (experiencing financial difficulties and high risks).
1.10 < Z < 2.6	A gray zone, where the company is in a vulnerable condition. In this condition, the company experiences financial problems that must be handled appropriately.
Z > 2.60	The safe zone, where the company is in good health so that the possibility of bankruptcy is tiny

(Melia & Febrimaiko, 2023)

### 3. RESULTS AND DISCUSSIONS

Based on data obtained from the annual financial statements of PT. PLN (Persero) in 2019, 2020, and 2021 obtained the following results:

Table 3. Financial Statement Data of PT. PLN (Persero) in 2019-2021

Information	2019	2020	2021
Total Assets	1.585.055.013,00	1.588.914.720,00	1.613.216.456,00
Total Liability	655.674.600,00	649.102.128,00	631.609.333,00
Current Assets	151.366.673,00	97.228.505,00	85.911.375,00
Current Debt	159.298.153,00	149.629.528,00	146.538.480,00
Working Capital	- 7.931.480,00	- 52.401.023,00	- 60.627.105,00
Profit before tax	26.119.210,00	12.291.919,00	23.221.084,00
Equity	929.380.413,00	939.812.592,00	981.607.123,00
Retained Earnings	70.997.731,00	71.928.554,00	84.962.218,00

From the table above, there has been a change in the total amount of assets, total liabilities, current assets, current debt, working capital, profit before tax equity, and retained earnings. These changes can be seen in the following histogram:

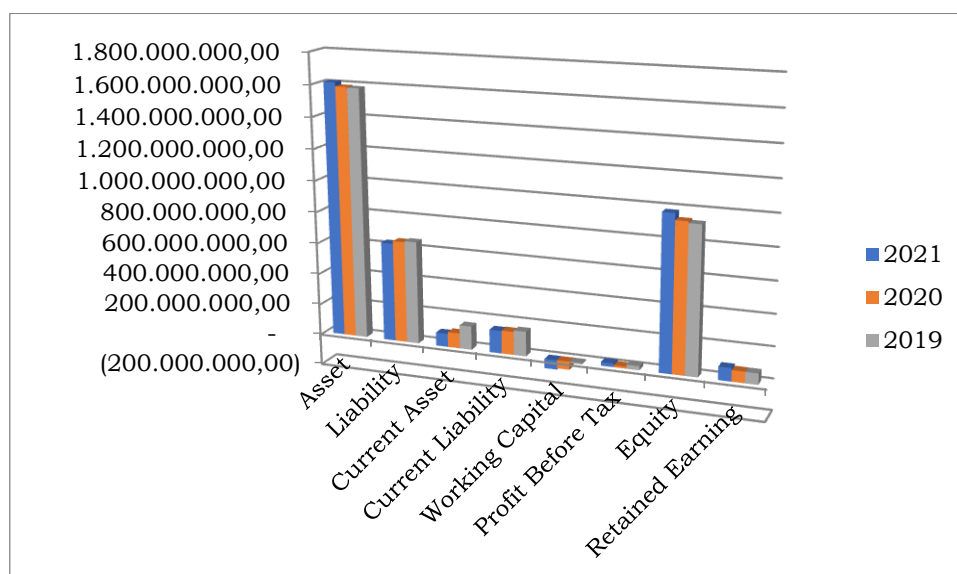


Figure 1. Financial Data Histogram

The modified Altman Z-Score model was analyzed by calculating the ratio first from the data above.

Table 3. Table of ratio calculation results

Information	2019	2020	2021
X1	-0,0050	-0,0330	-0,0376
X2	0,5863	0,5915	0,0527
X3	0,0165	0,0077	0,0144
X4	1,4174	1,4479	1,5541

Furthermore, from the results of the ratio calculation, calculations are carried out using the Modified Altman Z-Score model as follows:

Table 4. Calculation Modified Altman Z-Score

The year 2019
$6,56X1 + 3,62X2 + 6,72X3 + 1,05X4$
$= 6,56 (-0,0050) + 6,72 (0,5863) + 6,72 (0,0165) + 1,05 (1,4174)$
$= 3,688$
The year 2020
$6,56X1 + 3,62X2 + 6,72X3 + 1,05X4$
$= 6,56 (0,0330) + 3,62 (0,5915) + 1,05 (1,4479)$
$= 3,4971$
The Year 2021
$6,56X1 + 3,62X2 + 6,72X3 + 1,05X4$
$= 6,65 (0,0376) + 3,62 (0,0527) + 1,05 (1,5541)$
$= 1,6727$

From the calculation results above, the Z-Score in 2019 was 3,688, where  $Z > 2.60$  indicates that PT PLN's financial condition is in the safe zone. The Z-Score in 2019 shows that the company is in good health, so the possibility of bankruptcy is tiny. In line with 2019, based on the results of the Z-Score calculation, in 2020, it was more than 2.60, which is 3.4971. so that in 2020 the financial condition of PT. PLN is also how much is in the safe zone. In 2020 PT. PLN is in good financial condition and is unlikely to go bankrupt. Meanwhile, based on the results of the Z-Score calculation in 2021, PT. PLN is 1.6727, where the Z-Score is  $1.10 < Z < 2.6$ . Based on these values, PT. PLN is in a gray zone, where the company is vulnerable. In this condition, the company experiences financial problems that must be handled appropriately.

#### 4. CONCLUSION

Based on the calculation results of the Modified Altman Z-Score model, the 2019 Z-Score was obtained at 3.688, where  $Z > 2.60$ . This indicates that the financial condition of PT PLN in 2019 is in a safe zone and PT. PLN has a very good financial situation, so the possibility of bankruptcy is very small. In 2020, it was based on the results of the 2020 Z-Score calculation of 3.4971, where Z is more than 2.60. Just like the previous year, in 2020, the financial condition of PT. PLN is in the safe zone. In 2020 PT. PLN is in sound financial need and is unlikely to go bankrupt. Meanwhile, based on the calculation of the Z-Score for 2021, PT. PLN is 1.6727, where the Z-Score is  $1.10 < Z < 2.6$ . Thus, PT. PLN is in the grey zone, where companies are vulnerable. In this condition PT. PLN is experiencing financial problems that must be resolved correctly and policies to avoid bankruptcy. Based on the calculation results of the Altman Z-Score model during the Covid-19 pandemic, it shows that in 2019 and 2020, the financial condition of PT. PLN is in a safe condition, while in 2021, the financial condition of PT. PLN shows a vulnerable situation where there are financial difficulties in that year. Thus, even though PT. PLN is the only electricity company in Indonesia, but PT PLN may need help with economic

challenges. This happened to PT. PLN in 2021. Therefore, companies need to anticipate matters that can affect the company's financial condition both internally and externally, as happened during the Covid-19 Pandemic.

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