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# Capital Structure and Financial Distress: Empirical Study of Companies in the Mining Sector and the Infrastructure, Utilities & Transportation Sector

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**Abstract**

This study aims to provide empirical evidence about the effect of capital structure on financial distress in mining sector companies and the infrastructure, utilities and transportation sectors for the 2014-2018 period. The research sample was 37 companies in the mining sector and 44 companies in the infrastructure, utility and transportation sectors which were obtained through purposive sampling method. The data analysis technique uses logistic regression. The results provide evidence of a negative and significant relationship between capital structure and financial distress in the mining sector as well as a positive and significant relationship between capital structure and financial distress in the infrastructure, utility and transportation sectors.

*Keywords: Capital Structure, Profitability, Financial Distress.*

## 1. Introduction

The study of financial distress is an important issue in the last few egati (Veganzones & Severin, 2020). Financial distress is defined as a situation where the company faces solvency problems that have an impact on the decline in company value and even lead to bankruptcy and the company's exit from the market (Paule-Vianez et al., 2019). According to Rani et al. (2019), one of the causes of financial difficulties is an improper capital structure decision.

Capital structure can affect future funding sources, the amount of capital costs, risk characteristics, liquidity levels, returns to investors and firm value (Bajaj et al., 2020). In general, this condition is represented through the condition of companies in the mining sector as well as in the infrastructure, utilities and transportation sectors. Reporting from Bisnis.com (2018), in the mining sector there was an increase in the number of bad loans from 2016 to 2017, namely gross non-performing loans reaching 7.73% in November 2017. The increase in bad loans shows that the company's ability to fulfill its obligations has decreased. . Meanwhile, the infrastructure, utilities and transportation sectors show the potential for increased company performance. Quoted from Liputan6.com (2019), as much as 17 percent of fundraising from the capital market through stocks and debt securities in 2019 came from the infrastructure, utilities and transportation sectors. The use of the capital market for infrastructure development is still very large. Thus, analyzing the effect of capital structure on the condition of a company's financial difficulties is an interesting topic.

Capital structure is defined as a fundamental decision regarding the optimal composition of debt and equity in the negative term that has an impact on the company's business activities (Vo, 2017) and (Saif-Alyousfi et al., 2020). Bolarinwa & Adegboye (2020) and Khémiri & Noubbigh (2018) define capital structure as a decision regarding the combination of using debt and equity to meet investment financing as well as corporate financial considerations both in the short and negative term. Financial decisions are a tool to maintain the company's financial balance and maximize company value (Mangesti Rahayu et al., 2019). In terms of pecking order theory, companies have a preference in determining capital structure decisions. The company will use internal funding sources first, then debt and issue equity in the last position. The use of debt will increase the financial risk faced by the company. Therefore, determining the optimal composition of the capital structure is useful for minimizing the probability of financial difficulties and even bankruptcy (Mishra & Dasgupta, 2019).

Studies on financial distress contribute to companies, financial negativity, investors, regulatory authorities, and economic growth (Balasubramanian et al., 2019; Geng et al., 2015; Jayasekera, 2018; Chou et al., 2017; Khoja et al. , 2019). For companies, studies on financial distress can be used to detect early signs that arise before a company goes bankrupt (García et al., 2019). For investors, financial distress studies can be used to understand the company's financial risk (Shen et al., 2020). For financial enthusiasts, a study of financial distress can provide information for making credit decisions so as to minimize potential losses (Ogachi et al., 2020).

The urgency regarding the role of capital structure in explaining financial distress has not been supported by consistent research results. This can be proven through the results of the empirical studies of Faradila & Aziz (2016) and Murni (2018) which reveal that there is an egative and insignificant relationship between capital structure and financial distress. A different opinion is expressed by the research of Wahyu Widati (2015), Dance & Made (2019) and Hidayat & Meiranto (2014) which reveal that there is a positive and significant relationship between capital structure and financial distress. Therefore, further research is needed regarding the role of capital structure in financial distress.

This study aims to provide empirical evidence regarding the relationship between capital structure and financial distress. Furthermore, this study compares the effect of capital structure on financial distress in mining companies as well as in the infrastructure, utilities and transportation sectors.

## 2. Literature Review

### Financial Distress

Financial distress is defined as a condition that represents a company's failure from a financial, econometric, economic and juridical perspective (Veganzones & Severin, 2020). Paule-Vianez et al. (2019) defines financial distress as a situation where a company faces a solvency problem that causes a decrease in the value of the company and even results in bankruptcy and the company's exit from the market. According to Karugu et al. (2018), the consequences of financial distress in terms of economic aspects, namely the existence of relatively large legal costs. Financial distress also affects the company's position. For financial institutions, financial distress has the potential to cause relatively large costs when part or all of the total loan must be eliminated (Ben Jabeur, 2017).

### Capital Structure

Capital structure is defined as the composition of the use of debt and equity relating to the company's ability to meet stakeholder needs (Yildirim et al., 2018). Bolarinwa & Adegboye (2020)

and Khémiri & Noubbigh (2018) define capital structure as a decision regarding the combination of using debt and equity to meet investment financing and corporate financial considerations both in the short and long term. The optimal capital structure can represent the level of use of leverage by considering the balance of bankruptcy costs with the benefits obtained from debt financing sources (Mangesti Rahayu et al., 2019).

**Pecking-order Theory**

This theory explains that companies have a preference or hierarchy in determining the source of corporate funding decisions (Myer, 1984; Myers & Majluf, 1984). The existence of asymmetric information refers to the tendency of company management to better understand the company's condition compared to investors and creditors as external parties. Thus encouraging managers to have a hierarchy in determining sources of financing where internal sources of financing are preferred, when internal sources of financing are insufficient, the company will use external sources of financing in the form of debt and issue equity as the last option (Haron (2018); Hang et al. (2018) As an external source of funds, debt has a smaller risk when compared to issuing securities (Zhang & Liu, 2017).

**Capital Structure and Financial Distress**

According to Ramli et al. (2019) the use of a higher proportion of leverage than the proportion of equity can improve the company's financial performance. Jaisinghani & Kanjilal (2017) explain that using an optimal proportion of debt can help minimize overall capital costs and increase profitability. Judging from the pecking order theory, companies have a preference to use internal sources of funds, then when internal sources of funds are insufficient, companies will use external sources of funding. A high proportion of use of debt will increase the risk of the company experiencing financial difficulties (Karugu et al., 2018), namely when the company cannot pay its obligations at maturity. So that a large proportion of debt will increase the probability of the company experiencing financial distress. The first alternative hypothesis proposed in this study is as follows:

*H1a: In the mining sector, capital structure has a negative and significant relationship to financial distress.*

*H1b: In the infrastructure, utilities and transportation sectors, capital structure has a positive and significant relationship to financial distress.*

## 3. Methodology

This research belongs to the type of causative research. The study population consists of all mining sector companies as well as the infrastructure, utility and transportation sectors listed on the Indonesia Stock Exchange (IDX) for the 2014-2018 period. The research sample was taken using purposive sampling method. The sampling criteria consisted of a) mining sector companies as well as the infrastructure, utility and transportation sectors that have been listed on the IDX for the 2014-2018 period. b) companies in the mining sector as well as the infrastructure, utility and transportation sectors publish their audited financial reports in a row for the 2014-2018 period. c) mining companies as well as the infrastructure, utility and transportation sectors have complete data on the Altman Z-score and capital structure for the 2014-2018 period. Based on these criteria, the research obtained samples of 37 companies in the mining sector and 44 companies in the infrastructure, utility and transportation sectors.

The dependent variable in this study is financial distress. Financial distress is defined as a condition in which a company experiences financial difficulties. The prediction model used is the

Altman Z-score model. If the Z-score value is less than 2,675, it indicates that the company is experiencing financial distress. If the Z-score value is greater than 2,675, it indicates that the company is in a healthy category (Ross et al., 2013).

$$\mathbf{Z = 1{,}2\ x_1 + 1{,}4\ x_2 + 3{,}3\ x_3 + 0{,}6\ x_4 + 1{,}0\ x_5}$$

Where x1 is working capital / total assets; x2 is retained earnings / total assets; x3 is income before interest and tax / total assets; x4 is the market value of equity / book value of total liabilities and; x5 is sales / total assets.

The independent variable is the capital structure which is defined as the composition of the use of debt and equity in the company. Measurement of the capital structure variable uses debt to equity, namely the ratio between debt and company equity.

The research data used is secondary data, obtained through a review of audited financial reports available through the company website and the Indonesia Stock Exchange website. The data analysis technique was carried out by logistic regression which was carried out with SPSS version 22 software. The data analysis consisted of the goodness of fit test, the overall fit model test, the coefficient of determination test and the significance and hypothesis tests. The regression model in this study is stated as follows:

$$\boldsymbol{Ln\left(\frac{P}{1-P}\right) = \beta_0 + \beta_1 CS + \varepsilon}$$

Information:

| | |
|---|---|
| P / (1-P) | = probability of the company experiencing financial distress (t) |
| β0 | = constant |
| CS | = Capital structure |
| β1 | = Capital structure coefficient |
| ε | = residual error |

## 4. Result and Discussion

Based The logistic regression model is used to examine the effect of capital structure on financial distress in the mining sector as well as in the infrastructure, utilities and transportation sectors.

**Goodness of Fit Test**

**Table 1. Results of the Hosmer and Lemeshow Test**

| | **Mining Sector** | | **Infrastructure, utilities and transportation sectors** | |
|---|---|---|---|---|
| Step | Chi-square | Sig. | Chi-square | Sig. |
| 1 | 3.669 | 0.886 | 7.779 | 0.455 |

Goodness of fit test is done through the hosmer and lemeshow test. The statistical value of Hosmer and Lemeshow's Test in the mining sector is 3,669 with a significance value of 0.886 which

is greater than the assumed significance level of 0.05 (0.886> 0.05). In the infrastructure, utilities and transportation sectors, the significance value is 0.455, which is greater than the assumed significance level of 0.05 (0.455> 0.05). So it can be concluded that the prediction model in the mining sector as well as the infrastructure, utility and transportation sectors is able to predict and the model is in accordance with the results of the observations.

**Overall Fit Model Test**

This analysis was conducted to assess that the regression model as a whole was in accordance with the research data.

**Table 2. Results -2Log Likehood:**

| | Mining Sector | Infrastructure, utilities and transportation sectors |
|---|---|---|
| Step 0 | 233.132 | 228.243 |
| Step 1 | 140.560 | 208.031 |

In the mining sector, the initial -2Log Likelihood score of 233,132 has decreased to 140,560 at the final -2Log Likelihood value. In the infrastructure, utilities and transportation sectors, the initial -2Log Likelihood score of 228,243 decreased to 208,031 at the final -2Log Likelihood value. Decrease in value - 2 Log Likelihood indicates that the hypothesized regression model fits the data.

**Determination Coefficient Test**

**Table 3. Determination Coefficient Test Results**

| Nagelkerke R Square | | |
|---|---|---|
| | Mining Sector | Infrastructure, utilities and transportation sectors |
| Step 1 | 0.550 | 0.136 |

The results of the determination coefficient test in the mining sector are shown by the Nagelkerke R-Square value of 0.550 or 55.0%. Thus it can be concluded that the variable financial distress can be explained by the capital structure variable by 55.0%. Meanwhile, 45.0% is influenced by other variables outside the research model. In the infrastructure, utilities and transportation sectors, the Nagelkerke R-Square value is 0.136 or 13.6%. Thus it can be concluded that the financial distress variable can be explained by the capital structure variable by 13.6%. Meanwhile, 86.4% is influenced by other variables outside the research model.

**Significance and Hypothesis Test**

In this study, the significance test was carried out through the Wald test. The significance value is smaller than the assumed significance level of 5% (0.05), indicating that the independent variable has a significant relationship to the dependent variable.

**Table 4. Wald Test Results**

| | | Mining Sector | | | Infrastructure, utilities and transportation sectors | | |
|---|---|---|---|---|---|---|---|
| | | B | Wald | Sig. | B | Wald | Sig. |
| Step 1[a] | Capital Structure | -0.001 | 47.760 | 0.000 | 0.000 | 15.761 | 0.000 |
| | Constant | 1.847 | 24.158 | 0.000 | -0.001 | 0.000 | 0.997 |

In the mining sector, the Wald test results show the value of the variable wald capital structure of 47,760 with a significance value of 0.000. The coefficient value of - 0.001 indicates that there is a direction of negative influence between capital structure and financial distress. The significance value of 0.000 is lower than the assumption of the significance level of 0.05 (0.000 <0.05), which states that there is a significant influence between capital structure and financial distress. Thus the hypothesis which states that in the mining sector, capital structure has a negative and significant relationship to financial distress is proven, so the hypothesis is accepted.

In the infrastructure, utility and transportation sectors, the Wald test results show the wald value of the capital structure variable of 15,761 with a significance value of 0.000. The coefficient value of 0.000 indicates that there is a positive influence direction between capital structure and financial distress. The significance value of 0.000 is lower than the assumption of the significance level of 0.05 (0.000 <0.05), which states that there is a significant influence between capital structure and financial distress. Thus the hypothesis which states that in the infrastructure, utilities and transportation sectors, the capital structure has a positive and significant relationship to financial distress is proven, then the hypothesis is accepted.

**Discussion**

Based on the results of logistic regression analysis, the results show that there is a negative and significant relationship between capital structure and financial distress in mining sector companies and there is a positive and significant relationship between capital structure and financial distress in infrastructure, utility and transportation sector companies. The effect of capital structure on financial distress can be explained as follows:

**Capital Structure and Financial Distress**

In the mining sector, the regression model estimation results show that there is a negative and significant relationship between capital structure and financial distress. This can be proven by the significance value of 0.000 which is lower than the assumed significance level of 0.05 with the variable coefficient of -0.001. Likewise in the infrastructure, utilities and transportation sectors, the estimation results of the regression model show that there is a positive and significant relationship between capital structure and financial distress. This can be proven by the significance value of 0.000 which is lower than the assumed significance level of 0.05 with the variable coefficient of 0.000.

A significant relationship indicates that the research findings obtained have sufficient evidence to explain the effect of capital structure on financial distress in the mining sector as well as the infrastructure, utility and transportation sectors. This negative relationship between capital structure

and financial distress supports the results of research by Faradila & Aziz (2016) and Murni (2018) which reveal that there is a negative relationship between capital structure and financial distress. This positive relationship between capital structure and financial distress supports the research results of Wahyu Widati (2015), Dance & Made (2019) and Hidayat & Meiranto (2014).

In the mining sector, research results indicate that there is a negative relationship between capital structure and financial distress. This means that the greater the level of debt use, the lower the Z-score, thereby increasing the probability of the company experiencing financial distress. The results of this study support the pecking order theory which states that the greater the level of debt utilization, the higher the financial risk faced by the company. A high proportion of debt use will increase the risk of the company experiencing financial difficulties (Karugu et al., 2018)

In the infrastructure, utilities and transportation sectors, the results show that there is a positive relationship between capital structure and financial distress. This means that the greater the level of debt use, the greater the Z-score, so that the probability of the company experiencing financial distress is lower. Thus, the assumption of pecking order theory which shows that the greater the level of debt utilization will increase the risk of companies experiencing financial difficulties is not proven in this sector. In general, the decision to use debt can increase share prices by increasing company profitability. Thus, the welfare of shareholders will increase and have a relatively large potential for the company to continue to grow so that the probability of the company experiencing financial distress is lower (Murni, 2018)

## 5. Conclusion

The results of this study provide evidence regarding the role of capital structure in explaining financial distress in mining sector companies as well as companies in the infrastructure, utilities and transportation sectors. This is evidenced by the estimated negative and significant relationship between the capital structure and financial distress in the mining sector as well as a positive and significant relationship between capital structure and financial distress in the infrastructure, utilities and transportation sectors. Practically, this research provides benefits for companies, especially in the mining sector as well as companies in the infrastructure, utilities and transportation sectors in determining capital structure decisions and detecting the probability of financial distress as early as possible. This study is limited to an explanation of the relationship between capital structure and financial distress. Future research is expected to consider aspects of behavior finance such as managerial overconfidence to explain financial distress.

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