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***Research Paper***

# The effect of financial distress prediction methods on financial performance: The mediating role of corporate liquidity

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**Abstract**

This study examines the effects of five financial distress prediction models (Altman, Springate, Zmijewski, Foster, and Grover) on the financial performance of manufacturing companies listed on the Special Monitoring Board of the Indonesia Stock Exchange (IDX), with corporate liquidity as a mediating variable. Using a quantitative explanatory approach, this study analyzes balanced panel data from three companies over the 2022–2025 period, comprising 12 firm-year observations. Data were analyzed using panel regression with the Common Effect Model. The results indicate that Springate, Foster, and Grover have positive and significant effects on corporate liquidity, while Altman and Zmijewski show no significant effects. Regarding financial performance, only Springate has a significant negative effect. Corporate liquidity has no significant effect on financial performance and does not mediate the relationship between financial distress prediction models and financial performance. These findings suggest that financial distress prediction models provide more relevant insights into corporate liquidity than financial performance.

**Keywords**: Financial Distress, Corporate Liquidity, Financial Performance, Bankruptcy Prediction Models, Manufacturing Companies.

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**Abstrak**

Penelitian ini bertujuan untuk menganalisis pengaruh lima model prediksi financial distress (Altman, Springate, Zmijewski, Foster, dan Grover) terhadap kinerja keuangan perusahaan manufaktur yang terdaftar di Papan Pemantauan Khusus Bursa Efek Indonesia (BEI), dengan likuiditas perusahaan sebagai variabel mediasi. Penelitian ini menggunakan pendekatan kuantitatif dengan data panel seimbang dari tiga perusahaan selama periode 2022–2025, sehingga diperoleh 12 observasi perusahaan-tahun. Analisis data dilakukan menggunakan regresi data panel dengan Common Effect Model. Hasil penelitian menunjukkan bahwa model Springate, Foster, dan Grover berpengaruh positif dan signifikan terhadap likuiditas, sedangkan Altman dan Zmijewski tidak berpengaruh signifikan. Terhadap kinerja keuangan, hanya model Springate yang berpengaruh negatif dan signifikan. Likuiditas tidak berpengaruh signifikan terhadap kinerja keuangan serta tidak mampu memediasi hubungan antara model prediksi financial distress dan kinerja keuangan. Temuan ini menunjukkan bahwa model prediksi financial distress lebih relevan dalam memberikan informasi mengenai kondisi likuiditas dibandingkan kinerja keuangan.

**Kata Kunci:** Financial Distress, Likuiditas Perusahaan, Kinerja Keuangan, Model Prediksi Kebangkrutan, Perusahaan Manufaktur.

## 1. Introduction

The global economy has experienced considerable uncertainty in recent years due to the combined effects of the COVID-19 pandemic, geopolitical tensions, rising inflation, increasing interest rates, and disruptions in global supply chains. These conditions have significantly affected the manufacturing sector, particularly in emerging economies such as Indonesia. As one of the major contributors to Indonesia's Gross Domestic Product (GDP), exports, and employment, the manufacturing sector plays a strategic role in supporting national economic growth. However, prolonged economic uncertainty has increased financial pressure on manufacturing companies, as reflected in declining profitability, liquidity constraints, and rising debt burdens, which may lead to financial distress (International Monetary Fund, 2024; World Bank, 2024). Devi et al. (2020) found that the COVID-19 pandemic negatively affected the financial performance of Indonesian listed companies, while Handayati et al. (2022) identified an increase in financial distress among manufacturing companies.

The financial vulnerability of Indonesian listed companies is also reflected in the number of firms included on the Special Monitoring Board of the Indonesia Stock Exchange (IDX). This board was established to strengthen investor protection by monitoring listed companies experiencing significant financial or operational difficulties, including negative equity, substantial losses, defaults on financial obligations, and other conditions that may threaten business continuity. Companies included on this board generally face greater financial pressure than those traded under normal market conditions (Indonesia Stock Exchange, 2024). Therefore, these companies provide a relevant context for examining financial distress, corporate liquidity, and financial performance.

One approach to identifying potential financial difficulties is through financial distress prediction models. Several widely used models include Altman Z-Score, Springate, Zmijewski, Grover, and Foster. These models employ combinations of financial ratios reflecting profitability, liquidity, leverage, efficiency, and solvency to assess the likelihood of corporate financial failure (Altman, 1968; Springate, 1978; Zmijewski, 1984; Grover, 2001). However, the predictive performance of these models may vary depending on company characteristics, industry sectors,

and observation periods. Previous studies in Indonesia have demonstrated differences in the predictive accuracy of financial distress models during and after the COVID-19 pandemic (Bukhori et al., 2022; Andriani et al., 2025). These differences suggest that the effectiveness of financial distress prediction models needs to be reassessed across different corporate and economic contexts.

In addition to financial distress prediction models, corporate liquidity is an important indicator of financial health because it reflects a company's ability to meet its short-term obligations. Declining liquidity may signal increasing financial pressure, whereas adequate liquidity enables companies to maintain operational activities amid economic uncertainty. Liquidity is also associated with financial performance, as the ability to meet short-term obligations supports business operations and reduces the need for emergency financing. Conversely, liquidity shortages may disrupt operational activities and reduce profitability (Demirgunes, 2016; Atmaja & Usman, 2025). Accordingly, corporate liquidity is a relevant variable for examining the relationship between financial conditions reflected in distress prediction models and corporate financial performance.

Previous studies have examined bankruptcy prediction models and their relationship with corporate financial conditions. Altman (1968), Grice and Ingram (2001), and Wu et al. (2010), for instance, focused on evaluating the predictive capabilities of bankruptcy models across different industries. Other studies have investigated the determinants of corporate liquidity and its relationship with financial performance and corporate sustainability. In Indonesia, Prihatiningtias et al. (2026) demonstrated that the relationship between financial distress and corporate performance may differ between the pre- and post-pandemic periods. Meanwhile, Rizki et al. (2024) highlighted the influence of firm-specific characteristics beyond financial ratios on financial distress risk. Nevertheless, limited research has integrated five financial distress prediction models, corporate liquidity as a mediating variable, and financial performance within a single analytical framework, particularly among manufacturing companies listed on the IDX Special Monitoring Board during the post-pandemic economic recovery. This research gap provides an opportunity to extend the existing literature by examining the role of corporate liquidity in explaining the relationship between financial distress prediction models and financial performance.

Based on this background, this study aims to examine the effects of five financial distress prediction models, namely Altman, Springate, Zmijewski, Foster, and Grover, on corporate financial performance, with corporate liquidity serving as a mediating variable. The study focuses on manufacturing companies listed on the IDX Special Monitoring Board during the 2022–2025 period.

## 2. Theoretical Background and Hypothesis

### Signaling Theory

Signaling Theory introduced by Spence (1973), explains how information asymmetry between parties can be reduced through the communication of credible signals. Although originally developed in the context of labor market information, this theory has been widely applied in corporate finance to explain how companies communicate their financial conditions to external stakeholders. Managers generally possess more comprehensive information about a company's financial position and prospects than investors and creditors. Therefore, financial statements and other corporate disclosures serve as important sources of information for stakeholders in assessing corporate performance and financial risks (Spence, 1973).

In the context of this study, financial distress prediction models, including Altman, Springate, Zmijewski, Foster, and Grover, can be considered analytical indicators that communicate information about a company's financial condition. These models combine financial ratios to identify potential financial difficulties and bankruptcy risks (Altman, 1968; Zmijewski, 1984). Favorable prediction results may indicate stronger financial stability, whereas unfavorable results may signal increasing financial vulnerability. Such information can influence stakeholder perceptions, investment decisions, and creditors' willingness to provide financing.

Furthermore, financial information signals may be associated with corporate liquidity and financial performance. Companies demonstrating stronger financial conditions are generally better positioned to maintain their short-term financial obligations and sustain operational activities. Accordingly, Signaling Theory provides a theoretical foundation for examining the relationships among financial distress prediction models, corporate liquidity, and financial performance in this study.

**Financial Distress Prediction Methods and Corporate Liquidity**

Corporate liquidity represents a company's ability to meet its short-term financial obligations using available current assets. Liquidity is an important indicator of financial stability because it reflects the extent to which a company can maintain its operational activities and fulfill its immediate financial commitments. Under Signaling Theory, financial indicators provide information to external stakeholders regarding a company's financial condition. Favorable financial indicators may strengthen stakeholder confidence and support access to external financing, whereas unfavorable indicators may signal increasing financial risk.

Financial distress prediction models assess corporate financial conditions through various financial ratios related to liquidity, profitability, leverage, and operational efficiency. Altman (1968), for example, incorporates working capital relative to total assets as one of the components of the Z-Score model. Similarly, the Springate and Grover models incorporate working capital-related indicators, while other models employ different combinations of financial ratios to assess financial vulnerability. These indicators reflect different dimensions of a company's capacity to maintain financial stability.

Previous research supports the relevance of financial ratios in identifying potential corporate failure. Altman (1968) demonstrated the usefulness of financial ratios in predicting corporate bankruptcy, while Grice and Ingram (2001) highlighted that the predictive performance of bankruptcy models may vary across different corporate contexts. Almamy et al. (2016) further demonstrated the importance of financial indicators in assessing corporate failure risk. These findings suggest that financial distress prediction models provide useful information for evaluating corporate financial conditions, including liquidity.

Based on Signaling Theory and previous empirical evidence, financial distress prediction results are expected to be associated with corporate liquidity. Therefore, the following hypotheses are proposed:

**H1:** The Altman method significantly affects corporate liquidity.

**H2:** The Springate method significantly affects corporate liquidity.

**H3:** The Zmijewski method significantly affects corporate liquidity.

**H4:** The Foster method significantly affects corporate liquidity.

**H5:** The Grover method significantly affects corporate liquidity.

**Financial Distress Prediction Methods and Financial Performance**

Financial performance reflects a company's ability to manage its resources effectively and generate economic benefits through its operational activities. It is commonly assessed using financial indicators that reflect profitability, efficiency, and the company's ability to sustain its business operations. From the perspective of Signaling Theory, financial performance provides important signals to investors and creditors regarding management effectiveness and the company's future prospects.

Financial distress prediction models incorporate financial ratios that represent profitability, leverage, liquidity, and asset utilization. These components are closely related to the financial condition and operational capacity of a company. A company exhibiting unfavorable financial indicators may experience declining profitability, increasing financial obligations, and inefficient resource utilization, which can adversely affect its financial performance. Conversely, stronger financial indicators may reflect better financial stability and operational effectiveness.

Altman (1968) established the relationship between financial ratios and corporate bankruptcy prediction, demonstrating the importance of financial information in identifying potential financial failure. Grice and Ingram (2001) further emphasized that the applicability of bankruptcy prediction models depends on the characteristics of the firms being examined. In addition, research by Devi et al. (2020) and Handayati et al. (2022) highlights the financial consequences of economic disruptions and financial vulnerability among Indonesian companies. These findings support the relevance of examining financial distress prediction models as indicators associated with corporate financial performance.

Based on the theoretical arguments and previous empirical findings, this study proposes the following hypotheses:

**H6:** The Altman method significantly affects financial performance.

**H7:** The Springate method significantly affects financial performance.

**H8:** The Zmijewski method significantly affects financial performance.

**H9:** The Foster method significantly affects financial performance.

**H10:** The Grover method significantly affects financial performance.

**Corporate Liquidity and Financial Performance**

Corporate liquidity plays an important role in maintaining operational continuity and supporting financial performance. Adequate liquidity enables companies to meet short-term obligations, finance daily operational activities, and respond to unexpected financial needs. From the perspective of Signaling Theory, a company's ability to maintain sufficient liquidity provides a positive indication of its financial stability and ability to sustain business operations.

However, the relationship between liquidity and financial performance is not necessarily linear. Excessive investment in current assets may increase holding costs and reduce the efficiency of resource utilization, while insufficient liquidity may disrupt operational activities and increase financing costs. Therefore, companies need to maintain an appropriate balance between liquidity and profitability.

Previous empirical studies provide evidence of the relationship between liquidity and financial performance. Saleem and Rehman (2011) examined the relationship between liquidity ratios and profitability, while Demirgunes (2016) found a positive long-term relationship between liquidity and financial performance in the Turkish retail industry. More recently, Sany and Yonatan (2023) reported that liquidity measured by the current ratio had a positive and

significant effect on the profitability of publicly listed retail companies in Indonesia. Wibowo (2025) also found a positive and significant effect of liquidity on return on assets among Indonesian food and beverage companies. Nevertheless, differences in industry characteristics and liquidity management practices may produce different empirical results. Based on these theoretical considerations and previous findings, the following hypothesis is proposed:

**H11:** Corporate liquidity significantly affects financial performance.

**The Mediating Role of Corporate Liquidity**

Corporate liquidity may serve as an intervening mechanism linking financial distress prediction models to financial performance. Financial distress prediction models summarize various financial indicators that reflect a company's financial stability and vulnerability. These indicators may influence the company's ability to maintain adequate liquidity, which subsequently affects its capacity to sustain operational activities and generate profits.

From the perspective of Signaling Theory, favorable financial indicators may strengthen stakeholder confidence and improve a company's access to external financing. Better access to financing can support liquidity management and enable companies to meet short-term obligations. Adequate liquidity, in turn, provides financial flexibility to maintain business operations and support financial performance. Conversely, deteriorating financial conditions may restrict financial flexibility, weaken liquidity, and ultimately affect corporate performance.

Previous research has established the relevance of financial ratios in predicting corporate financial difficulties (Altman, 1968; Grice & Ingram, 2001), while empirical studies have demonstrated the relationship between liquidity and profitability (Demirgunes, 2016; Sany & Yonatan, 2023). These findings provide a basis for examining whether liquidity transmits the effects of financial distress prediction models to financial performance. Accordingly, this study proposes the following mediation hypothesis:

**H12:** Corporate liquidity mediates the effect of financial distress prediction methods on financial performance.

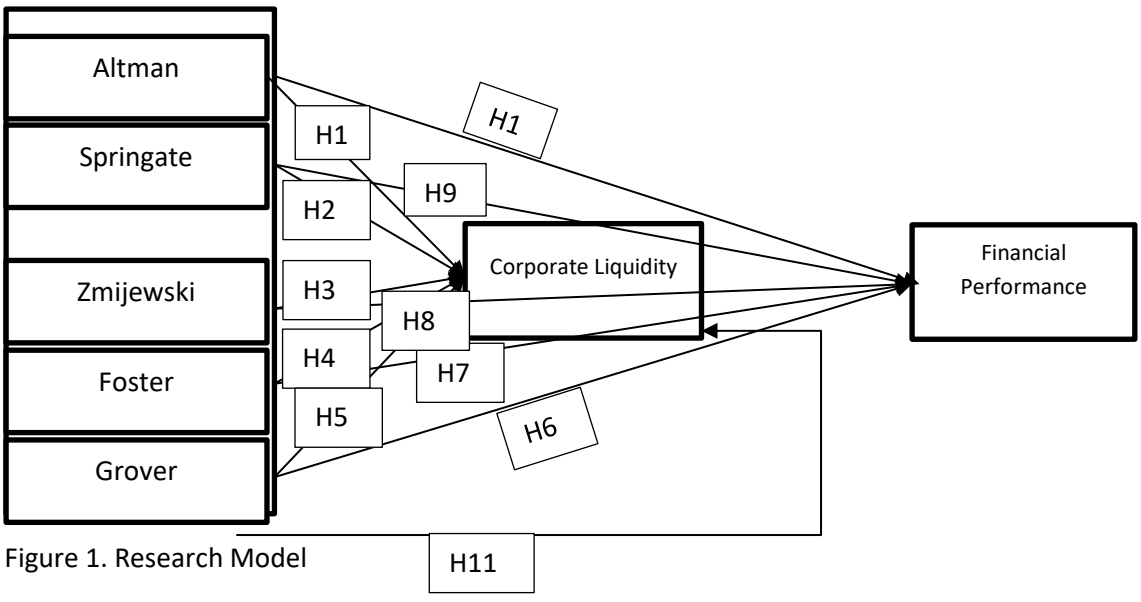



Figure 1. Research Model

## 3. Metode

### Sample and Data Collection Procedures

This study employed a quantitative explanatory research design using secondary data obtained from the audited annual financial statements of manufacturing companies listed on the Indonesia Stock Exchange (IDX). The population consisted of manufacturing companies included on the IDX Special Monitoring Board during the 2022–2025 observation period. Purposive sampling was applied based on the following criteria: (1) manufacturing companies listed on the IDX; (2) companies included on the Special Monitoring Board during the observation period; (3) companies publishing complete audited annual financial statements throughout 2022–2025; and (4) companies providing complete financial information required to calculate all research variables.

Initially, 15 manufacturing companies were identified on the Special Monitoring Board. Following the application of the sampling criteria, one company was excluded because it did not publish complete financial statements, while 11 companies were excluded due to incomplete financial information required for calculating the financial distress prediction models. Consequently, the final sample comprised three manufacturing companies observed over four years, resulting in 12 firm-year observations. The dataset therefore represents balanced panel data combining cross-sectional and time-series dimensions.

The data collection procedure involved retrieving audited annual financial statements from the IDX database, identifying the financial information required for each variable, calculating the financial distress prediction scores and financial ratios, and compiling the results into a panel dataset for statistical analysis. Given the limited number of eligible companies and observations, this study adopts an exploratory approach, and its findings are interpreted cautiously rather than generalized to the entire population.

### Measurement Instruments

This study involved five independent variables representing financial distress prediction methods, one mediating variable representing corporate liquidity, and one dependent variable representing financial performance. Financial distress was assessed using the Altman Z-Score, Springate, Zmijewski, Foster, and Grover models. Corporate liquidity was measured using the Current Ratio (CR), while financial performance was measured using Return on Assets (ROA). The operational definitions and measurements of these variables are presented in Table 1.

The five financial distress prediction models were used to assess different dimensions of corporate financial vulnerability. The Altman Z-Score was calculated following Altman (1968), incorporating working capital, retained earnings, earnings before interest and taxes, market value of equity, and sales relative to total assets. The Springate model followed the formulation developed by Springate (1978), while the Zmijewski model was calculated based on the profitability, leverage, and liquidity indicators proposed by Zmijewski (1984). The Foster model followed Foster's (1986) bankruptcy prediction approach, whereas the Grover model was calculated using the revised prediction model developed by Grover (2001).

Corporate liquidity was measured using the Current Ratio, which indicates the company's ability to meet short-term obligations using available current assets. The ratio was calculated by dividing current assets by current liabilities. Financial performance was measured using Return on Assets (ROA), calculated by dividing net income by total assets and multiplying the result by 100%. ROA reflects management effectiveness in utilizing corporate assets to generate earnings (Brigham & Ehrhardt, 2020).

Table 1. Operational Definition and Measurement of Variables

| Variable | Operational definition and measurement | Reference |
|---|---|---|
| Altman | Altman Z-Score, calculated using working capital, retained earnings, EBIT, market value of equity, and sales relative to total assets. | Altman (1968) |
| Springate | Springate Score, calculated using financial ratios representing working capital, profitability, and asset efficiency. | Springate (1978) |
| Zmijewski | Zmijewski Score, calculated using profitability, leverage, and liquidity indicators. | Zmijewski (1984) |
| Foster | Foster Score, calculated using financial ratios to assess corporate bankruptcy risk. | Foster (1986) |
| Grover | Grover Score, calculated using profitability and liquidity-related financial indicators. | Grover (2001) |
| Corporate Liquidity | Current Ratio = Current Assets / Current Liabilities. | Brigham & Ehrhardt (2020) |
| Financial Performance | Return on Assets = (Net Income / Total Assets) × 100%. | Brigham & Ehrhardt (2020) |

Source: Authors' compilation based on the cited literature.

**Data Analysis Techniques**

The data were analyzed using panel data regression with the Panel Least Squares method. This approach was selected because the dataset combines cross-sectional observations from three companies and time-series observations covering four years. Panel regression was considered more appropriate than Structural Equation Modeling (SEM-AMOS), which was used in an earlier version of the study but proved unsuitable due to the limited sample size of 12 observations and the risk of model over-parameterization (Baltagi, 2021).

Three panel regression specifications were initially considered: the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM). The Chow test was used to determine the appropriate specification between CEM and FEM. The REM was not selected as the primary estimation approach because the limited number of cross-sectional units made reliable estimation of firm-specific random effects difficult. Consequently, the Hausman and Lagrange Multiplier tests were not used as the basis for model selection. The CEM was retained when the Chow test did not indicate statistically significant firm-specific effects, whereas the FEM was considered when significant individual effects were identified.

Before hypothesis testing, descriptive statistics were calculated to examine the characteristics of the research variables. Diagnostic tests, including normality, multicollinearity, heteroscedasticity, and autocorrelation tests, were also conducted to assess potential violations of the regression assumptions.

Hypothesis testing was conducted in three stages. First, each financial distress prediction method was separately regressed against corporate liquidity to test H1–H5 and against financial performance to test H6–H10. Separate regression models were employed because the five prediction methods incorporate overlapping financial ratios, potentially generating high correlations among their scores and unstable coefficient estimates when included simultaneously. Second, the five prediction methods were entered jointly into a

regression model to examine their combined explanatory power for corporate liquidity using the F-test. Corporate liquidity was subsequently included alongside the five prediction methods in the financial performance regression to test H11.

Third, the mediating role of corporate liquidity was examined using the causal-steps approach proposed by Baron and Kenny (1986). The procedure evaluated the relationships between each financial distress prediction method and corporate liquidity, corporate liquidity and financial performance, and each prediction method and financial performance after including the mediating variable. The indirect relationship was assessed based on the significance of the relevant regression paths. Statistical significance was determined at the 5% level ($p < 0.05$).

Considering the limited sample size of 12 firm-year observations, the statistical power of the tests is relatively low, and the estimates may be sensitive to individual observations. Therefore, the findings are interpreted as exploratory associations rather than definitive evidence of causal relationships.

## 4. Result and Discussion

Descriptive statistics were used to examine the characteristics of the research variables based on 12 firm-year observations from manufacturing companies listed on the IDX Special Monitoring Board during 2022–2025. The analysis included the mean, median, standard deviation, skewness, kurtosis, and Jarque-Bera probability for each variable.

Table 2. Descriptive Statistics

| Variable | Mean | Median | Std. Dev. | Jarque-Bera (Prob.) |
|---|---|---|---|---|
| Altman (X1) | 1.415 | 1.331 | 0.539 | 1.431 (0.489) |
| Springate (X2) | 0.694 | 0.811 | 0.328 | 1.389 (0.499) |
| Zmijewski (X3) | 3.137 | 3.395 | 0.630 | 1.462 (0.481) |
| Foster (X4) | 0.323 | 0.252 | 0.245 | 0.885 (0.642) |
| Grover (X5) | 0.323 | 0.252 | 0.246 | 0.895 (0.639) |
| Corporate Liquidity (M) | 1.686 | 1.225 | 0.771 | 2.005 (0.367) |
| Financial Performance (Y) | 0.811 | 0.695 | 0.266 | 1.192 (0.551) |

Source: Processed data, 2026.

Table 2 shows that the Zmijewski model recorded the highest mean score (3.137), followed by Altman (1.415), Springate (0.694), and Foster and Grover (0.323). Corporate liquidity had a mean of 1.686 and a standard deviation of 0.771, while financial performance recorded a mean of 0.811 and a standard deviation of 0.266. Notably, the Foster and Grover models exhibited nearly identical descriptive statistics, indicating potential similarities in their scores that require further examination in the simultaneous regression analysis. All Jarque-Bera probability values exceeded 0.05, indicating no significant departure from normality at the variable level.

The classical assumption tests were conducted to evaluate the reliability of the regression estimates. The residual normality test produced a Jarque-Bera statistic of 0.057 with a probability value of 0.972, exceeding the 0.05 significance level. The Durbin-Watson statistic

was 1.543, indicating no serious autocorrelation based on the criterion applied in this study. Furthermore, the Glejser test produced probability values ranging from 0.065 to 0.785, suggesting no significant heteroscedasticity.

Regarding multicollinearity, the partial regression models do not present this concern because each model includes only one independent variable. However, the simultaneous models require further examination because the Foster and Grover scores exhibit nearly identical descriptive characteristics. Their correlation coefficient and Variance Inflation Factor (VIF) should be reported to assess potential multicollinearity. The Chow test was also conducted to determine the appropriate panel regression specification between the Common Effect Model (CEM) and Fixed Effect Model (FEM). However, the F-statistic and probability value must be reported before the final model selection can be established.

Table 3. Partial Regression Results

| Hypothesis | Relationship | Coefficient | t-statistic | Prob. | $R^2$ | Decision |
|---|---|---|---|---|---|---|
| H1 | Altman → Liquidity | -0.368 | -0.841 | 0.420 | 0.066 | Not supported |
| H2 | Springate → Liquidity | 1.428 | 2.419 | 0.036 | 0.369 | Supported |
| H3 | Zmijewski → Liquidity | 0.620 | 1.858 | 0.093 | 0.257 | Not supported |
| H4 | Foster → Liquidity | 2.705 | 5.355 | 0.000 | 0.741 | Supported |
| H5 | Grover → Liquidity | 2.704 | 5.415 | 0.000 | 0.746 | Supported |
| H6 | Grover → Performance | -0.499 | -1.646 | 0.131 | 0.213 | Not supported |
| H7 | Foster → Performance | -0.501 | -1.648 | 0.130 | 0.214 | Not supported |
| H8 | Zmijewski → Performance | -0.162 | -1.314 | 0.218 | 0.147 | Not supported |
| H9 | Springate → Performance | -0.521 | -2.653 | 0.024 | 0.413 | Supported |
| H10 | Altman → Performance | -0.105 | -0.688 | 0.507 | 0.045 | Not supported |

Source: Processed data, 2026. Significance level: 5%.

Table 3 presents the partial regression results for the effects of the five financial distress prediction methods on corporate liquidity and financial performance. Regarding corporate liquidity, the Springate method has a positive and significant effect (β = 1.428; p = 0.036). Similarly, the Foster and Grover methods demonstrate positive and significant effects, with coefficients of 2.705 (p = 0.000) and 2.704 (p = 0.000), respectively. These findings indicate that variations in the scores generated by these three models are significantly associated with corporate liquidity. In contrast, the Altman method (β = -0.368; p = 0.420) and the Zmijewski method (β = 0.620; p = 0.093) do not have statistically significant effects on liquidity. Therefore, H2, H4, and H5 are supported, whereas H1 and H3 are not supported.

Regarding financial performance, only the Springate method demonstrates a statistically significant relationship, with a negative coefficient of -0.521 (p = 0.024). This indicates that higher Springate scores are associated with lower financial performance in the sampled companies. Meanwhile, the Grover (β = -0.499; p = 0.131), Foster (β = -0.501; p = 0.130), Zmijewski (β = -0.162; p = 0.218), and Altman (β = -0.105; p = 0.507) methods do not

demonstrate statistically significant effects on financial performance. Accordingly, only H9 is supported, while H6, H7, H8, and H10 are not supported.

Table 4. Simultaneous Regression Results

| Model | Relationship | F-statistic | Prob. (F) | $R^2$ | Adjusted $R^2$ |
|---|---|---|---|---|---|
| M1 | X1, X2, X3, X4, X5 → Liquidity | 8.771 | 0.010 | 0.880 | 0.779 |
| M2 | X1, X2, X3, X4, X5, M → Performance | 1.322 | 0.388 | 0.613 | 0.150 |

Source: Processed data, 2026.

Table 4 shows that the five financial distress prediction methods jointly have a significant effect on corporate liquidity (F = 8.771; p = 0.010). The coefficient of determination ($R^2$) of 0.880 indicates that the five prediction models collectively explain 88.0% of the variation in corporate liquidity, while the remaining 12.0% is explained by factors outside the model. The adjusted $R^2$ of 0.779 indicates that the explanatory power decreases after accounting for the number of independent variables.

In contrast, the second regression model does not demonstrate a statistically significant joint effect of the five financial distress prediction methods and corporate liquidity on financial performance (F = 1.322; p = 0.388). Although the model produces an $R^2$ of 0.613, its adjusted $R^2$ is only 0.150. This suggests that the apparent explanatory power is substantially reduced after accounting for the number of predictors relative to the limited sample size. Therefore, the model does not provide sufficient statistical evidence of a joint relationship with financial performance.

The effect of corporate liquidity on financial performance was evaluated within the simultaneous regression model. The estimated coefficient is positive at 0.337, with a probability value of 0.278. Since the probability exceeds the 0.05 significance level, the relationship is not statistically significant. Thus, although corporate liquidity exhibits a positive coefficient, there is insufficient empirical evidence to conclude that liquidity significantly affects financial performance in the sampled companies. Consequently, H11 is not supported.

The mediating role of corporate liquidity was examined using the causal-steps approach proposed by Baron and Kenny (1986). The analysis evaluated whether financial distress prediction methods significantly affected corporate liquidity and whether corporate liquidity subsequently influenced financial performance.

The results indicate that the Springate, Foster, and Grover methods have significant effects on corporate liquidity. However, corporate liquidity does not have a statistically significant effect on financial performance (β = 0.337; p = 0.278). Therefore, the second condition for establishing mediation through the causal-steps approach is not satisfied.

These findings indicate that corporate liquidity does not mediate the relationship between the financial distress prediction methods and financial performance in the observed sample. Consequently, H12 is not supported. This result suggests that although several financial distress prediction methods are significantly associated with corporate liquidity, such relationships do not translate into a statistically significant indirect relationship with financial performance.

## Discussion

### The Effect of Financial Distress Prediction Methods on Corporate Liquidity

The findings indicate that the Altman and Zmijewski methods do not significantly explain corporate liquidity. This suggests that the two models are more useful for assessing overall financial distress than for directly evaluating a company's ability to meet short-term obligations.

Their composite scores incorporate several financial dimensions, including profitability and leverage, which may not consistently reflect changes in current liquidity. This finding is consistent with Grice and Dugan (2001), who emphasize that the predictive accuracy of financial distress models may vary depending on the sample, industry, and observation period. Similarly, Wu et al. (2010) found that the performance of bankruptcy prediction models varies over time, indicating that no single model is equally effective in every context.

In contrast, the Springate, Foster, and Grover methods demonstrate significant positive relationships with corporate liquidity. These findings suggest that the financial indicators incorporated into these models provide relevant information about companies' short-term financial conditions, particularly those related to working capital and profitability. This result is generally supported by Wu et al. (2010), who found that different bankruptcy prediction models contain distinct financial information. However, their study focused on bankruptcy prediction rather than the direct relationship between distress scores and liquidity. Therefore, the present findings extend the discussion by examining how different prediction methods relate to corporate liquidity.

Overall, the findings demonstrate that financial distress prediction methods do not have uniform relationships with corporate liquidity. From the perspective of Signaling Theory (Spence, 1973), financial distress scores provide signals about a company's financial condition. However, the usefulness of these signals depends on the financial dimensions captured by each model. Therefore, investors and creditors should complement financial distress assessments with specific liquidity ratios when evaluating a company's short-term financial capacity.

**The Effect of Financial Distress Prediction Methods on Financial Performance**

The findings show that the Altman, Zmijewski, Foster, and Grover methods do not significantly explain financial performance. This indicates that financial distress indicators alone may not adequately capture a company's ability to generate returns from its assets. Profitability is also influenced by operational efficiency, asset utilization, managerial decisions, and market conditions. This finding is consistent with Grice and Dugan (2001) and Wu et al. (2010), who highlight the limitations and varying predictive performance of financial distress models across different contexts. Thus, financial distress scores should not automatically be interpreted as direct indicators of profitability.

Meanwhile, the Springate method demonstrates a significant negative relationship with financial performance. This finding suggests that an improvement in the Springate score does not necessarily coincide with higher profitability among the sampled companies. Since the model combines working-capital, profitability, and sales-efficiency indicators, its composite score may reflect financial conditions that do not move in the same direction as ROA. The result also indicates a different relationship from the other financial distress methods examined in this study. Wu et al. (2010) provide relevant supporting evidence that the predictive performance of financial distress models varies over time and across models. Nevertheless, further analysis of the individual Springate components is needed to identify the factors underlying this negative relationship.

These findings suggest that financial distress prediction models should not be treated as direct measures of profitability. In the context of Signaling Theory, financial distress scores communicate information about a company's financial condition, but they do not necessarily represent its ability to generate returns. Investors and management should therefore complement these models with profitability and operational-efficiency indicators.

**The Joint Effect of Financial Distress Prediction Methods on Corporate Liquidity**

The simultaneous findings indicate that the five financial distress prediction methods collectively provide relevant information for explaining corporate liquidity. This suggests that considering

several models may capture different dimensions of a company's financial condition more comprehensively than relying on a single method. This finding is in line with Wu et al. (2010), who demonstrated that different bankruptcy prediction models contain unique information and that combining relevant indicators can improve model performance.

Nevertheless, this result should be interpreted cautiously. The study involves a limited number of observations, while the Foster and Grover scores exhibit nearly identical patterns. Consequently, the explanatory contribution of the combined model may be affected by overlapping information among the predictors. Further research using a larger sample is necessary to assess whether the combined application of these models consistently improves liquidity assessment.

**The Effect of Corporate Liquidity on Financial Performance and Its Mediating Role**

The findings indicate that corporate liquidity does not significantly explain financial performance. This suggests that maintaining a higher level of current assets does not automatically lead to greater profitability. In financially distressed companies, current assets may consist of inventories or receivables that have not been effectively converted into cash or revenue. Therefore, liquidity management needs to be accompanied by effective asset utilization and operational management.

This finding is not consistent with Demirgünes (2016), who identified a positive long-term relationship between liquidity and financial performance among Turkish retail companies. It also differs from Atmaja and Usman (2025), who found that liquidity positively affects the profitability of manufacturing companies listed on the IDX. However, the present finding is partly supported by Li et al. (2020), who reported that the relationship between liquidity and financial performance varied depending on the liquidity measure used. Their study also found that liquidity did not consistently produce a positive effect on profitability. These differences may be related to the characteristics of the sampled companies, particularly their financial difficulties and inclusion on the IDX Special Monitoring Board.

The mediation analysis also does not support the role of corporate liquidity in linking financial distress prediction methods to financial performance. Although several prediction methods are associated with liquidity, liquidity itself does not significantly explain financial performance in the estimated model. Thus, the findings do not provide sufficient evidence that liquidity serves as an intervening mechanism in this relationship. This result suggests that financial performance may depend on broader factors, including operational efficiency, capital structure, and asset utilization. Further research is needed to examine this mediating relationship using a larger sample and a formal indirect-effect test.

## 5. Conclussion

This study examined the effects of five financial distress prediction methods on corporate liquidity and financial performance, with liquidity as a mediating variable, among manufacturing companies listed on the IDX Special Monitoring Board during 2022–2025.

The findings indicate that the Springate, Foster, and Grover methods have significant positive relationships with corporate liquidity, whereas the Altman and Zmijewski methods do not. Regarding financial performance, only the Springate method demonstrates a significant negative relationship. Furthermore, corporate liquidity does not significantly affect financial performance and does not mediate the relationship between financial distress prediction methods and financial performance. These results demonstrate that the usefulness of financial distress prediction models varies depending on the financial dimension being assessed. Therefore, these models should be used as complementary tools rather than direct measures of

corporate profitability.

**Limitations and Suggestion**

This study is limited by its small sample of three companies and 12 firm-year observations, which restricts the generalizability of the findings. The similar patterns of the Foster and Grover scores also indicate potential overlapping information between the two models. Accordingly, future research should expand the sample size, observation period, and industry coverage. Additional variables, such as corporate governance, firm size, leverage, and macroeconomic conditions, may also be incorporated. Furthermore, future studies should examine multicollinearity among prediction models and apply formal indirect-effect testing to provide stronger evidence regarding the mediating role of corporate liquidity.

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