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Analysis of the Effect Financial Ratios to Probability Default With the Risk as Moderation in Indonesian Building Construction Sub-Sector Companies

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ABSTRACT: The construction and building sector are one of the important sectors for Indonesia development and economy, furthermore it is also being an indicator in assessing the economic development of a country. The development in the sector of construction and building, which is currently facing intense market competition, is encouraging many companies to improve their management fundamentals. A company's inability to anticipate changes can result the decreasing in business volume, which eventually has a negative impact on profits and caused bankruptcy. The aim of this research is to analyze the effect of GPM, NPM, CR, DER, TIE, and TATO by moderating risk on probability default (probability of bankruptcy) in the construction and building companies in Indonesia which registered on the IDX for the 2014-2023 period. The research method used in this research is a panel data model to estimate the coefficient model. The result shows that Total Assets Turnover (TATO) has a positive and significant effect on the probability of bankruptcy. Meanwhile, Gross Profit Margin (GPM), Net Profit Margin (NPM), Current Ratio (CR), Debt Equity Ratio (DER), and Times Interest Earned (TIE), does not have a significant effect on the probability default in the construction and building companies.

KEYWORDS: Probability Default, Total Assets Turnover, Gross Profit Margin, Net Profit Margin, Current Ratio, Debt Equity Ratio, Times Interest Earned.

I. INTRODUCTION

The phenomenon of financial difficulties in public companies listed on the Indonesia Stock Exchange (BEI) occurred due to Covid 19 in 2020. Many companies experienced financial difficulties due to Covid 19 and did not get the opportunity to sell their products, so they used their assets and capital to survive. during the pandemic. However, the company's inability to replace the capital and assets used during several periods of the pandemic caused instability in their financial. Financial performance problems in construction and building companies in Indonesia are one of the challenges that often faced by these companies. Some of the main problems that can cause financial distress including unstable economic growth, fluctuations in raw material prices and external variables such as the COVID-19 pandemic. Moreover, excessive debt, high production costs, and less effective financial management can also cause financial distress.

Rising debt and declining financial performance are the challenges for the construction sector. It is projected that improving the performance of this sector this year will be difficult because the risk in stocks with low valuations is still high. The share prices of construction issuers experienced a significant decline. For example, PT Waskita Karya experienced a weakening of 43% since the beginning of the year, while PT Wijaya Karya weakened by 34%, PT PP fell 17%, and PT Adhi Karya weakened almost 5%. Particularly in the State-owned companies show a downward trend in the medium to long term. This condition is related to the issuer's fundamentals which are burdened by a high debt to equity ratio (DER) and poor cash flow performance. In the first quarter of 2023, construction fundamentals show a significant decline in financial performance. PT Waskita Karya recorded a net loss of more than 374 billion rupiah with a very small decline in revenue. PT Wijaya Karya also recorded a net loss of more than 521 billion rupiah, while PT Adhi Karya's revenue fell drastically by 30%. Only PT PP recorded a slight increase in revenue and net profit. Before the Covid 19 pandemic, State-owned companies was still able to overcome their debt. However, the pandemic situation caused a drastic decline in revenue, thereby eliminating their ability to bear debt, which ultimately resulted in the company's net

loss. In the third quarter of 2023, the performance of BUMN Karya issuers will still vary. PT Wijaya Karya recorded a very large net loss even though its revenue rose almost 18% compared to the same period the previous year. Waskita Karya experienced a drastic change from profit to a large net loss, with a decline in revenue of more than 24%. On the other hand, PT Adhi Karya recorded a slight net profit with a significant increase in revenue. PT PP recorded a fairly large increase in net profit even though its revenue decreased slightly (Kontan.id).

The management of public companies must control their financial performance carefully to obtain early information whether the company is still in good financial condition or is already in the stage of financial difficulty. It is important to know the symptoms of early financial distress (Pranowo et al., 2010). The company's financial condition reflects accurate financial conditions. Conditions and events experienced by a company can provide an indication of the company's continuity, such as significant and ongoing operational losses. This raises doubts about the company's sustainability. Some literature states that changes in share prices are influenced by various factors, including the fundamental condition of the company, the law of supply and demand, interest rates, fluctuations in foreign exchange rates, foreign funds entering the stock exchange, news and rumors, dividends, company profits,and other factors (Mayliza et al., 2020). It can be said that company performance is influenced by fundamental factors or internal and external factors.

Driving factors for companies experiencing bankruptcy or financial difficulties caused by internal controls or miss-management within the company and external company factors such as the economic situation which can also influence performance of the company. Miss-management will result in the company's performance being down compared to previous performance. Miss-management is always reflected in the ratio corporate finance (Manurung, et al., 2020). Therefore, financial performance will be examined as an independent variable in this research. Profitability ratios reflect the company's ability to generate profits by utilizing company resources such as assets, capital, or sales including the liquidity ratio that provides description of how company's ability to pay its current debt, ratio Solvency describes a company's ability to pay short-term debt and long term, as well as the activity ratio will give an idea of how the effectiveness of the company employing the company's resources.

Altman, (1968) argued that measuring profitability, liquidity, and ratios solvency is the most significant ratios in predicting company bankruptcy. Altman, (1968) also predicted bankruptcy using discriminant analysis. Beaver (1966, 1968) predicts whether a company will bankrupt or not by using univariate method on the thirty financial ratios. Furthermore, Merton (1974) introduced the failure model with a modification of the Black-Scholes Model regarding option prices. This Merton model was modified by KMV so that the company's failure mode is well-known as the KMV Model. Duffie & Singleton (2003) develop company failure with the availability of company information.

Bankruptcy is a process that results in the company being unable to pay the company's short-term and long-term debts. According to Platt & Platt (2002) financial distress has been defined as a decline or even a state of decline. Financial distress is a topic of interest in the financial sector as an important indicator for users interested in knowing more about company performance. There are some researches regarding financial difficulties or financial distress. Charalambakis & Garrett (2019) investigated the determinants of corporate financial distress using a multi-period logit model and concluded that profitability, leverage, size, and output growth rate have significant predictive power on financial distress for Greek companies. Research conducted by Risma & Munandar (2023) analyzed financial distress In the building construction sub-sector companies, the results were that the construction and building sub-sector was within grey zone until distress zone. Research by Mayliza et al. (2020) analyzed financial ratios against probability default in coal mining companies in Indonesia. This research tries to use the financial ratio variable as an independent variable, by adding a moderating variable, namely risk.

The main objective of this research is to identify several factors determining the probability of bankruptcy in the construction and building industry in Indonesia, using data for the last 10 years, 2014-2023. Researchers use the Merton model and develop this model, to determine the company's performance in paying its receivables, and find out estimates if this occurs default probability in companies that can lead to bankruptcy. Apart from that, to find out what ratio has the most influence on default probability Construction Company.

II. LITERATURE REVIEW AND HYPOTESIS DEVELOPMENT

A. Probability Default

There are several research done on measuring the probability of bankruptcy. Summary Measuring the risk of failure was started by Beaver (1966) using a Univariate model that uses financial ratios. Furthermore, Altman (1968) used a discriminant model to classify companies that failed or were unable to pay debts, known as Altman's Z-Score Model. Merton (1974) introduced the failure model with a modification of the Black-Scholes model of option pricing. Merton stated that company failure can be estimated using indicators of total assets, equity and company debt. Increasing debt and a lack of assets that are unable to pay

debts result in companies failing to pay debts. The Merton model was modified by KMV so that the company's failure mode is well-known as the KMV Model. This model is based on a modification of the Black-Scholes-Merton framework that states that default conditions can occur at any time and do not need to occur when the obligation matures. This KMV Merton model calculates Expected Default Frequency (EDF), namely the probability of failure over the next few years or years for the company whose shares are traded.

B. Stock Price Risk

Stock price risk is a situation in the stock investment market where a stock price has the possibility of causing a loss or the opportunity for a profit from investment decisions made by investors regarding the stock price. To measure the risk level of a company's share price, use the equation of standard deviation. Risk is calculated using prices because all information is reflected in stock prices (Fama, 1965 and 1970). The daily stock price data used is then calculated return and the number 252 to show that the market opened in the 4th year, because the market is not open on Saturdays and Sundays (Manurung et al., 2020)

C. Gross Profit Margin

This ratio is used to measure management effectiveness as demonstrated by profits generated from company sales and investments. There are two types of this ratio, the first one shows the probability in relation to sales, and the second one shows probability in relation to an investment. These two types of reliability ratio show the effectiveness of the company's operations. Ciptawan & Frandjaja Research (2022) Gross Profit Margin has a positive influence on financial distress, this research is in line with Manurung et al. (2020) which states that GPM has a positive significant effect to Expected Default Frequency, while the results of the research carried out by Mayliza et al. (2020) state that Gross Profit Margin has negative and significant effect on probability default. Based on this explanation, then the first and seventh hypotheses can be formulated as follows:

H1: Gross Profit Margin negative and significant effect on Probability Default

H7: Risk moderates the intermediate influence Gross Profit Margin to Probability Default

D. Net Profit Margin

This ratio is the result of the company's operational activities in a one period, and the effective measurement for evaluating company management capabilities. This ratio shows how much net profit the company obtains from every Rupiah of sales made. The higher the NPM, the better it is for the company (Lieu et al. 2008). Udin et.al (2017) found that NPM was negatively related to probability of financial distress, which showed that the profit margin decreases for company causes an increase of the company failure. Murni et al. (2019) stated that net profit margin has positive and significant effect on financial distress, while another research conducted by Balasubramanian et al. (2019) showed that NPM has a negative and significant effect on distress probability. Based on this explanation, the second and eighth hypotheses can be formulated as follows:

H2: Net Profit Margin negative and significant effect on Probability Default

H8: Risk moderates the intermediate influence Net Profit Margin to Probability Default

E. Current Ratio

Liquidity shows the company's ability to pay all obligations short-term finance using current assets owned by the company. Liquidity position is related to the company's ability to pay due date in the short term, and the possibility of the company experiencing internal problems. If the company is in liquid condition, then the company will automatically be able to cope with financial distress. The lower the company's CR, the higher the possibility of financial difficulties (Shrivastava et al., 2018). A high CR indicates that the company can fulfill its current obligations when due date, so that fewer companies are threatened with bankruptcy. Research by Bukhori et al. (2022) states that liquidity (current ratio) has a negative and significant effect to financial distress, increasing liquidity will decrease possibility or probability financial distress. This is in line with research conducted by Charalambakis & Garrett (2019), Iftinan & Trisnawati (2023), Mahardika & Mulyawan (2023), Nurrahmi et al. (2023). Based on this explanation, then the third and ninth hypotheses can be formulated as follows:

H3:Current Ratio negative and significant effect on Probability Default

H9: Risk moderates the intermediate influence Current Ratio to Probability Default

F. Debt Equity Ratio

Leverage is a ratio that describes the company's capabilities to pay debts both short term and long term. In other words, the company able to finance the assets obtained by comparing total liabilities to total assets or shareholder securities. Research result done by Iftina & Trisnawati (2023) stated that debt to equity ratio influence the finances distress caused by increasing debt. The company cannot optimize the debt so that the DER value is high. This is in line with research conducted by Sarina et al. (2020) whose research results showed that debt to Equity ratio has a significant effect on financial distress. The results of this research

are supported by Sutra & Mais (2019), Wahyuni & Rubiyah (2021), Endiramurti et al. (2022), and Andreini & Safrida (2023). Based on this explanation, then the fourth and tenth hypotheses can be formulated as follows:

H4: Debt Equity Ratio negative and significant effect on Probability Default

H10: Risk moderates the intermediate influence Debt Equity Ratio to Probability Default

G. Times Interest Margin

This ratio measures the ratio between the amount of interest due this year and operational profit. Time interest earned is the ratio between interest expense and profit before interest and taxes or operating profit. This ratio shows the ability of operational profit to pay interest (Manurung et al., 2020). The research results stated Time Interest Earned has significant negative effect on Expected Default Frequency. This is in line with research conducted by Mayliza et al. (2020) that stated EBIT/TIE has a negative and significant effect on probability default. Based on this explanation, then the fifth and eleventh hypotheses can be formulated as follows:

H5: Times Interes Margin negative and significant effect on Probability Default

H11: Risk moderates the intermediate influence Times Interest Margin to Probability Default

H. Total Asset Turnover

This activity ratio describes how the company's asset turnover activities (Kasmir, 2016). This ratio also states how many assets must be provided for earning one rupiah on sales. It indicates that if the company is able to manage their assets well and rotate their assets well, then there is lower chance for experiencing financial distress. Research done by Sasongko et al. (2021) stated that total assets turnover (TATO) influences financial distress. If retail Trade Company is able to manage its assets well, then the company will be able to return cash to investors, so there is less chance of financial losses distress. The results of this research are in line with research done by Mahardika & Mulyawan (2023), Oktariyani (2019), Asfali (2019), Manurung et al. (2020) which stated that Total Assets have an influence negative towards Expected Default Frequency. Based on this explanation, then the sixth and twelfth hypotheses can be formulated as follows:

H6: Total Asset Turnover significant negative effect on Probability Default

H12: Risk moderates the intermediate influence Total Asset Turnover to Probability Default

III. RESEARCH METHODS

This type of research is quantitative research using descriptive analysis and causal analysis. Quantitative research methods are research methods based on the philosophy of positivism. This approach is used for certain populations or samples using quantitative or statistical data analysis, with the aim of testing hypotheses that have been previously formulated (Manurung, 2019). This research aims to explore the influence of Gross Profit Margin (GPM), Net Profit Margin (NPM), Current Ratio (CR), Debt Equity Ratio (DER), Times Interest Earned (TIE), and Total Assets Turnover (TATO) which is moderated by the risk of the condition financial distress in mining sector companies in Indonesia. The sampling techniques in this study used purposive sampling. Sugiyono (2018), namely the sample selection process which is carried out with various specific considerations in accordance with the criteria created by the researcher.

The data used in this research is secondary data obtained from the company's official website and the Indonesian Stock Exchange, covering the period 2014 to 2023. The sample consists of 9 companies that have complete data for this period. The data analyzed in this research only from the period of 2014 to 2023 for calculating the expected default frequency. The variables and measurements used in this research aim to determine the relationship between the independent variables and moderating variables on the dependent variable where each measurement is as follows:

Table 1. Identification and Measurement of Variables

Variable	Symbol	Operational definition	Source
Expected Default Frequency	EDF	$DD_t = \frac{log\left[\frac{V_0}{D}\right] + r - \frac{\sigma^2}{2} * T}{\sigma\sqrt{T}}$	(Merton, 1974)
Gross Profit Margin	GPM	$GPM = \frac{Gross\ Profit}{Net\ Sales}$	(Manurung, 2022)
Net Profit Margin	NPM	$NPM = \frac{Net\ Income}{Net\ Sales}$	(Manurung, 2022)

Current Ratio	CR	$CR = \frac{Current\ Asset}{Net\ Sales}$	(Manurung, 2022)
Debt Equity Ratio	DER	$DER = \frac{Debt}{Equity}$	(Manurung, 2022)
Times Interest Earned	TIE	$TIE = \frac{EBIT}{Interest\ Expense}$	(Manurung, 2022)
Total Assets Turnover	TATO	$TATO = \frac{Net\ Sales}{Total\ Asset}$	(Manurung, 2022)
Risk	RISK	$\sigma = \sqrt{\frac{\sum_{i=1}^{252}(R_i - E(R_i)^2}{n-1}} * 252$	(Manurung et al., 2020)

The model in mathematics is as follows:

$$EDF_{i,t} = \beta_0 + \beta_1 \mathrm{GPM}_{i,t} + \beta_2 \mathrm{NPM}_{i,t} + \beta_3 \mathrm{CR}_{i,t} + \beta_4 \mathrm{DER}_{i,t} + \beta_5 \mathrm{TIE}_{i,t} + \beta_6 \mathrm{TATO}_{i,t} + \beta_7 (\mathrm{GPM} * \mathrm{RISK})_{i,t} + \beta_8 (\mathrm{NPM} * \mathrm{RISK})_{i,t} + \beta_9 (\mathrm{CR} * \mathrm{RISK})_{i,t} + \beta_{10} (\mathrm{DER} * \mathrm{RISK})_{i,t} + \beta_{11} (\mathrm{TIE} * \mathrm{RISK})_{i,t} + \beta_{12} (\mathrm{TATO} * \mathrm{RISK})_{i,t} + \varepsilon_{i,t}$$

This research uses a panel data model to estimate the relationship between several independent variables to determine the probability of bankruptcy of construction and building companies as the dependent variable and Gross Profit Margin (GPM), Net Profit Margin (NPM), Current Ratio (CR), Debt Equity Ratio (DER), Times Interest Earned (TIE), and Total Assets Turnover (TATO) as an independent variable. This research also uses risk as a moderating variable. The Panel Data Model is suitable for data that has a short time series and small companies as samples. In addition, the panel data model also shows time and cross-section as samples.

IV. ANALYSIS RESULT

A. Descriptive Analysis

Descriptive analysis used the data in table 3 which contains the minimum, maximum, average (mean), and standard deviation, skewness and kurtosis values of each research variable.

Table 2. Descriptive Statistics

	EDF	GPM	NPM	CR	DER	TIE	TATO	RISK
Mean	0.936941	0.178482	-0.008560	1.479823	2.571026	-191.4156	0.672387	0.434239
Median	0.975850	0.136531	0.034241	1.411303	1.624157	-3.982056	0.527477	0.393805
Maximum	1.000000	2.712161	0.541160	2.503456	31.35506	4.568513	5.260542	1.387840
Minimum	0.564000	-0.300854	-1.114453	0.639725	0.439237	-8043.134	0.055226	0.000000
Std. Dev.	0.082641	0.340721	0.206334	0.398901	3.559187	961.6805	0.597605	0.181353
Skewness	-1.637247	6.097195	-3.073307	0.351012	6.102237	-6.694989	5.229765	1.797969
Kurtosis	6.454743	42.64558	16.90984	2.594917	48.89295	52.03931	39.90158	10.96867
Jarque-Bera	84.96585	6451.780	867.2420	2.463488	8456.669	9690.544	5516.731	286.6140
Probability	0.000000	0.000000	0.000000	0.291783	0.000000	0.000000	0.000000	0.000000

Source: *Data processed by researchers*

Average value Gross Profit Margin (GPM) for construction companies listed on the Indonesia Stock Exchange (BEI) during the 2014-2023 period is 0.17. This figure shows that the company is not in good performance since the ratio is quite low. Furthermore, GPM has a maximum value of 2.7, and a minimum value of -0.300, with a standard deviation of 0.300. Meanwhile, the Skewness value is 6.09 and kurtosis is 42.64. It means that the company has not had a good performance in managing its profits, and it can cause the probability of company bankruptcy.

Average value Net Profit Margin (NPM) for Construction companies listed on the Indonesia Stock Exchange (BEI) during the 2014-2023 period is 0.008. This figure shows that the company's performance is not good because the ratio is quite low. Furthermore, NPM has a maximum value of 0.54, and a minimum value of -1.11, with a standard deviation of 0.20, while the

Skewness value is -3.07 and kurtosis is 16.90. This means that the company has not had a good performance in managing its net profit. This can be one of the causes of the probability of company bankruptcy.

Average value Current Ratio (CR) for Construction companies listed on the Indonesian Stock Exchange (BEI) during the 2014-2023 period is 1.47. Furthermore, CR has a maximum value of 2.5 and a minimum value of 0.6 with a standard deviation of 0.39, a Skewness value of 0.35 and a kurtosis of 2.5 . This figure shows that the low CR ratio explains that the company's ability to pay debts is quite low, which could lead to the possibility of the company failing to pay its receivables.

Average value Debt to Equity Ratio (DER) for construction companies listed on the Indonesia Stock Exchange (BEI) during the 2014-2023 period is 2.57, this figure shows that the company's capital ability to fulfill all its obligations is not good because the ratio is quite high. Furthermore, DER has a maximum value of 31.3, and a minimum value of 0.43, with a standard deviation of 3.55. Meanwhile, the Skewness value is 6.1 and kurtosis is 48.89. It indicates that

The distribution is not ideal, and a low ratio indicates that the company is performing poorly in paying its receivables.

Average value Times Interest Earned (TIE) Construction companies listed on the Indonesia Stock Exchange (BEI) during the 2014-2023 period is -1-91, this figure shows that the ability of operational profits to pay interests is not good because the ratio is quite low. Furthermore, TIE has a maximum value of 4.5, and a minimum value of -80.43, with a standard deviation of 961.68. Meanwhile, the Skewness value is 6.6 and kurtosis is 52.03. This indicates that the spread is not ideal, and a low ratio indicates that the company is performing poorly in paying its interest expenses.

Average value Total Assets Turnover (TATO) for construction companies listed on the Indonesian Stock Exchange (BEI) during the 2014-2023 period is 0.67, this figure shows that the company is less capable manage its assets well or rotating the assets well. Furthermore, TIE has a maximum value of 5.26, and a minimum value of 0.055, with a standard deviation of 0.597. Meanwhile, the Skewness value is 5.2 and kurtosis is 39.90. This indicates that the distribution is not ideal,and a low ratio indicates that the company is performing poorly in rotating its assets.

B. Analysis of The Determining Factors of Bankruptcy Probability

In this sub-section, it will analyze the determining factors of Bankruptcy Probability in construction and building companies. Model estimation using the eviews program. The results show the following:

$$EDF_{i,t} = 0.951793 \underset{(0.585)}{-0.032560GPM_{i,t}} + \underset{(0.586)}{0.044554NPM_{i,t}} + \underset{(0.338)}{0.028373CR_{i,t}} \underset{(0.703)}{-0.002433DER_{i,t}}$$

$$\underset{(0.593)}{-0.001061TIE_{i,t}} \underset{(0.069)}{-0.084197TATO_{i,t}} + \underset{(0.2708)}{0.157282(GPM * RISK)_{i,t}} \underset{(0.5789)}{-0.078211(NPM * RISK)_{i,t}}$$

$$\underset{(0.7023)}{-0.021414(CR * RISK)_{i,t}} \underset{(0.4628)}{-0.010507(DER * RISK)_{i,t}} + \underset{(0.9222)}{0.000458(TIE * RISK)_{i,t}}$$

$$+ \underset{(0.6959)}{0.000458(TATO * RISK)_{i,t}}$$

R2 = 0.850361

F = 24.64824

P-Value in parentheses

Gross Profit Margin (GPM) states the company's ability to share profits from sales. If this ratio becomes smaller, it will affect the company's performance and result in the company's bankruptcy. This research found that Gross Profit Margin (GPM) has no effect on Expected Default Frequency.

Net Profit Margin (NPM) has no effect on the probability of bankruptcy (EDF), if this ratio is significant then this ratio will be high and have an impact on the company not going bankrupt.

NPM does not affect probability of bankruptcy since the profits generated by the company have decreased. However, by using internal company debt funds and company costs still be fulfilled (Amanah et al., 2023). The results of this study are in line with research done by Mayliza et al. (2020).

Current Ratio (CR) has no effect on Expected Default Frequency (EDF). In fact, CR should be a variable that influences the probability of bankruptcy (EDF). In other words, if Current Ratio (CR) of the company increases, the probability of the company experiencing bankruptcy becomes lower, and vice versa, if Current Ratio (CR) of a company decreases, the probability of the company experiencing bankruptcy becomes higher (Oktariyani, 2019). However, the results of this study show that Current Ratio

has no effect on the probability of bankruptcy. This is possible because in the sample data used in this research, several companies with high Current Ratio included in the category Financial Distress because in the last decade the construction and building sector has still found difficulty to improve.

Debt to Equity Ratio is a ratio that shows the ability of equity to pay debt. An increase in debt will affect net income and result in company bankruptcy. The results of this research found that Debt to Equity Ratio has no effect on Expected Default Frequency. These findings are consistent with research. A high value of Debt to Equity Ratio (DER) can indicate good company conditions, because with a low DER value, the company owner must provide more funds for increased operations. (Amanah et al., 2023). Companies are tend to use long-term loans with caution, realizing that having large debts requires strategies to generate higher returns. The results of this study are in accordance with Ningsi et al. (2024) and Hayati & Sholichah (2022)

Ratio time interest earned, this ratio indicates the ability of operational profit to pay interest, some researchers or academics include the credit or loan installments (Manurung et al., 2020). Time Interest Earned does not have a significant effect on Expected Default Frequency. The findings of this research are contradictive to previous research (Manurung et al., 2020), If this ratio increase, the probability of bankruptcy decreases or becomes almost non-existent because the banks that provide loans do not want the companies going bankrupt. In fact, banks continue to provide loans to companies with below average performance so that these companies can survive.

Total asset turnover (TATO) has a significant positive effect on Expected Default Frequency at the level of significance of 10%. The findings of this research do not support the theory which states that TATO should have a negative value. Total asset turnover (TATO) is the ratio between sales and total assets of a company, which describes the speed of total asset turnover in a certain period. If the company becomes increasingly ineffective in using assets to generate sales, this can lead to greater losses. This condition indicates poor company performance, which can affect the company's financial condition and trigger financial problems.

As previously mentioned, this research also tested the influence of six independent variables on Expected Default Frequency with risk as a variable moderation. The research results stated that Variable gross profit margin (GPM), net profit margin (NPM), current ratio (CR), debt equity ratio (DER), times interest earned (TIE), and total assets turnover (TATO) does not affect Expected Default Frequency through risk as a moderating variable.

V. CONCLUSIONS

This research has the following conclusions:

1. Average value Expected Default Frequency (EDF) construction and building companies listed on the Indonesia Stock Exchange (BEI) during 2014-2023 was 93.69%. Furthermore, EDF has a maximum value of 1 and a minimum value of 0.564 with a standard deviation of 8.26, a Skewness value of -1,637 and a kurtosis of 6,454. This figure shows that the fluctuation in the Probability Default Frequency between companies is quite high, even close to 1.
2. Total assets turnover (TATO) has a positive and significant effect on the probability of bankruptcy.
3. Gross profit margin (GPM), net profit margin (NPM), current ratio (CR), debt equity ratio (DER), and times interest earned (TIE), does not have a significant effect on the probability of bankruptcy in construction and building companies listed on the Indonesia Stock Exchange (BEI) for the 2014-2024 period

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