How liquidity, profitability, and leverage ratios influence financial distress: A study on Indonesian mining firms

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Abstract
This study investigates the impact of liquidity, profitability, and leverage ratios on financial distress in mining companies listed on the Indonesia Stock Exchange. It posits that higher liquidity in a company correlates with reduced financial distress. The research encompasses eight mining companies observed from 2016 to 2020. Purposive sampling was employed to select a sample of eight companies meeting specific criteria. The study utilizes multiple linear regression analysis as its analytical approach. The findings, significant at the 5% level, reveal that liquidity, profitability, and leverage ratios collectively exert a substantial influence on financial distress, accounting for 85.3% of the variance in the dependent variable. Specifically, the study concludes that: 1) Liquidity has a significant negative effect on financial distress, 2) Profitability also demonstrates a significant negative impact on financial distress, and 3) Leverage exhibits a significant positive effect on financial distress.

Keywords: Financial distress, Financial ratio, Leverage, Liquidity, Profitability.

JEL Classification: G32, G33, Q31

INTRODUCTION
In the dynamic and competitive global market, companies must innovate and adapt continuously to maintain their viability and profitability. The capacity of a company to produce market-competitive products is fundamental to its competitiveness. A failure in this regard can lead to financial losses and, in extreme cases, severe financial distress. Financial distress manifests in various forms, from short-term liquidity challenges to insolvency, where liabilities exceed assets (Bushashe, 2023). Plat & Platt (2002) define financial distress as a condition in which the company's finances are in trouble, unhealthy situation, or circumstances. The company is experiencing difficulties finances in meeting its debts. The repercussions of such financial challenges have been particularly pronounced in recent years, especially in the volatile Indonesian economy. Despite its critical role in the national economy, the mining sector has not been exempt from these challenges.

As noted by Jock O'Callaghan, PwC's Global Mining leader in 2015 (Soda, 2016), the mining sector faced significant challenges, including a 25% decline in commodity prices from the previous year. This decline pushed numerous mining companies towards financial distress, leading some to the verge of closure and necessitating the
disposal of assets. To mitigate these financial challenges, companies have adopted various tools and techniques to monitor and manage their financial health. Among these, the analysis of financial ratios has proven to be particularly valuable.

Financial statements are crucial tools, providing a comprehensive view of a company's financial status and operational performance. These documents are invaluable to stakeholders, including internal parties like management and owners, and external entities such as investors, creditors, and regulatory bodies. They offer insights into the financial health of a company.

Key metrics within these financial statements, such as liquidity, profitability, and leverage ratios, are essential in evaluating a company's financial stability. Liquidity ratios, calculated by dividing current assets by current liabilities, assess a company's ability to meet short-term obligations. Profitability ratios, which involve dividing after-tax profit by total assets, offer insights into the company's financial performance. Leverage ratios, calculated by dividing total liabilities by total assets, indicate the extent of a company's reliance on debt financing. Additionally, tools like the Z-score are employed to evaluate the likelihood of financial distress.

This study aims to provide a comprehensive analysis of these financial aspects, offering deeper insights into the financial health of companies and their implications for sustaining business operations. Understanding these critical ratios enables stakeholders to make informed decisions, enhancing company performance and ensuring financial stability in an ever-changing market.

Table 1 presents the net profit of various companies in the coal mining sub-sector over five years (2016-2020).

<table>
<thead>
<tr>
<th>Companies Code</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2016</td>
</tr>
<tr>
<td>ADRO</td>
<td>340,686</td>
</tr>
<tr>
<td>ARII</td>
<td>-25,482</td>
</tr>
<tr>
<td>BSSR</td>
<td>27,421,577</td>
</tr>
<tr>
<td>EARTH</td>
<td>120,255,710</td>
</tr>
<tr>
<td>BYAN</td>
<td>18,015,433</td>
</tr>
<tr>
<td>DOID</td>
<td>37,089,185</td>
</tr>
<tr>
<td>GEMS</td>
<td>34,988,248</td>
</tr>
<tr>
<td>GTBO</td>
<td>-5,200,467</td>
</tr>
<tr>
<td>HRUM</td>
<td>29,391,728</td>
</tr>
<tr>
<td>KGGI</td>
<td>10,324,405</td>
</tr>
<tr>
<td>MBAP</td>
<td>27,113,735</td>
</tr>
<tr>
<td>MYOH</td>
<td>21,258,853</td>
</tr>
<tr>
<td>TOBA</td>
<td>14,585,772</td>
</tr>
</tbody>
</table>

Source: Indonesia Stock Exchange (2022)

An analysis of Table 1 reveals a significant upward trend in net profits for the mining companies over the past four years. However, 2020 marked a notable shift in the industry's performance. Several companies experienced a drastic decline in net profit, with some incurring losses. This downturn in 2020 may be attributed to various external factors, including changes in commodity prices, the impact of the COVID-19 pandemic, and other economic influences.

During this period, specific events and factors significantly impacted the financial performance of the mining industry. For example, the profit for the year of several companies listed on the Indonesia Stock Exchange in the coal mining sector decreased sharply. This decline in net profit can be attributed to unfavorable global and sectoral
economic conditions, underscoring the mining industry's susceptibility to external economic factors.

Moreover, financial distress is a critical concern in this context. Various methods are used to predict financial difficulty that occurs within an organization. One of the main ones is using ratio analysis based on financial data provided in the company's balance sheet. Studies conducted by Altman (1968) are preliminary studies that support using a ratio analysis of exchange rates as a tool for estimating the financial health of businesses. This study investigates the relationship between financial distress and key financial indicators, including liquidity, profitability, and leverage. Liquidity, as defined by Prastowo (2015), refers to a company's ability to meet its short-term debt obligations. As Sudana (2015) described, profitability measures a company's efficiency in generating profits from its resources. The leverage ratio, another predictor of financial distress, will also be examined. This research aims to determine the individual and combined effects of liquidity, profitability, and leverage on financial distress, particularly in the context of the mining industry's challenges during this period.

METHODS

This study examines the influence of liquidity, profitability, and leverage ratios as independent variables on financial distress, the dependent variable, in mining companies listed on the Indonesia Stock Exchange (IDX) during the 2016-2020 period. The population for this study comprises all mining companies listed on the IDX within this timeframe, totaling 41 companies.

The sample selection was conducted using purposive and simple random sampling methods. This approach resulted in a sample of 8 mining companies, yielding 40 valid observations that met the established criteria. The criteria for sample selection were as follows: (1) continuous listing on the IDX during the study period, (2) provision of complete financial reports throughout the study period, and (3) preparation of financial statements in Indonesian Rupiah ( IDR). The study utilized secondary data from the mining companies obtained from the IDX website (www.idx.com).

The study used Multiple Linear Regression Analysis to examine the data. The following equation represents the relationship among the variables:

\[ Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + e \]

Where:
- \( Y \) represents financial distress,
- \( X_1 \) represents liquidity,
- \( X_2 \) represents profitability,
- \( X_3 \) represents leverage,

RESULTS AND DISCUSSION

Descriptive analysis

The descriptive analysis in this study provides an overview of the development of liquidity (CR), profitability (ROA), and leverage (DAR) in relation to financial distress in mining companies listed on the Indonesia Stock Exchange. Based on Table 2, the Current Ratio (CR) has a mean of 2.3950 and a standard deviation of 0.55696 across 40 observations. The highest CR was recorded by PT Harum Energy (HRUM) in 2020, and the lowest by PT Bayan Resources, Tbk (BYAN) in 2018. The Rate of Return on Assets (ROA) has a mean of 13.1843 and a standard deviation of 10.95856, with 40 observations. The highest ROA was by Bayan Resources, Tbk (BYAN) in 2018, and the lowest was by PT Cita Mineral Investindo Tbk (CITA) in 2016. The Debt to Total Asset Ratio (DAR) has a mean of 43.9930 and a standard deviation 20.13399. The highest
DAR was by PT Tambang Batubara Bukit Asam (PTBA) in 2020, and the lowest was by PT Harum Energy (HRUM) in 2020. The Financial Distress (FD) variable has a mean of 1.8617 and a standard deviation of 0.75366.

**Table 2.** Descriptive statistical test

<table>
<thead>
<tr>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR</td>
<td>40</td>
<td>2.3950</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.55696</td>
</tr>
<tr>
<td>ROA</td>
<td>40</td>
<td>13.1843</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10.95856</td>
</tr>
<tr>
<td>DAR</td>
<td>40</td>
<td>43.9930</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20.13399</td>
</tr>
<tr>
<td>FD</td>
<td>40</td>
<td>1.8617</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.75366</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>40</td>
<td></td>
</tr>
</tbody>
</table>

**Classical assumption tests**

The objective of the data normality test is to ascertain whether the data distribution within the regression model adheres to a normal distribution.

**Graph 1.** Normal PP plot of regression standardized residual-normal

The analysis of the profitability graph in Figure 1 suggests that the data distribution is normal, as evidenced by the alignment of the residual data distribution with the diagonal line (normal line). Additionally, the Kolmogorov-Smirnov (KS) test was employed to validate the research data's normality quantitatively. According to the KS test, data is normally distributed if the Asymptotic Significance (Asymp. Sig.) value in a two-tailed test exceeds 0.05. Conversely, a value less than 0.05 indicates a deviation from normal distribution.

Multicollinearity in a regression model refers to a situation with a perfect or near-perfect correlation among the independent variables.

**Table 3.** Multicollinearity test results

<table>
<thead>
<tr>
<th>Model</th>
<th>Collinearity Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tolerance</td>
</tr>
<tr>
<td>1</td>
<td>CR</td>
</tr>
<tr>
<td></td>
<td>ROA</td>
</tr>
<tr>
<td></td>
<td>DAR</td>
</tr>
</tbody>
</table>

*a. Dependent Variable: FD*
As shown in Table 3, the Variance Inflation Factor (VIF) values indicate that multicollinearity is absent in the model. This conclusion is drawn from the fact that the tolerance values for all independent variables are greater than 0.1, and the VIF values are less than 10.

The heteroscedasticity test examines whether there is a variance inequality in the residuals across different observations within the regression model.

Graph 2. Graph of heteroscedasticity test scatterplots

The scatterplot illustrates that the data points are randomly dispersed, both above and below the zero point on the Y-axis and to the right and left of the zero point on the X-axis, without forming any discernible pattern. Based on this observation, it is concluded that heteroscedasticity is not present in the model.

Autocorrelation refers to the correlation between time-sequenced observations in a regression model. In simpler terms, it implies that the previous year's observation error may influence the error associated with the current year's observation.

This study calculated the Durbin-Watson (DW) statistic to be 1.867. This value is assessed against the Durbin-Watson table values, determined at a 5% significance level, with a sample size of 40 and three independent variables. The critical values from the Durbin-Watson table \( d_L = 1.338 \) and \( d_U = 1.659 \).

Given that the calculated DW value (1.867) is greater than the upper limit \( d_U = 1.659 \) and less than \( 4-d_U \) (which is \( 4-1.659=2.341 \)), the condition \( d_U <DW<4-d_U \) is satisfied, specifically \( 1.659<1.867<2.341 \). Therefore, it can be concluded that autocorrelation is not present in the model.

Multiple linear regression analysis

The analysis, as presented in Table 4, reveals that the F-statistic for the variables Liquidity (Current Ratio, X1), Profitability (Rate of Return on Assets, X2), and Leverage (Debt to Total Asset Ratio, X3) in relation to Financial Distress (Y) is 76.378, which is greater than the critical F-value of 2.87. With a significance level of 0.000, which is less than the threshold of 0.05, the null hypothesis (H0) is rejected, and the alternative hypothesis (Ha) is accepted. This indicates that Liquidity, Profitability, and Leverage have a significant simultaneous impact on Financial Distress.

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>716603.373</td>
<td>3</td>
<td>238867,791</td>
<td>76,378</td>
<td>.000a</td>
</tr>
<tr>
<td>Residual</td>
<td>11235.280</td>
<td>36</td>
<td>312,091</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>727838.653</td>
<td>39</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Predictors: (Constant), DAR, ROA, CR; Dependent Variable: FD

The coefficient of determination, as shown in Table 5, assesses the extent of the relationship between the independent variables (liquidity, profitability, and leverage)
and the dependent variable (financial distress). The R-Square value of 0.957 indicates that these independent variables can explain 95.7% of the variation in financial distress. The remaining 4.3% is attributed to other factors not included in this study.

**Table 5. Coefficient of determination test (R²)**

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.992a</td>
<td>.957</td>
<td>.958</td>
<td>17.66610</td>
</tr>
</tbody>
</table>

*Predictors: (Constant), DAR, ROA, CR; Dependent Variable: FD*

The t-test was employed to examine the regression coefficients of each independent variable with the dependent variable, as detailed in Table 6.

**Table 6. Partial test (t-test)**

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>21,733</td>
<td>17.008</td>
<td>.210</td>
</tr>
<tr>
<td></td>
<td>CR</td>
<td>1.021</td>
<td>.203</td>
<td>.260</td>
</tr>
<tr>
<td></td>
<td>ROA</td>
<td>4.052</td>
<td>.319</td>
<td>.306</td>
</tr>
<tr>
<td></td>
<td>DAR</td>
<td>5.926</td>
<td>.229</td>
<td>.673</td>
</tr>
</tbody>
</table>

*a. Dependent Variable: FD*

From Table 6, the results of the t-test are as follows:

1. Liquidity (CR): With a t-statistic of 2.370 and a significance level of 0.032, it is indicated that liquidity has a significant positive impact on Financial Distress.
2. Profitability (ROA): Exhibiting a t-statistic of 12.705 and a significance level of 0.00, it is evident that profitability significantly and positively affects Financial Distress.
3. Leverage (DAR): The t-statistic of 25.909 and a significance level of 0.00 confirm that Leverage significantly and positively influences Financial Distress.

**Discussion**

**Effect of liquidity on financial distress**

Liquidity significantly and positively influences financial distress. Represented by the current ratio, liquidity reflects a company's capacity to meet short-term obligations using its current assets (Titto, 2013). A higher current ratio implies a greater volume of current assets, enhancing the company's ability to cover current liabilities swiftly. This, in turn, reduces the potential for financial distress. Liquidity indicates a company's capability to fulfill short-term financial obligations (Sartono, 2001) timely. This study corroborates the findings of Subramanyam & Wild (2011), demonstrating liquidity as a critical measure of a company's ability to meet short-term obligations. Kasimir (2010) describes that the liquidity ratio indicates a company's capability to fulfill short-term debts. However, this study's findings contrast with previous research by Kartika & Hasanudin (2019), Nurhamidah & Kosasih (2021), Sutra & Mais (2019), Setiyawan & Musdholifah (2020), Asmarani & Purbawati (2020), Carolina et al. (2017), Liana & Sutrisno (2014), Hapsari (2012), Fitriyah & Haryati (2013), which state that the liquidity ratio, using the current ratio indicator, does not influence financial distress.

**Effect of profitability on financial distress**

Profitability significantly and positively influences financial distress prediction. As a ratio, profitability measures a company's ability to generate profits relative to a certain level of sales, assets, and share capital (Indarti & Sapari, 2020). Derived from
sales and investment income, profitability assesses a company's efficiency in using assets to generate profit. This study finds a correlation between higher profitability ratios and a reduced likelihood of financial distress, suggesting effective overall management. These findings support the traditional financial theory (Trade-off Theory), positing profitability as a key factor in achieving an optimal balance in a firm's capital structure (Said, 2022; Yakubu et al. 2021). This study is in alignment with the research conducted by Yanti and Darmayanti (2019), Mufliah (2017), Saleem et al. (2020), Kalbuna et al. (2022), and Ayu et al. (2017), which collectively demonstrate a positive influence of profitability on financial distress prediction.

The effect of leverage on financial distress

Leverage significantly and positively influences financial distress prediction. As Rahma (2020) defined, the leverage ratio determines how much a company funds its assets and business activities through debt. Representing the ratio of a company's debt to its equity, leverage indicates its capacity to meet long-term obligations. The study reveals that significant interest payments from high leverage or substantial debt increase financial distress. This finding aligns with the Trade-off Theory, which suggests that companies must balance debt and equity to mitigate financial distress risks. The study's results are consistent with Satria (2020) and are further supported by Putri & Erinos (2020), highlighting the risks associated with high leverage and its impact on financial distress. Conversely, the study's findings differ from those of Septiani et al. (2021), Nugraha & Nursito (2021), Faldiansyah et al. (2020), Saputra & Salim (2020), Dirman (2020), Atina & Rahmi (2019).

Effect of liquidity, profitability, and leverage on financial distress

The simultaneous analysis of liquidity, profitability, and leverage as independent variables suggests a collective impact on financial distress. The research implications indicate that high liquidity is essential for a company's financial stability, as greater liquidity typically equates to a reduced risk of financial distress. A company is deemed liquid if it can efficiently meet its short-term debts. Thus, a high liquidity value is crucial for avoiding financial distress, particularly in the mining sector, where enhancing liquidity is imperative.

Profitability reflects a company's capability to utilize its assets effectively. Optimal asset utilization generates substantial profits, while inefficient use leads to suboptimal earnings. A continuous decline in profitability, particularly into negative figures, escalates financial distress. Therefore, it is vital for companies, especially in the mining sector, to maintain or increase their profitability to avoid financial distress.

Leverage measures a company's ability to fulfill its long-term obligations. This ratio compares the company's debt to its equity. A higher leverage ratio, indicating debt exceeding equity, increases the risk of financial distress due to substantial debt and interest payments. However, maintaining a low leverage ratio is essential for averting financial distress. High leverage does not necessarily pose a problem in the mining sector, as it does not significantly impact financial distress.

These findings demonstrate that the independent variables of liquidity, profitability, and leverage collectively explain the dependent variable of financial distress. Therefore, it is concluded that these factors simultaneously influence financial distress in the context of Indonesian mining firms.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The following conclusions are drawn from the research and discussions: The study demonstrates that liquidity, profitability, and leverage collectively impact
financial distress in mining companies listed on the Indonesia Stock Exchange during the 2016-2020 period.

As measured by the Current Ratio, liquidity significantly and positively affects financial distress in these mining companies. Similarly, profitability, indicated by the Rate of Return on Assets, and leverage, represented by the Debt to Total Asset Ratio, significantly and positively impact financial distress for the same period.

These findings have substantial implications for the Indonesian mining industry. Enhancements in liquidity, profitability, and leverage management can be crucial in mitigating the risk of financial challenges that mining companies may face. This contributes to maintaining financial stability and reducing the risk of bankruptcy. Furthermore, a deeper understanding of how these factors interact with financial distress provides valuable insights for decision-makers in the industry, laying the groundwork for more effective financial management strategies within mining companies. Consequently, these insights are invaluable for mining companies, regulators, and other stakeholders, improving financial performance and stability in Indonesia's mining sector.

Recommendations

The findings suggest that mining companies listed on the Indonesian Stock Exchange should prioritize effective liquidity management, operational efficiency, and cautious leverage use. Collaboration with regulators is key to identifying and mitigating potential risks. Stakeholders, including regulatory bodies, are advised to enhance their monitoring of these companies, focusing on liquidity, profitability, and leverage. Education in financial risk management, improved reporting standards, and cooperation with various stakeholders are crucial. These measures aim to create a stable and sustainable business environment for the mining sector.

For future research, it is recommended to broaden the scope of the study by including additional years and incorporating other variables that may influence financial distress, such as company size, managerial ownership, audit committee effectiveness, and alternative proxies for financial distress conditions.

REFERENCES


