

Financial Ratios and Corporate Governance as Determinants of Financial Distress Probability: Evidence from Indonesian Manufacturing Firms

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ABSTRACT: This study aims to examine the effects of financial ratios and corporate governance on the probability of financial distress among manufacturing companies listed on the Indonesia Stock Exchange during the 2020–2025 period. Financial ratios are represented by profitability, liquidity, leverage, and activity ratios, while corporate governance is proxied by the proportion of independent commissioners. This study employed a quantitative research approach using secondary data obtained from the annual financial statements of manufacturing companies listed on the Indonesia Stock Exchange. The sample consisted of 900 firm-year observations selected through purposive sampling. Data were analyzed using binary logistic regression to estimate the probability of financial distress. Prior to hypothesis testing, the model was evaluated through multicollinearity testing, overall model fit, Hosmer–Lemeshow goodness-of-fit test, classification accuracy, receiver operating characteristic (ROC) analysis, and the Nagelkerke R-square coefficient. The results reveal that profitability, measured by Return on Assets (ROA), and activity ratio, measured by Total Asset Turnover (TATO), have a significant negative effect on the probability of financial distress, indicating that firms with higher profitability and more efficient asset utilization are less likely to experience financial distress. Conversely, leverage, measured by the Debt-to-Equity Ratio (DER), has a significant positive effect, suggesting that greater reliance on debt financing increases the likelihood of financial distress. In contrast, liquidity, measured by the Current Ratio (CR), and corporate governance, proxied by the proportion of independent commissioners, do not have a statistically significant effect on financial distress. The findings highlight that profitability, leverage, and asset utilization are key determinants of financial distress, whereas short-term liquidity and board independence are insufficient to explain financial distress among Indonesian manufacturing firms. These findings provide valuable insights for corporate managers, investors, creditors, and policymakers in identifying early warning indicators of financial distress and strengthening corporate financial sustainability.

KEYWORDS: asset turnover, corporate governance, financial distress, leverage, liquidity, manufacturing firms, profitability, Indonesia Stock Exchange

INTRODUCTION

The global economy has experienced persistent uncertainty over the past several years due to escalating geopolitical tensions, inflationary pressures, disruptions in global supply chains, and the tightening of monetary policies implemented by many countries to stabilize inflation. These conditions have weakened global economic activity and created considerable challenges for businesses operating across industries. The International Monetary Fund (IMF) projected global economic growth of only 3.1% in 2026, while the World Bank estimated an even lower growth rate of 2.5%, representing the weakest global economic performance since the COVID-19 pandemic. The prolonged uncertainty has increased operational risks, reduced investment confidence, and intensified financial pressures on corporations, particularly those operating in capital-intensive industries.

Indonesia has demonstrated relatively stable economic performance during the post-pandemic recovery period. National economic growth reached 5.05% in 2023, slightly moderated to 5.03% in 2024, and was projected to increase marginally to approximately 5.1% in 2025. Despite this resilience, the Indonesian economy remains highly exposed to external shocks, including global trade uncertainty, exchange rate volatility, inflationary pressures, and fluctuations in international financial markets. These external factors may adversely affect corporate performance by increasing production costs, reducing market demand, and limiting firms' access to external financing. Consequently, maintaining corporate financial stability has become increasingly important for ensuring long-term business sustainability.



Among all economic sectors, the manufacturing industry plays a strategic role in supporting Indonesia's economic development. According to data from the Central Bureau of Statistics (BPS), the manufacturing sector consistently contributed approximately 18–19% of Indonesia's Gross Domestic Product (GDP) during the 2020–2025 period, making it the country's largest contributor to national output. Besides its substantial contribution to GDP, the sector also serves as one of Indonesia's largest employers, absorbing approximately 20.31 million workers, equivalent to 13.86% of total national employment. Furthermore, manufacturing industries generate the largest share of Indonesia's export earnings, with export values reaching approximately USD 227.10 billion or more than 80% of the country's total export value. These figures demonstrate that the sustainability of manufacturing firms is closely associated with Indonesia's broader economic stability and competitiveness.

Despite its strategic importance, the manufacturing sector is particularly vulnerable to financial difficulties because of its operational characteristics. Manufacturing firms generally require substantial investment in fixed assets, maintain relatively high working capital requirements, and depend on complex production and supply chain systems. Such characteristics make manufacturing companies highly sensitive to fluctuations in raw material prices, disruptions in global logistics, exchange rate movements, changes in consumer demand, and increases in financing costs. Consequently, adverse macroeconomic conditions can rapidly deteriorate corporate financial performance and increase the likelihood of financial distress.

Financial distress represents a condition in which a firm experiences financial deterioration that impairs its ability to meet contractual obligations and maintain normal business operations. Although financial distress does not necessarily indicate immediate bankruptcy, it is widely recognized as an early warning stage preceding corporate failure. Previous studies have emphasized that early identification of financial distress enables management to undertake corrective actions before financial problems become irreversible (Meng *et al.*, 2024). Such actions may include restructuring debt, improving capital allocation, disposing of non-productive assets, reducing operating expenditures, or redesigning business strategies to restore financial stability (Ambarwati & Haryono, 2021). Therefore, identifying the determinants of financial distress has become an important issue for managers, investors, creditors, regulators, and other stakeholders seeking to minimize corporate failure risk.

One of the earliest indicators of financial deterioration is declining profitability. Net income reflects management's effectiveness in utilizing corporate resources, controlling operating expenses, and creating value for shareholders. Persistent declines in profitability may indicate weakening operational efficiency and reduced cash-generating capability, thereby increasing the probability of financial distress (Rao *et al.*, 2024). The financial performance of Indonesian manufacturing companies illustrates this concern. Although average net income recovered after the COVID-19 pandemic in 2021, profitability subsequently declined during the following years, suggesting that many firms continued to face significant operational and financial challenges. Sustained decreases in profitability may eventually limit firms' capacity to generate sufficient cash flows to satisfy financial obligations.

Besides profitability, a firm's ability to fulfill its financial commitments is equally important in assessing financial health. One commonly used indicator is the Interest Coverage Ratio (ICR), which measures the extent to which operating income can cover interest expenses (Li *et al.*, 2021). A declining ICR generally indicates weakening debt-servicing capacity and increasing financial vulnerability. The downward trend observed in the average Interest Coverage Ratio among Indonesian manufacturing firms further reflects mounting financial pressure associated with declining operating performance and increasingly burdensome financing costs. Together, these developments emphasize the growing importance of identifying the financial and governance factors that influence the likelihood of financial distress.

The literature suggests that financial distress is a multidimensional phenomenon that cannot be explained solely by profitability. Instead, it is influenced by a combination of financial characteristics, including liquidity, leverage, operational efficiency, and corporate governance quality (Tron *et al.*, 2023). Financial ratio analysis remains one of the most widely accepted approaches for evaluating corporate financial health because it provides comprehensive information regarding profitability, liquidity, capital structure, and asset utilization (Brigham & Houston, 2019). Simultaneously, recent studies argue that financial information alone is insufficient for accurately predicting financial distress. Corporate governance mechanisms have increasingly been recognized as important determinants because effective governance strengthens managerial oversight, reduces agency conflicts, and improves strategic decision-making, thereby enhancing firms' resilience during periods of financial uncertainty (Meng *et al.*, 2024; Truong, 2022).

Previous empirical studies have extensively investigated the relationship between financial ratios and financial distress; however, the findings remain inconclusive. Profitability, commonly measured by Return on Assets (ROA), has been reported to



reduce the likelihood of financial distress (Gunawan & Putra, 2021; Ha *et al.*, 2023; Hassan *et al.*, 2023; Isayas, 2021; Kebede *et al.*, 2024). In contrast, Ceylan (2021) and Chen (2018) documented a positive relationship, while Adielyani and Pangestuti (2023) as well as Luu Thu (2023) found no significant effect. Similar inconsistencies are evident for liquidity, leverage, and activity ratios. Although several studies reported that higher liquidity reduces financial distress (Abdu, 2022; Gunawan & Putra, 2021; Kebede *et al.*, 2024), others observed a positive association (Ceylan, 2021; Li *et al.*, 2021; Luu Thu, 2023) or statistically insignificant results (Isayas, 2021; Oktaviani & Lisiantara, 2022). Likewise, leverage and asset turnover have produced conflicting empirical evidence across different countries, industries, and observation periods, suggesting that the predictive ability of financial ratios remains context-dependent.

Beyond financial performance, corporate governance has received increasing attention as a mechanism for mitigating corporate financial risk. Agency theory argues that effective governance reduces conflicts of interest between managers and shareholders, improves monitoring effectiveness, and strengthens strategic decision-making. Among governance mechanisms, independent commissioners are expected to enhance board oversight and protect shareholders by ensuring greater transparency and accountability (Truong, 2022). Nevertheless, previous studies also report inconsistent findings. Several studies found that independent commissioners reduce the probability of financial distress (Gerged *et al.*, 2022; Puspaningsih *et al.*, 2024; Wang & Deng, 2006), whereas others documented positive or insignificant relationships (Candradewi & Rahyuda, 2021; Jhunjunwala, 2024; Nasir & Ali, 2018; Yuliani & Rahmatiasari, 2021). These contradictory findings indicate that the effectiveness of governance mechanisms may depend on institutional settings, corporate characteristics, and economic conditions.

The inconsistent empirical evidence demonstrates an important research gap regarding the determinants of financial distress, particularly in emerging markets. Indonesia provides a compelling context because its manufacturing sector is highly exposed to global economic uncertainty while simultaneously serving as a major contributor to national output, employment, and exports. Furthermore, the 2020–2025 period captures substantial economic disruptions associated with the post-pandemic recovery, global inflation, monetary tightening, and geopolitical instability, making it an appropriate setting for reassessing the predictive role of financial ratios and corporate governance.

Unlike many previous studies that examine financial indicators or governance mechanisms separately, this study integrates profitability, liquidity, leverage, activity ratio, and independent commissioners into a single empirical framework to evaluate their combined effects on the probability of financial distress among Indonesian manufacturing firms. In addition, this study employs binary logistic regression, which is particularly appropriate for modeling the probability of financial distress as a binary outcome. By incorporating both financial and governance perspectives within a comprehensive prediction model, this study contributes to the growing literature on corporate financial distress and provides updated empirical evidence from an emerging economy during a period characterized by heightened economic uncertainty.

Accordingly, this study aims to examine the effects of profitability, liquidity, leverage, activity ratio, and independent commissioners on the probability of financial distress among manufacturing companies listed on the Indonesia Stock Exchange during the 2020–2025 period. The findings are expected to enrich the literature on financial distress prediction while providing practical implications for corporate managers, investors, creditors, and policymakers in identifying early warning signals of financial difficulties and strengthening corporate financial resilience.

METHODOLOGY

This study employed a quantitative research approach to examine the effects of financial ratios and corporate governance on the probability of financial distress among manufacturing companies listed on the Indonesia Stock Exchange (IDX) during the 2020–2025 period. A quantitative approach was selected because it enables the empirical examination of causal relationships between independent and dependent variables using statistical analysis (Creswell, 2014). The study utilized secondary data obtained from audited annual financial statements and corporate governance reports published by manufacturing companies through the Indonesia Stock Exchange and the respective companies' official websites. The research population consisted of all manufacturing firms listed on the Indonesia Stock Exchange during the observation period. The research sample was determined using purposive sampling based on predetermined criteria: (1) manufacturing companies consistently listed on the Indonesia Stock Exchange during 2020–2025; (2) companies that published complete annual financial statements throughout the observation period; and (3)

companies with complete financial and corporate governance information required for measuring all research variables. Based on these criteria, the final sample comprised 900 firm-year observations.

Financial distress was treated as the dependent variable and measured as a binary outcome suitable for logistic regression analysis. The independent variables consisted of profitability measured by Return on Assets (ROA), liquidity measured by the Current Ratio (CR), leverage measured by the Debt-to-Equity Ratio (DER), activity ratio measured by Total Asset Turnover (TATO), and corporate governance proxied by the proportion of independent commissioners. These variables were selected because they represent key dimensions of corporate financial performance and governance that have been widely employed in previous financial distress studies.

Data analysis was performed using binary logistic regression because the dependent variable is dichotomous, indicating whether a firm experienced financial distress or not. Prior to hypothesis testing, the regression model was evaluated through multicollinearity testing to examine correlations among the independent variables, followed by overall model fit assessment using the -2 Log Likelihood statistic. Model calibration was further evaluated using the Hosmer–Lemeshow goodness-of-fit test, while predictive performance was assessed through the classification accuracy rate, the Receiver Operating Characteristic (ROC) curve, and the Area Under the Curve (AUC). The explanatory power of the model was determined using the Nagelkerke R-square coefficient. Statistical significance was evaluated at the 5% significance level, and all analyses were conducted using IBM SPSS Statistics.

RESULTS AND DISCUSSION

This section presents the empirical findings of the study. The results are organized into three parts. First, descriptive statistics summarize the characteristics of the research variables. Second, the performance and adequacy of the binary logistic regression model are evaluated through several diagnostic measures. Finally, the regression results are presented to examine the effects of financial ratios and corporate governance on the probability of financial distress among Indonesian manufacturing firms.

Descriptive Statistics

Descriptive statistics provide an overview of the distribution and characteristics of the variables used in this study. Table 1 presents the number of observations, minimum and maximum values, means, and standard deviations for the dependent and independent variables.

Table 1. Descriptive Statistics

Variable	N	Minimum	Maximum	Mean	Std. Dev.
Financial Distress	900	0.000	1.000	0.282	0.450
Return on Assets (ROA)	900	-1.430	0.943	0.023	0.120
Current Ratio (CR)	900	0.020	83.430	2.812	4.368
Debt-to-Equity Ratio (DER)	900	-84.990	199.370	1.214	7.803
Total Asset Turnover (TATO)	900	0.010	77.000	1.146	2.910
Independent Commissioners	900	0.250	0.830	0.432	0.134

Table 1 shows that the study analyzed 900 firm-year observations of manufacturing companies listed on the Indonesia Stock Exchange during the 2020–2025 period. Financial distress has a mean value of 0.282, indicating that approximately 28.2% of the observations were classified as financially distressed. The average Return on Assets (ROA) is 2.3%, suggesting relatively modest profitability across the sampled firms. The mean Current Ratio (CR) of 2.812 indicates that, on average, companies possessed current assets sufficient to meet their short-term liabilities.

The Debt-to-Equity Ratio (DER) exhibits substantial dispersion, with values ranging from -84.990 to 199.370 and a standard deviation considerably exceeding its mean, reflecting substantial differences in capital structures among firms. Likewise, Total Asset Turnover (TATO) demonstrates considerable variability in operational efficiency across the sample. The average proportion of independent commissioners is 43.2%, exceeding the minimum requirement stipulated by the Indonesian Financial Services Authority (OJK), while its relatively small standard deviation suggests that board independence is comparatively homogeneous among Indonesian manufacturing companies.

Logistic Regression Model Evaluation

Prior to hypothesis testing, the binary logistic regression model was evaluated to ensure that it adequately represented the observed data and possessed sufficient predictive capability. The assessment included multicollinearity diagnostics, overall model fit, goodness-of-fit evaluation, classification accuracy, discriminative ability, and explanatory power.

Table 2. Logistic Regression Model Evaluation

Evaluation Indicator	Result
VIF Range	1.005–1.031
Initial –2 Log Likelihood	1069.937
Final –2 Log Likelihood	512.593
Hosmer–Lemeshow χ^2	187.172
Hosmer–Lemeshow Sig.	0.001
Classification Accuracy	90.43%
Area Under the ROC Curve (AUC)	0.935
Cox & Snell R^2	0.461
Nagelkerke R^2	0.663

The multicollinearity assessment indicates that all Variance Inflation Factor (VIF) values range from 1.005 to 1.031, well below the commonly accepted threshold of 10, confirming the absence of multicollinearity among the independent variables. Moreover, the –2 Log Likelihood decreases substantially from 1069.937 in the null model to 512.593 in the final model, indicating a considerable improvement in model fit after incorporating the explanatory variables.

Although the Hosmer–Lemeshow goodness-of-fit test is statistically significant ($p = 0.001$), this result should be interpreted with caution because the test is known to be highly sensitive to large sample sizes. Consequently, model adequacy was further assessed using predictive performance indicators. The classification table shows that the model correctly classified 814 of the 900 observations, yielding an overall prediction accuracy of 90.43%. Furthermore, the Receiver Operating Characteristic (ROC) analysis produced an Area Under the Curve (AUC) value of 0.935, indicating excellent discriminatory ability in distinguishing financially distressed firms from non-distressed firms. The Nagelkerke R^2 value of 0.663 further suggests that the explanatory variables account for approximately 66.3% of the variation in financial distress, indicating substantial explanatory power.

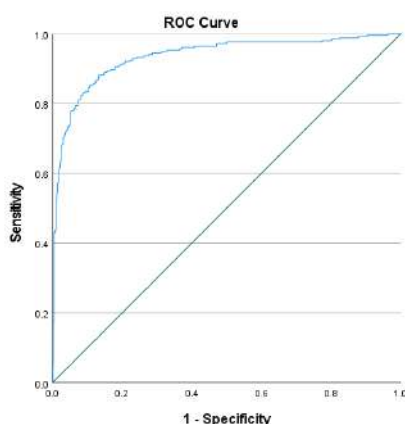


Figure 1. Receiver Operating Characteristic (ROC) Curve

Logistic Regression Results

The effects of financial ratios and corporate governance on the probability of financial distress were estimated using binary logistic regression. Table 3 presents the estimated coefficients, Wald statistics, significance levels, and odds ratios for each explanatory variable.



Table 3. Binary Logistic Regression Results

Variable	B	Wald	p-value	Odds Ratio
Return on Assets (ROA)	−0.412	147.737	0.001	0.657
Current Ratio (CR)	−0.026	2.749	0.097	0.974
Debt-to-Equity Ratio (DER)	0.109	6.515	0.011	1.115
Total Asset Turnover (TATO)	−0.478	4.010	0.045	0.624
Independent Commissioners	0.748	0.853	0.356	2.112
Constant	−0.669	2.442	0.343	0.512

The regression results reveal that profitability, leverage, and activity ratio significantly influence the probability of financial distress. Return on Assets (ROA) has a significant negative coefficient ($\beta = -0.412$, $p = 0.001$), indicating that firms with higher profitability are less likely to experience financial distress. Specifically, the odds ratio of 0.657 suggests that an increase in ROA reduces the likelihood of financial distress by approximately 34.3%, holding other variables constant.

Leverage, measured by the Debt-to-Equity Ratio (DER), exhibits a significant positive relationship with financial distress ($\beta = 0.109$, $p = 0.011$). The corresponding odds ratio of 1.115 indicates that each one-unit increase in DER increases the likelihood of financial distress by approximately 11.5%. Conversely, Total Asset Turnover (TATO) shows a significant negative effect ($\beta = -0.478$, $p = 0.045$), suggesting that firms with more efficient asset utilization are less likely to experience financial distress. The estimated odds ratio of 0.624 implies a reduction of approximately 37.6% in the probability of financial distress associated with improvements in asset turnover.

In contrast, the Current Ratio (CR) and the proportion of independent commissioners do not exhibit statistically significant relationships with financial distress. Although both variables display the expected directional coefficients, their p-values exceed the 5% significance threshold, indicating that short-term liquidity and board independence do not significantly explain the probability of financial distress among Indonesian manufacturing firms during the observation period after controlling for profitability, leverage, and operational efficiency.

Profitability and Financial Distress

The empirical results demonstrate that profitability, measured by Return on Assets (ROA), has a significant negative effect on the probability of financial distress among manufacturing firms listed on the Indonesia Stock Exchange. The estimated odds ratio of 0.657 indicates that firms with higher profitability are substantially less likely to experience financial distress than firms generating lower returns from their assets. This finding confirms that the ability to convert corporate assets into earnings is a critical determinant of financial stability. Profitable firms possess stronger internal financing capacity, enabling them to meet operational expenses, service debt obligations, and withstand adverse economic conditions without excessive dependence on external financing.

This finding is consistent with signaling theory, which argues that corporate financial performance conveys important information to external stakeholders regarding the firm's future prospects. A higher ROA serves as a positive signal that management is capable of utilizing corporate assets efficiently to generate sustainable earnings. Such positive signals increase investors' and creditors' confidence, facilitate access to external financing, and reduce perceived default risk. Conversely, persistent declines in profitability may be interpreted as negative signals regarding deteriorating operational performance, thereby increasing stakeholders' concerns over the firm's ability to maintain financial sustainability.

From the perspective of agency theory, profitability also reflects managerial effectiveness in fulfilling fiduciary responsibilities to shareholders. Managers are entrusted with optimizing corporate resources to maximize firm value while maintaining financial stability. Higher profitability indicates that management has successfully allocated corporate assets to productive activities, generated sufficient operating cash flows, and minimized inefficient resource utilization. These conditions strengthen the firm's financial resilience by reducing reliance on debt financing and enhancing its capacity to absorb unexpected economic shocks. In contrast, weak profitability limits internally generated funds, increases financing constraints, and ultimately elevates the probability of financial distress.

The present finding supports a growing body of empirical evidence indicating that profitability is one of the strongest predictors of financial distress. Similar conclusions were reported by Kebede *et al.* (2024), Ha *et al.* (2023), Hassan *et al.* (2023), and Isayas (2021), who consistently found that firms with stronger profitability exhibit lower financial distress risk. However, the



result differs from those reported by Adielyani and Pangestuti (2023), Luu Thu (2023), Ceylan (2021), and Chen (2018), who documented either insignificant or contrasting relationships. These inconsistencies suggest that the influence of profitability may vary depending on industrial characteristics, institutional environments, macroeconomic conditions, and the measurement of financial distress employed across studies.

The findings have important practical and theoretical implications. From a managerial perspective, improving profitability should become a primary strategy for reducing financial distress risk through more efficient asset utilization, cost control, and sustainable revenue growth. For investors and creditors, profitability remains one of the most reliable early warning indicators when assessing firms' financial health and creditworthiness. Theoretically, the results reinforce the relevance of signaling theory and agency theory in explaining how strong financial performance enhances corporate resilience and reduces the likelihood of financial distress, particularly within manufacturing firms operating under heightened economic uncertainty.

Liquidity and Financial Distress

The empirical findings indicate that liquidity, measured by the Current Ratio (CR), does not have a statistically significant effect on the probability of financial distress among Indonesian manufacturing firms. Although the estimated regression coefficient is negative, the relationship is not statistically significant, suggesting that higher liquidity alone is insufficient to reduce the likelihood of financial distress. This finding implies that firms with relatively high current assets are not necessarily in a stronger financial position, particularly when those assets cannot be converted efficiently into sustainable earnings and cash flows. Conceptually, the Current Ratio reflects a firm's capacity to meet its short-term obligations using current assets. Conventional financial theory suggests that firms with higher liquidity should face a lower probability of financial distress because they possess sufficient resources to settle maturing liabilities. However, liquidity primarily captures short-term solvency rather than overall financial performance. Consequently, a firm may exhibit a strong liquidity position while simultaneously experiencing declining profitability, inefficient asset utilization, or excessive leverage, all of which may ultimately contribute to financial distress. This finding therefore indicates that liquidity should not be interpreted as a standalone indicator of corporate financial health.

The insignificant relationship observed in this study can also be explained by trade-off theory. Maintaining a high level of liquid assets provides financial flexibility and reduces the risk of short-term default; however, excessive liquidity may also indicate inefficient resource allocation. Funds tied up in cash, inventories, or receivables may remain underutilized instead of being invested in productive activities capable of generating higher returns. For manufacturing firms, which require substantial investments in production capacity and operational efficiency, excessive liquidity may therefore represent an opportunity cost rather than a competitive advantage. Consequently, firms with high Current Ratios do not necessarily possess stronger long-term financial resilience.

The present finding is consistent with previous empirical studies reporting that liquidity is not a significant determinant of financial distress. Isayas (2021), Selimefendigil (2023), and Oktaviani and Lisiantara (2022) similarly concluded that short-term liquidity does not adequately explain the occurrence of financial distress. Nevertheless, the result contrasts with those reported by Luu Thu (2023), Kebede *et al.* (2024), Abdu (2022), Ceylan (2021), and Li *et al.* (2021), who found that firms with stronger liquidity were significantly less likely to experience financial distress. These inconsistent findings suggest that the predictive ability of liquidity varies across institutional environments, industrial structures, and macroeconomic conditions.

From a practical perspective, the findings suggest that managers should not focus solely on maintaining high liquidity ratios as a strategy to prevent financial distress. Instead, greater emphasis should be placed on optimizing working capital management and ensuring that current assets contribute effectively to profitability and operational performance. For investors and creditors, liquidity should therefore be interpreted alongside profitability, leverage, and operational efficiency rather than being used as an isolated indicator when evaluating firms' financial health and financial distress risk.

Leverage and Financial Distress

The regression analysis reveals that leverage, measured by the Debt-to-Equity Ratio (DER), has a significant positive effect on the probability of financial distress. The estimated odds ratio indicates that increases in leverage substantially raise the likelihood of financial distress, implying that firms relying more heavily on debt financing are exposed to greater financial risk. This result demonstrates that debt structure remains an important determinant of corporate financial vulnerability, particularly within capital-intensive manufacturing industries where substantial external financing is frequently required to support production activities and



business expansion. Higher leverage reflects greater dependence on borrowed funds, which inevitably increases fixed financial obligations in the form of principal repayments and interest expenses. Although debt financing may facilitate corporate growth by providing additional investment capital, excessive leverage reduces financial flexibility and increases firms' exposure to earnings volatility. When operating income declines because of adverse market conditions or economic uncertainty, highly leveraged firms face greater difficulty meeting debt obligations, thereby increasing the probability of financial distress. Consequently, firms with more conservative capital structures are generally better positioned to withstand economic shocks than firms with excessive financial leverage.

This finding strongly supports trade-off theory, which argues that firms seek an optimal balance between the benefits and costs of debt financing. While moderate leverage generates tax advantages through interest tax shields, excessive borrowing eventually increases expected financial distress costs and bankruptcy risk. Once debt exceeds its optimal level, the marginal costs associated with financial obligations outweigh the benefits of additional financing, resulting in declining financial stability. The present findings therefore indicate that manufacturing firms should carefully manage their capital structures to ensure that debt remains within sustainable limits while supporting long-term corporate growth.

The positive relationship between leverage and financial distress is consistent with previous empirical evidence reported by Isayas (2021), Younas *et al.* (2021), and Kebede *et al.* (2024), who similarly found that higher leverage significantly increases the probability of financial distress. However, the finding differs from those of Hassan *et al.* (2023), Luu Thu (2023), Abdu (2022), and Chen (2018), who reported either insignificant or opposite relationships. Such inconsistencies indicate that the impact of leverage may depend on firms' financing strategies, debt maturity structures, macroeconomic conditions, and differences in financial distress measurement across countries and industries.

The findings provide important implications for both corporate managers and external stakeholders. Managers should maintain prudent debt policies by balancing external financing with internally generated funds to preserve long-term financial sustainability. Excessive reliance on debt should be accompanied by adequate earnings generation and cash flow management to minimize financial vulnerability. For investors and creditors, leverage remains one of the most informative indicators for evaluating firms' default risk and financial resilience. Theoretically, the findings reinforce the applicability of trade-off theory in explaining the relationship between capital structure decisions and the probability of financial distress among manufacturing firms in emerging markets.

Activity Ratio and Financial Distress

The empirical results demonstrate that the activity ratio, measured by Total Asset Turnover (TATO), has a significant negative effect on the probability of financial distress. The estimated odds ratio indicates that firms with higher asset turnover are substantially less likely to experience financial distress than firms with lower operational efficiency. This finding suggests that the effectiveness of asset utilization plays an important role in maintaining corporate financial stability. Manufacturing firms capable of generating higher sales from existing assets are more likely to produce sufficient operating cash flows to finance business activities and fulfill financial obligations. Theoretically, Total Asset Turnover reflects the efficiency with which management utilizes corporate assets to generate revenue. Higher asset turnover indicates that corporate resources are employed productively, resulting in stronger operational performance and improved financial sustainability. Conversely, low asset turnover may indicate idle production capacity, inefficient resource allocation, or weak market demand, all of which may reduce revenue generation and increase the likelihood of financial distress. Therefore, operational efficiency constitutes an important mechanism through which firms strengthen their financial resilience.

This finding is also consistent with agency theory, which emphasizes management's responsibility to maximize shareholder value through the efficient utilization of corporate resources. Managers acting in the best interests of shareholders are expected to optimize asset allocation, minimize operational inefficiencies, and improve productivity. Efficient asset management enables firms to increase sales without proportionally increasing investment in assets, thereby improving profitability and operating cash flows. Consequently, firms with higher asset turnover are better equipped to withstand financial pressures arising from economic uncertainty and changing market conditions.

The present findings support previous empirical evidence reported by Kebede *et al.* (2024), Ha *et al.* (2023), Gerged *et al.* (2022), and Abdioğlu (2019), all of whom concluded that operational efficiency significantly reduces the likelihood of financial distress. However, the results differ from those reported by Luu Thu (2023), Oktaviani and Lisiantara (2022), Ceylan (2021), and



Assaji and Machmuddah (2019), who found insignificant or contrasting relationships. These discrepancies may reflect differences in industrial characteristics, economic environments, asset intensity, and financial distress measurement across previous studies.

From a practical perspective, the findings suggest that improving operational efficiency should become one of the primary strategies for reducing financial distress risk. Manufacturing firms should focus on optimizing production processes, increasing asset productivity, improving inventory management, and enhancing sales performance to maximize returns from existing assets. For investors and creditors, Total Asset Turnover provides valuable information regarding managerial efficiency and operational performance, making it an important complement to profitability and leverage indicators when evaluating firms' financial health.

Corporate Governance and Financial Distress

The findings reveal that corporate governance, proxied by the proportion of independent commissioners, does not have a statistically significant effect on the probability of financial distress among Indonesian manufacturing firms. Although the estimated regression coefficient is positive, the relationship is insignificant, indicating that variations in board independence are not sufficient to explain differences in firms' financial distress conditions. This finding suggests that board composition alone may not adequately capture the effectiveness of corporate governance in preventing financial difficulties. According to agency theory, independent commissioners play an important role in mitigating agency conflicts by strengthening oversight of managerial decisions and protecting shareholders' interests. Effective board independence is expected to improve transparency, enhance monitoring quality, and discourage managerial behavior that could jeopardize corporate financial stability. Nevertheless, the effectiveness of independent commissioners depends not only on their numerical representation but also on their independence, competence, authority, and active participation in strategic decision-making. Consequently, compliance with formal governance requirements does not necessarily translate into more effective corporate oversight.

One possible explanation for the insignificant finding is the institutional context of corporate governance practices in Indonesia. In many listed companies, the appointment of independent commissioners primarily fulfills regulatory requirements established by the Financial Services Authority (OJK), while their actual influence on strategic corporate decisions may remain limited. Concentrated ownership structures and the dominance of controlling shareholders may further reduce the ability of independent commissioners to challenge managerial decisions effectively. As a result, formal board independence may not always improve governance quality or reduce financial distress risk.

The present findings are consistent with those reported by Candradewi and Rahyuda (2021) and Nasir and Ali (2018), who also concluded that independent commissioners do not significantly influence the likelihood of financial distress. However, the results differ from those of Puspaningsih *et al.* (2024), Wang and Deng (2006), Jhunjhunwala (2024), and Yuliani and Rahmatiasari (2021), who documented significant governance effects. These inconsistent findings suggest that the effectiveness of corporate governance mechanisms is likely influenced by institutional quality, ownership concentration, regulatory enforcement, and differences in governance implementation across countries.

The findings imply that strengthening corporate governance requires more than merely increasing the proportion of independent commissioners. Companies should also improve board competence, independence, accountability, and monitoring effectiveness to ensure that governance mechanisms function as intended. For regulators, the results indicate that governance quality should be evaluated based on the effectiveness of board oversight rather than solely on compliance with minimum structural requirements. From a theoretical perspective, the findings suggest that agency theory may not fully explain financial distress in emerging markets unless governance mechanisms operate effectively within the broader institutional environment.

CONCLUSION

This study examined the effects of financial ratios and corporate governance on the probability of financial distress among manufacturing companies listed on the Indonesia Stock Exchange during the 2020–2025 period. The findings demonstrate that internal financial characteristics play a substantial role in explaining corporate financial distress. Specifically, profitability, measured by Return on Assets (ROA), and operational efficiency, measured by Total Asset Turnover (TATO), exert significant negative effects on financial distress, indicating that firms with stronger earnings-generating capacity and more efficient asset utilization are less likely to experience financial difficulties. Conversely, leverage, measured by the Debt-to-Equity Ratio (DER), has a significant positive effect, suggesting that greater reliance on debt financing increases firms' financial vulnerability. In contrast, liquidity,



proxied by the Current Ratio (CR), and corporate governance, represented by the proportion of independent commissioners, do not significantly influence the probability of financial distress within the observed manufacturing firms.

Despite these findings, several limitations should be acknowledged. First, financial distress was measured using a single proxy, which may not fully capture the multidimensional nature of corporate financial difficulties. Second, the observation period was limited to 2020–2025, restricting the ability to capture longer-term changes in firms' financial conditions across different economic cycles. Third, the analysis focused exclusively on manufacturing companies, limiting the generalizability of the findings to other industrial sectors. Future studies are therefore encouraged to employ alternative financial distress measures, extend the observation period, and incorporate firms from multiple industries to improve the robustness and external validity of the findings.

The findings provide important implications for both practice and future research. Corporate managers should prioritize improving profitability, enhancing asset utilization efficiency, and maintaining prudent debt policies to strengthen financial resilience and reduce the likelihood of financial distress. Investors and creditors may also consider profitability, leverage, and operational efficiency as important early-warning indicators when evaluating firms' financial health and investment risk. Future research may further enrich this line of inquiry by incorporating additional financial and non-financial determinants of financial distress and comparing conventional statistical approaches with machine learning techniques to enhance predictive accuracy and provide more comprehensive insights into corporate financial risk.

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