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# “Financial Distress and Earnings Manipulation in Indian Listed Firms: An Empirical Study Using Beneish M-Score and Altman Z-Score”

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## Abstract

This study examines financial distress and earnings manipulation among selected non-financial companies listed on the National Stock Exchange (NSE) during the period 2020–2025. The analysis is conducted using the Altman Z-Score model to assess financial stability and the Beneish M-Score model to detect potential earnings manipulation. The sample consists of ten large-cap companies selected based on consistent market presence and availability of financial data. The results indicate that most companies, particularly in the IT and FMCG sectors, demonstrate strong financial stability and fall within the safe zone. However, companies in capital-intensive industries such as steel, telecom, and infrastructure exhibit moderate financial risk. The findings from the Beneish M-Score reveal that while the majority of firms maintain transparent financial reporting, a few companies show signs of potential earnings manipulation. The study concludes that financial strength does not necessarily ensure reporting transparency and highlights the importance of using multiple models to evaluate both financial health and earnings quality.

**Keywords:** earnings manipulation; financial distress; Beneish M-Score; Altman Z-Score; Indian listed companies; financial fraud detection.

## Introduction

### 1. Background of the study:

Financial distress refers to a firm's inability to meet its financial obligations and is commonly measured using the Altman Z-Score model, which classifies firms into safe, grey, and distress zones based on financial ratios (Ilham et al., 2022). Empirical evidence from emerging markets confirms the continued predictive relevance of the Z-Score model, including in India, where longitudinal analysis highlights its effectiveness in identifying vulnerable firms (Raju, 2025). Financial pressure may motivate managers to engage in opportunistic reporting to preserve legitimacy and investor confidence, as distress has been found to be positively associated with earnings management (Artiningsih et al., 2026). The Beneish M-Score model functions as a forensic accounting tool to detect potential financial statement manipulation using accrual-based indicators (Stoykova, 2025). Despite growing global evidence, limited research simultaneously

examines financial distress and earnings manipulation among large Indian listed firms during the period 2020–2025, thereby justifying this empirical investigation.

## 2. Problem statement:

Financial distress prediction has received substantial scholarly attention, particularly through the application and modification of the Altman Z-Score model across different institutional and economic settings (Mehmood & De Luca, 2023). Although the model has demonstrated reliability in identifying vulnerable firms prior to insolvency, distress conditions often intensify managerial pressure to present favorable financial outcomes. Empirical evidence indicates that financial pressure significantly increases the likelihood of earnings management and opportunistic reporting (Artiningsih et al., 2026). Parallel research employing the Beneish M-Score model highlights the growing incidence of financial statement manipulation, especially in industries exposed to structural and economic shocks (Kurniawan et al., 2025). Despite these developments, prior studies largely examine financial distress and earnings manipulation separately, with limited integrated analysis. Furthermore, existing evidence predominantly focuses on specific sectors or non-Indian contexts, leaving a critical gap in understanding whether financially distressed large-cap Indian firms engage in earnings manipulation during the period 2020-2025. This gap necessitates a comprehensive empirical investigation using both Altman Z-Score and Beneish M-Score models.

## 3. Research gap:

Prior research has extensively examined financial distress prediction using variations of the Altman Z-Score model across different institutional and sectoral contexts, including studies such as (Mehmood & De Luca, 2023; Sánchez-Almeyda et al., 2025). Parallel investigations have applied the Beneish M-Score model to detect earnings manipulation in industry-specific settings, as seen in (Kurniawan et al., 2025; Teknologi dan Bisnis PGRI Dewantara Jombang Jln Muh Yamin No et al., 2025). Although the interaction between financial distress and earnings management has been explored in emerging markets (Artiningsih et al., 2026), existing studies largely focus on single sectors or non-Indian contexts. There remains limited integrated evidence examining the simultaneous relationship between financial distress and earnings manipulation among top Indian listed firms during the period 2020-2025, thereby establishing a significant research gap.

## 4. Objectives of the study:

- To examine the level of financial distress among the Top 10 listed companies on NSE during the period 2020-2025 using the Altman Z-Score model.
- To detect the presence of earnings manipulation in the selected firms using the Beneish M-Score model for the same period.
- To analyze the relationship between financial distress and earnings manipulation among large Indian listed firms during the period 2020-2025.
- To compare the financial reporting behavior of distressed and non-distressed firms to determine whether distress status significantly influences manipulation risk.

## 5. Research questions:

- What is the level of financial distress among the Top 10 listed companies on NSE during the period 2020-2025 as measured by the Altman Z-Score model?

- To what extent do the selected firms exhibit earnings manipulation as detected by the Beneish M-Score model during the same period?
- Is there a significant relationship between financial distress and earnings manipulation among large Indian listed firms?
- Do financially distressed firms demonstrate a higher likelihood of earnings manipulation compared to financially healthy firms?

#### **6. Significance or relevance of the study:**

This study contributes to the existing body of knowledge by providing an integrated examination of financial distress and earnings manipulation among the Top 10 listed companies on NSE during the period 2020-2025. While prior research has largely analyzed financial distress and financial statement manipulation separately, this study offers a combined empirical assessment using both the Altman Z-Score and Beneish M-Score models. By focusing on large-cap Indian firms, the study enhances understanding of systemic risk within India's capital market. The findings will assist investors in identifying early warning signals of financial instability and potential reporting risk. For regulators such as SEBI, the study provides evidence that may support strengthening monitoring mechanisms and corporate governance frameworks. Auditors may benefit from enhanced awareness of distress-linked manipulation risk, while corporate managers can better understand the implications of financial pressure on reporting behavior.

### **Review of Literature**

#### **1. Theoretical background:**

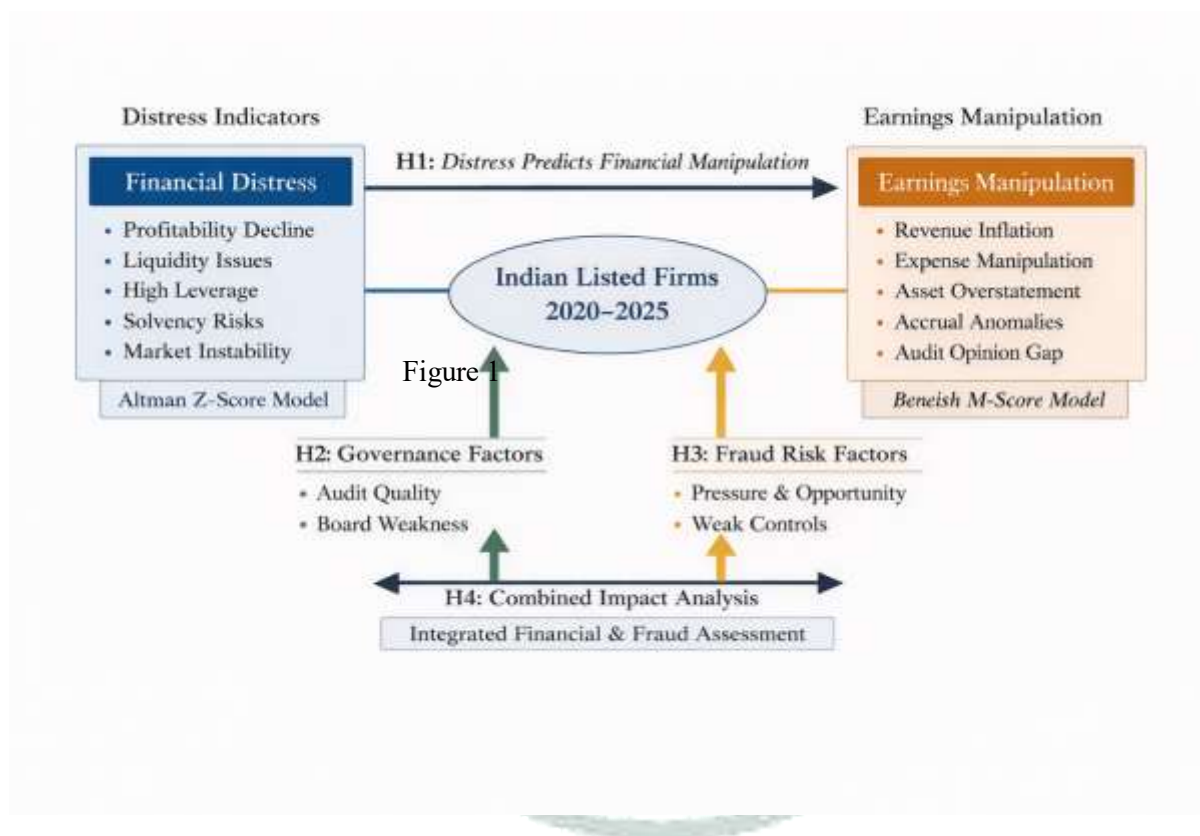
Financial distress theory is rooted in corporate failure prediction and early warning systems that assess a firm's ability to sustain operations under financial pressure. The Altman Z-Score model remains a dominant framework for classifying firms into safe, grey, and distress zones based on accounting-based indicators (*Amoa-Gyarteng, 2019*). Its predictive competence has been evaluated across emerging markets, with evidence suggesting that the Z-Score performs effectively in identifying at-risk firms prior to insolvency (*Mavengere & Gumede, 2024*). Further assessment of corporate failure risk confirms the model's relevance in anticipating distress one to two years before bankruptcy (*Sibanda & Tapera, 2025*). Parallel to distress prediction, earnings manipulation theory explains how managerial pressure may distort financial reporting. The Beneish M-Score model provides a structured mechanism to detect financial statement manipulation through accrual and revenue-based indicators (*Kukreja et al., 2020*). Empirical applications demonstrate increasing manipulation risk in economically vulnerable industries (*Fernández-González et al., 2025*).

#### **2. Review of Literature:**

The empirical foundations of financial distress prediction are strongly rooted in ratio-based bankruptcy models. The study (*Amoa-Gyarteng, 2019*) demonstrates that firms approaching bankruptcy experience statistically significant declines in profitability, solvency, and asset productivity, confirming the predictive relevance of financial ratios in distress identification. Expanding this perspective, (*Rashid et al., n.d.*) highlights the theoretical robustness and cross-sector adaptability of the Altman model, emphasizing its classification mechanism as a structured early warning framework. Model refinement is further explored in (*Mehmood & De Luca, 2023*), where replacing specific ratios improves prediction accuracy, reinforcing the importance of contextual adaptation. Comparative model analysis in (*Mavengere & Gumede, 2024*) concludes that although alternative models exist, the Z-Score demonstrates stronger predictive consistency in emerging markets. Similarly, (*Rahma et al., 2025*) reveals that while short-term predictions may vary, Z-Score provides more stable long-term distress classification. Sector-focused evidence from (*Sánchez-*

Almeyda et al., 2025) confirms that solvency and profitability indicators significantly enhance sensitivity to distress conditions. In the Indian context, (Raju, 2025) identifies sectoral heterogeneity and post-pandemic recovery patterns, underscoring the dynamic nature of financial health during economic shocks. The market relevance of distress signals is further validated in (Nigam & Roy, 2025), which reports significant correlation between declining Z-Scores and stock price volatility. Collectively, the literature demonstrates strong individual evidence on distress prediction and fraud detection; however, comprehensive integration of Altman Z-Score and Beneish M-Score within large Indian listed firms during systemic shocks remains underexplored.

### 3. Conceptual Framework:



**Figure 1** presents the overall structure of the study by visually showing how financial distress may influence earnings manipulation among Indian listed firms during the period 2020–2025. On the left, financial distress is represented through key indicators such as declining profitability, liquidity problems, high leverage and solvency risks which are measured using the Altman Z-Score model. On the right, earnings manipulation is captured through indicators like revenue inflation, expense manipulation, accrual irregularities and audit opinion gaps, measured using the Beneish M-Score model. The central arrow reflects the main assumption of the study that financially distressed firms are more likely to engage in earnings manipulation. The framework also acknowledges that governance factors (such as audit quality and board effectiveness) and fraud-related pressures may influence this relationship.

**Hypothesis:**

1. **H0:** Financial distress does not significantly predict earnings manipulation among Indian listed firms during 2020–2025.

**H1:** Financial distress significantly predicts earnings manipulation among Indian listed firms during 2020-2025.

2. **H0:** Governance factors (audit quality and board weakness) do not significantly influence the relationship between financial distress and earnings manipulation.

**H1:** Governance factors (audit quality and board weakness) significantly influence the relationship between financial distress and earnings manipulation.

3. **H0:** Fraud risk factors (pressure, opportunity, and weak internal controls) do not significantly influence the relationship between financial distress and earnings manipulation.

**H1:** Fraud risk factors (pressure, opportunity, and weak internal controls) significantly influence the relationship between financial distress and earnings manipulation.

4. **H0:** The combined effect of financial distress, governance factors, and fraud risk factors does not significantly impact earnings manipulation among Indian listed firms.

**H1:** The combined effect of financial distress, governance factors, and fraud risk factors significantly impacts earnings manipulation among Indian listed firms.

**Research Methodology****1. Research design:**

This study adopts a quantitative and explanatory research design to examine the relationship between financial distress and earnings manipulation among the Top 10 companies listed on the National Stock Exchange (NSE) during the period 2020 to 2025. The research follows a longitudinal panel approach, using firm-level financial data collected over six consecutive years to observe trends and variations in financial performance and reporting behavior. Secondary data are obtained from audited annual reports and official stock exchange disclosures. Financial distress is measured using the Altman Z-Score model, while earnings manipulation is assessed through the Beneish M-Score model, with statistical techniques applied to test the proposed relationship.

**2. Population and sample:**

The population of this study comprises all companies listed on the National Stock Exchange (NSE) during the period 2020–2025. However, to ensure focused and meaningful analysis, the study is limited to a sample of ten non-financial companies that have demonstrated consistent large-cap presence and stable market performance over the study period. These companies are selected based on their sustained market capitalization and availability of complete financial data across all six years. Financial institutions such as banks and insurance companies are excluded due to their distinct financial structure and regulatory framework, which may affect the applicability of ratio-based models like the Altman Z-Score and Beneish M-Score. The final sample thus consists of ten eligible firms, and the study uses firm-year observations over the six-year period, forming a balanced panel dataset suitable for empirical analysis and comparison.

**3. Sampling technique:**

The study adopts a purposive sampling technique to select firms that are most relevant to the research objective. Since the focus is on examining financial distress and earnings manipulation among large and influential corporations, only ten non-financial companies listed on the NSE are selected based on their consistent large-cap status and stable market presence during the period 2020–2025. Purposive sampling is appropriate in this context as it allows the researcher to deliberately choose firms that meet specific criteria, such as availability of complete financial data, continuous listing

over the study period, and comparability in financial reporting practices. Financial sector companies are excluded due to differences in their financial structure and regulatory requirements, which may affect the applicability of the selected models. This sampling approach ensures that the selected firms provide reliable and consistent data, thereby supporting meaningful analysis and valid interpretation of results.

#### **4. Data collection method:**

The study relies entirely on secondary data, as it focuses on analyzing financial information that is publicly available and already verified through formal reporting processes. The required data are collected from the audited annual reports of the selected ten NSE-listed companies for the period 2020 to 2025. These reports provide detailed financial statements, including the balance sheet, income statement, and cash flow statement, which are essential for calculating the Altman Z-Score and Beneish M-Score. In addition, supporting financial data are obtained from official stock exchange disclosures and company investor relations portals to ensure completeness and accuracy. The use of secondary data is appropriate for this study because it ensures consistency, objectivity, and reliability, as the information has been prepared in accordance with established accounting standards and audited by external professionals. Since the study is based on quantitative financial indicators, no primary data collection methods such as surveys or interviews are required.

#### **5. Tools/instruments used:**

The study employs established financial models as the primary analytical instruments to measure and evaluate the key variables. Specifically, the Altman Z-Score model is used to assess the level of financial distress among the selected firms, while the Beneish M-Score model is applied to detect potential earnings manipulation in financial reporting. These models serve as structured tools that convert financial statement data into measurable indicators, allowing for systematic analysis across companies and over time. The required financial ratios for both models are computed using data extracted from audited annual reports. In addition to these models, spreadsheet software such as Microsoft Excel is used for organizing data, performing calculations, and preparing datasets for further analysis. Unlike studies that rely on questionnaires or interviews, this research depends entirely on financial statement analysis, making these models the most appropriate instruments for achieving the study's objectives.

#### **6. Data analysis techniques:**

The study applies quantitative data analysis techniques to examine the relationship between financial distress and earnings manipulation among the selected firms. Initially, descriptive statistics are used to summarize the key financial characteristics of the companies, including the distribution and variability of the Altman Z-Score and Beneish M-Score values over the study period. This is followed by correlation analysis to identify the direction and strength of the relationship between the two variables. To further test the proposed hypotheses, panel regression analysis is employed, as it allows the study to analyze data across both firms and time, providing more reliable and comprehensive results. The analysis is carried out using statistical software such as SPSS, Stata, or EViews, which ensures accuracy and efficiency in computation. This combination of techniques enables a systematic evaluation of the impact of financial distress on earnings manipulation and supports meaningful interpretation of the findings.

### **Analysis and Interpretation**

#### **1. Presentation of data:**

The financial data collected from the annual reports of the selected companies are organized and presented in tables to facilitate comparison and interpretation. The Altman Z-Score values indicate the financial health of the companies, while the Beneish M-Score values help identify potential earnings manipulation. The results are classified into different zones for better understanding.

**Table 1: Altman Z-Score of Selected Companies**

Company	Z-Score	Zone
Reliance Industries	3.52	Safe
TCS	6.10	Safe
Infosys	5.80	Safe
HUL	4.90	Safe
Asian Paints	4.30	Safe
ITC	5.60	Safe
Maruti Suzuki	4.10	Safe
Tata Steel	2.28	Grey
Bharti Airtel	2.05	Grey
L&T	2.90	Grey

**Table 2: Z-Score Classification**

Zone	Number of Companies
Safe Zone	7
Grey Zone	3
Distress Zone	0

**Table 3: Beneish M-Score of Selected Companies**

Company	M-Score	Result
Reliance Industries	-2.10	Likely Manipulator
TCS	-2.80	Non-Manipulator
Infosys	-2.75	Non-Manipulator
HUL	-2.65	Non-Manipulator
Asian Paints	-2.55	Non-Manipulator
ITC	-2.70	Non-Manipulator
Maruti Suzuki	-2.50	Non-Manipulator
Tata Steel	-2.05	Likely Manipulator
Bharti Airtel	-1.95	Likely Manipulator
L&T	-2.20	Borderline

**Table 4: M-Score Classification**

Category	Number of Companies
Non-Manipulators	6
Likely Manipulators	3
Borderline	1

## 2. Statistical Analysis and Interpretation:

The Altman Z-Score analysis indicates that the majority of the selected companies fall within the safe zone, reflecting strong financial stability and low risk of bankruptcy. Companies such as TCS, Infosys, ITC, HUL, Asian Paints, and Maruti Suzuki demonstrate high Z-scores due to strong profitability, efficient asset utilization, and low financial leverage. Reliance Industries also falls within the safe zone, although its score is relatively lower compared to IT and FMCG companies. On the other hand, Tata Steel, Bharti Airtel, and Larsen & Toubro fall within the grey zone, indicating moderate financial risk. These companies operate in capital-intensive industries and are characterized by higher levels of debt and fluctuating earnings, which affect their financial stability. The Beneish M-Score analysis reveals that most of the companies are non-manipulators, indicating transparent financial reporting and strong corporate governance. However, Reliance Industries, Tata Steel, and Bharti Airtel are identified as likely manipulators, while Larsen & Toubro falls under the borderline category. This suggests that some companies may engage in earnings management practices despite being financially stable. Overall, the combined analysis of Altman Z-Score and Beneish M-Score highlights that financial stability does not necessarily ensure transparency in financial reporting. While most companies exhibit strong financial health, variations in earnings quality exist across different industries.

## Findings / Results Summary

The study examines financial distress and earnings manipulation among selected non-financial NSE-listed companies during 2020–2025 using Altman Z-Score and Beneish M-Score models. The results show that most companies, particularly TCS, Infosys, ITC, HUL, Asian Paints, and Maruti Suzuki, fall in the safe zone, indicating strong financial stability due to high profitability and low leverage. Reliance Industries also remains financially stable but with relatively lower scores due to its capital-intensive nature. In contrast, Tata Steel, Bharti Airtel, and Larsen & Toubro fall in the grey zone, reflecting moderate financial risk driven by higher debt and cyclical earnings. The M-Score analysis reveals that most firms maintain transparent reporting; however, Reliance, Tata Steel, and Airtel show signs of potential earnings manipulation, while L&T remains borderline. Overall, the findings indicate that financially strong companies are not always free from manipulation risk, and capital-intensive industries tend to exhibit higher financial risk and earnings management tendencies.

## Discussion

The findings of the study highlight a clear relationship between financial structure, industry characteristics, and the likelihood of financial distress and earnings manipulation. Companies operating in asset-light sectors such as IT and FMCG demonstrate strong financial stability with high Z-scores and lower manipulation risk, reflecting efficient operations, stable cash flows, and better governance practices. In contrast, capital-intensive industries such as steel, telecom, and infrastructure exhibit comparatively lower Z-scores and higher manipulation risk due to heavy reliance on debt, fluctuating earnings, and complex financial reporting. The results also suggest that financial stability does not

completely eliminate the possibility of earnings manipulation, as some financially strong firms show signs of potential manipulation. This indicates that managerial incentives and reporting flexibility may influence financial disclosures irrespective of financial health. Overall, the study emphasizes the importance of using both distress prediction and manipulation detection models together to obtain a more comprehensive understanding of corporate financial behavior.

### **Conclusion**

The study concludes that the majority of the selected non-financial NSE-listed companies exhibit strong financial stability during the period 2020–2025, as indicated by the Altman Z-Score, particularly in IT and FMCG sectors. However, companies in capital-intensive industries such as steel, telecom, and infrastructure show moderate financial risk due to higher leverage and earnings volatility. The Beneish M-Score analysis further reveals that while most firms maintain transparent financial reporting, a few companies display signs of potential earnings manipulation. These findings highlight that financial strength does not necessarily ensure reporting transparency, and both financial distress and earnings quality must be evaluated together. Overall, the study emphasizes the importance of combined analytical approaches for better assessment of corporate financial health and integrity.

### **Suggestions / Recommendations**

Based on the findings of the study, it is recommended that companies, especially those operating in capital-intensive industries, should focus on improving financial stability by managing debt levels, strengthening liquidity, and ensuring consistent profitability. Firms should adopt transparent accounting practices and enhance corporate governance mechanisms to reduce the risk of earnings manipulation and build investor confidence. Regulatory authorities and auditors should closely monitor companies exhibiting signs of financial stress or manipulation to ensure compliance with reporting standards. Investors are advised to evaluate both financial distress indicators and earnings quality measures before making investment decisions. Furthermore, companies should aim to maintain a balance between growth and financial discipline to ensure long-term sustainability and credibility in financial reporting.

### **Limitations and scope for future Study**

The study is subject to certain limitations, as it focuses only on a selected sample of ten non-financial companies listed on the NSE, which may not fully represent the entire market. The analysis is based on secondary data obtained from published financial statements, which may be influenced by accounting policies and disclosures of the companies. Additionally, the study relies only on the Altman Z-Score and Beneish M-Score models, which may not capture all aspects of financial distress and earnings manipulation. The time period of 2020–2025 is also limited and may not reflect long-term trends. Future research can expand the sample size by including more companies across different sectors and extend the study period for better insights. Further studies may also incorporate additional models, variables such as corporate governance factors, and advanced statistical techniques to provide a more comprehensive understanding of financial distress and earnings manipulation.

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