Anticipating financial distress: Leveraging financial information, financial ratios, and corporate governance for proactive risk management

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Abstract: This article presents significant findings from a logistic regression model that analyzes the factors contributing to corporate financial distress. It emphasizes the crucial role of financial information quality, financial ratios, and corporate governance in predicting financial distress. The study's results show that high-quality financial information can significantly reduce the likelihood of distress by enhancing investor confidence and facilitating access to capital. Effective corporate governance, on the other hand, can mitigate financial vulnerability through robust risk management and ethical leadership. The study also highlights the risk of distress associated with high debt levels, underscoring the importance of prudent debt management. Profitability, it finds, can bolster financial resilience by generating healthy cash flows. The study also identifies certain industries more susceptible to risk due to specific factors such as competition and technological disruptions. Interestingly, the study reveals that larger companies may present a slightly higher risk of distress due to the complexity of their management. In light of these findings, the study provides actionable recommendations for companies to enhance their financial reporting, adopt good governance practices, manage debt prudently, and assess sector risks to reduce the likelihood of financial distress, thereby empowering finance professionals, researchers, and stakeholders with practical tools to manage and mitigate financial risks effectively.

Keywords: Corporate governance, Financial distress, Financial information, Financial ratios, Indebtedness, Profitability.

1. Introduction

In the dynamic and ever-changing financial landscape, the early detection of financial distress in companies is a critical skill. Financial distress, a clear indication of a company's increasing struggles to meet its financial obligations, is a warning sign for various stakeholders, including investors, creditors, and managers (Dance and Imade, 2019 [1] Altman ;and al., 2017 [2]In this context, the quality of .(financial information, financial ratio analysis, and corporate governance are emerging as essential components in financial analysis. The quality of financial information goes beyond simply compiling accounting data; it represents the trustworthiness and reliability of the disclosed information, influencing how stakeholders perceive a company's financial well-being (Kothari and al., 2009 [3]). Additionally, traditional financial ratios, such as gearing and liquidity, provide tangible benchmarks for evaluating a company's financial strength and repayment capacity (Altman, 1968 [4]). On the other hand, corporate governance is critical in managing activities and decision-making within an organization, encompassing the structures, processes, and practices that govern interactions between internal and external stakeholders, ultimately influencing the company's strategic and operational direction. From this perspective, these variables are interconnected and mutually reinforcing in identifying and managing

financial risks. In light of this, our study investigates how financial information quality, financial ratios, and corporate governance can be employed to anticipate a company's financial distress. We hypothesize that logistic regression models using high-quality financial information are likely to yield more accurate predictions of financial distress (H1). Similarly, we posit a significant correlation between the level of debt and the financial situation of companies (H2). Furthermore, we delve into the impact of the liquidity ratio on the probability of financial distress (H3) and the correlation between financial distress and return on equity (H4). These findings will empower finance professionals, researchers, and stakeholders with the knowledge and tools to effectively manage and mitigate financial risks.

Our research will shed light on how financial ratios influence the likelihood of financial distress and how this is influenced by the quality of corporate governance (H5). We firmly believe that robust governance indicators, such as institutional ownership and accounting prudence, are linked to a reduced likelihood of financial distress, irrespective of traditional economic indicators (H6). Moreover, we hypothesize that transparent corporate governance bolsters financial reliability. Through our analysis, we will employ logistic regression to make distress predictions and curb earnings management practices and other forms of financial information manipulation (H7). This study is poised to significantly enhance our ability to anticipate and mitigate potential financial risks, a finding that will undoubtedly enlighten and inform finance professionals, researchers, and stakeholders. Our article will be structured clearly and concisely to communicate these crucial findings effectively.

We will start with a literature review to provide context for our study and then present the methodology, including data collection, choice of financial indicators, and statistical techniques used. Subsequently, we will present and discuss the results of our analysis in detail. Finally, we will conclude by emphasizing our study's contribution to understanding the anticipation of financial distress and suggesting areas for future research.

2. Literature Review

2.1. Early Indicators of Financial Distress

Recent research has explored various indicators and forecasting techniques, including the use of financial strength indicators (Pietrzak, 2021 [5]), option pricing as a measure of bank risk (Coffinet and al., 2010 [6]), and the use of market indicators to predict bank financial distress (Distinguin and al., 2005 [7]). Other studies have examined the ability of firms to raise capital to avoid financial distress (Kane, 2000 [8]), the use of early warning models to predict financial crises in emerging markets (Chamon and Crowe, 2013 [9]), and the evaluation of different indicators to anticipate systemic financial crises in the European Union (Gaytán and Johnson, 2002 [10]). Research has also delved into predicting financial distress among SMEs in Malaysia (Ma'aji and al., 2018 [11]) and used various economic indicators to predict currency crises. Recent studies (Ikpesu and al., 2020 [12]) have synthesized developments in financial distress and corporate turnaround, focusing on determinants, strategies, theories, and measures for sustainable recovery. Similarly, research by Harrop Galvão and al. (2006) [13] examined the selection of financial ratios for the classification of distress, highlighting the use of discriminant analysis to classify companies based on these ratios. Additionally, Poortstra and Marton (2019) [14] analyzed the impact of corporate governance variables on the financial distress of US manufacturing firms, while Santoso and Wibowo (2018) [15] focused on predicting the financial distress of industrial firms in Indonesia using linear discriminant analysis and the support vector machine.

2.2. Integrating Financial Information Quality and Ratios for Predicting Distress

The connection between the quality of financial information and financial ratios is rooted in solid theoretical principles closely tied to economics and finance fundamentals. This connection is primarily based on two major theories: asymmetric information and rational investor behavior. The behavioral model developed by Dechow and Sloan (1991) [16] emphasizes the critical importance of the accuracy of financial information in shaping investor expectations and warns against biased valuations that can result from inferior detail. On the other hand, as proposed by Jensen and Meckling (1976) [17], agency theory

provides a crucial framework for understanding managers' incentives to manipulate financial information, highlighting the importance of maintaining a positive corporate image.

The comprehensive integration of theories allows for designing advanced predictive models that consider both traditional financial ratios and the quality of financial information. This holistic approach is crucial for more accurate and comprehensive anticipation of financial distress, considering the complex interplay between information, investor behavior, and management incentives. Additionally, extensive research in the financial literature focuses on forecasting corporate financial distress by examining financial ratios and evaluating the quality of financial information. Studies by Wittenberg-Moerman (2008) [18] and Rosmawati (2022) [19] have supported these theoretical foundations, emphasizing significant relationships between the quality of financial information, information asymmetry, and earnings management. This work confirms the relevance and validity of this integrative approach to finance.

The Z-Score model, introduced by Altman (1968) [4] and the work of Beaver (1966) [20], was the first to use financial ratios as indicators of financial distress. Subsequent studies, such as those by Dechow and Dichev (2002) [21] and Francis and Schipper (1999) [22], have emphasized the importance of financial statement quality in accurately assessing financial health. In addition, probabilistic models such as Ohlson's (1980) [23] and more nuanced approaches such as real options theory have enriched the range of predictive methodologies. Research has also introduced innovative risk models, such as Shumway's (2001) [24], which have helped to improve tools for predicting corporate financial difficulties. Furthermore, recent studies, such as those by Chung and al. (2021) [25] and Chen and Hou (2020) [26], have highlighted the importance of financial reporting quality and corporate governance in determining corporate financial distress.

Research by Lu and al. (2008) [27] emphasized the significance of corporate governance transparency in determining financial distress. Additionally, Liu and Lu (2018) [28] highlighted the role of financial reporting quality in earnings management within UK companies. Conversely, Zainudin and Hashim (2016) [29] demonstrated the utility of financial ratio analysis in detecting fraudulent financial reporting. Finally, Almwajeh and Nassir (2020) [30] employed artificial neural networks and logistic regression to predict financial distress in Jordan-listed companies, showcasing the effectiveness of modern approaches to financial risk prediction.

2.3. Role of Governance in Managing Financial Distress

The anticipation and management of corporate financial difficulties are crucial issues that require an integrated approach linking financial information and corporate governance mechanisms. Several studies have explored this complex dynamic and highlighted the importance of interactions between these two aspects. Agustin and al. (2023) [31] examined the impact of institutional ownership on financial distress, finding a significant positive correlation. However, audit committee independence and board size could have significantly affected this risk. Similarly, Caroline and Sari (2023) [32] observed that companies facing financial distress tend to adopt a more conservative approach to accounting principles. Although information asymmetry has not been identified as influencing this dynamic, accounting prudence is a natural response to financial distress.

In an intriguing study, Farooq and al. (2023) [33] discovered a significant inverse connection between corporate social responsibility (CSR) and financial distress. This finding emphasizes the importance of corporate governance in strengthening this relationship. The results indicate that CSR can be a financial risk mitigator, mainly supported by robust governance mechanisms. Likewise, Septriana (2023) [34] investigated the association between specific financial ratios and financial distress, highlighting the moderating influence of corporate governance, mainly managerial ownership. Hence, corporate governance is critical in how companies navigate economic pressures. On the other hand, Williansyah and Meiliana (2022) [35] reported concentrated ownership and board education as factors mitigating financial difficulties, while other aspects of governance showed no significant effect. This observation underlines the complexity of governance mechanisms and their interaction with financial

problems. Furthermore, Tron and al (2022) [36] developed predictive models based on corporate governance variables to anticipate corporate defaults, highlighting the importance of these variables in predicting financial distress. This approach shows how governance can be used proactively to mitigate financial risk.

Lastly, Yousaf and al. (2022) [37] underscored the necessity of a contextual approach in examining the relationship between corporate governance and financial distress. This call for a more detailed exploration of the underlying mechanisms highlights the importance of considering each company's unique characteristics and environment when managing financial risks.

2.4. Economic Theories and Corporate Financial Distress

The theory of financial structure, as exemplified by Modigliani and Miller (1958) [38], presents a groundbreaking concept. This theory challenges the significance of financial structure in a tax and bankruptcy-cost-free context, emphasizing that a company's value primarily resides in its future cash flows rather than its debt or equity composition. Another pivotal theoretical approach is excessive debt, associated with Minsky (1986) [39]. Through his study of financial cycles and economic crises, Minsky introduced the concept of the "Minsky moment," a scenario where a prolonged monetary stability period can foster excessive risk-taking, ultimately leading to financial difficulties. As explored by Fama and French (1993) [40], the profitability theory scrutinizes corporate profitability and financial position determinants, highlighting the economic factors that influence corporate performance. Financial management also plays a crucial role, with authors such as Brealey, Myers, and Allen (2017) [41] examining strategies for maximizing corporate value. Their book Principles of Corporate Finance provides insights into how financial management can impact a company's overall health by managing its investment and financing decisions.

Porter (1990) [42] examines industrial dynamics and their impact on companies. In his book The Competitive Advantage of Nations, he outlines how industry characteristics can affect a company's competitiveness and ability to cope with financial difficulties, highlighting the importance of industrial structure to a company's economic performance. Corporate governance, analyzed by Jensen and Meckling (1976) [17], also plays a central role. Their work explores agency relationships and the governance impact on corporate financial performance, highlighting the importance of a sound governance structure in preventing financial distress. Finally, restructuring theories offer insights into financial crisis management and effective corporate restructuring. Authors such as Bibeault (1982) [43] and Hess (2010) [44], in their books examines best practices for overcoming financial difficulties and revitalizing struggling companies, underlining the adaptation importance and flexibility in a changing economic environment.
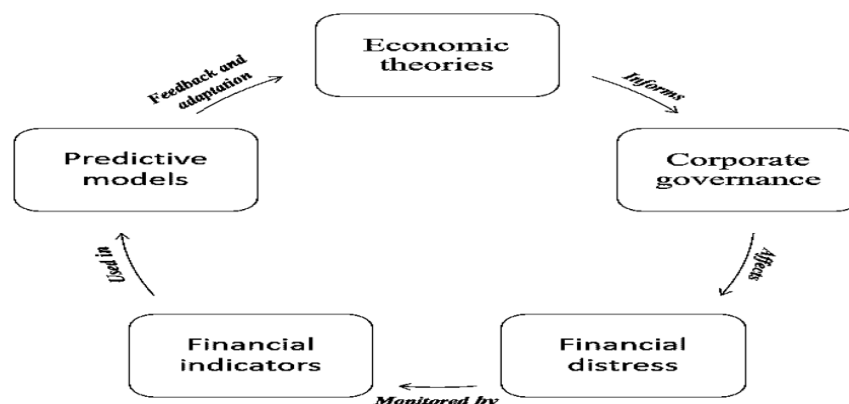
Figure 1.
Linking economics theories and financial distress.
Source: Authors' compilation.

3. Methodology

Using a comprehensive methodological approach was crucial to uphold the integrity and research rigor. This approach was developed to validate the theoretical model and test the formulated hypotheses. The methodology structured the study by carefully defining and applying the appropriate tools and techniques and providing a data collection, analysis, and interpretation framework. This rigorous process ensured the reliability of the results and allowed for a critical evaluation of the findings, thereby supporting the validity of the conclusions drawn from the research.

3.1. Data Description

As part of our detailed study, we meticulously organized the collection and analysis of data from a comprehensive database held by the Banque Populaire (famous bank) in the Casablanca region. This source covers a significant ten-year period, from 2011 to 2020. At the heart of our analysis, we have carefully selected 100 of this bank's corporate customers, including companies facing financial difficulties and financially stable ones. Our approach goes beyond a simple accumulation of figures; it represents an in-depth exploration of these companies' balance sheets, offering a detailed insight into their financial health over an extended period. The excellent quality of the database, sourced from a renowned financial institution, guarantees the reliability and relevance of the information gathered, reinforcing the robustness of our analysis.

3.2. Data Collection and Processing Methods

The data was collected and analyzed with exemplary rigor using various appropriate tools. We used the R statistical programming software for data analysis, allowing for precise manipulation and in-depth interpretation of the results. To ensure data reliability, we applied various scrupulous validation tests.

We carefully examined the companies' financial statements during the data collection phase. We used Microsoft Excel for crucial processing, implementing rigorous filtering to eliminate outliers that could distort the analysis. This thorough approach guarantees a comprehensive and reliable assessment of the companies' financial performance over the studied period, providing a solid foundation for drawing well-founded and relevant conclusions.

3.3. Variables Selection

The study variables, selected based on hypotheses formulated to examine the role of financial reporting and corporate governance in anticipating financial distress, are organized as follows:

a. **Dependent variable**
    Financial Distress: Measured by Altman's Z-score, a widely-used indicator of the probability of corporate bankruptcy. The Z-score combines several financial ratios to assess a company's financial health quantitatively.

b. **Independent Variables**
*   Quality of financial information: Measured by the Jones (1991) [45] indicator, which assesses the management of accounting results to detect earnings manipulation.
*   Debt: Measured by the debt ratio (total debts / total assets), indicating the proportion of the company's financing from external sources relative to its assets.
*   Liquidity: Measured by the current ratio (current assets / current liabilities), assessing the company's ability to cover its short-term obligations.
*   Return on equity (ROE): Measured by the ratio of net income to shareholders' equity, indicating the return on equity invested by shareholders.
*   Quality of corporate governance: Measured by a governance score, which assesses various aspects of a company's governance, such as board structure, shareholder rights, and transparency practices.

These variables are selected for their theoretical relevance in explaining financial distress according to the hypotheses formulated. They capture various aspects of financial performance and corporate governance, likely influencing the probability of financial distress.

c. *Control Variables*
- Company size: Measured by sales, this variable controls for the impact of company size on financial distress, as larger companies may have different resources and management capabilities than smaller companies.
- Type of activity: Measured by the sector of activity, this variable controls for sectoral differences that may influence financial distress, as some industries may be more vulnerable to economic risks than others.

These control variables are included to account for factors that may influence financial distress but are not directly related to the variables of interest. They isolate the effect of independent variables on the dependent variable, minimizing potential bias due to exogenous factors.

d. *How to Calculate Variables*

In the context of a company, the Z-score is a financial indicator used to evaluate financial stability and forecast the probability of bankruptcy. This metric incorporates various financial ratios, such as profitability, leverage, liquidity, solvency, and operational efficiency, into a formula. The Z-score formula, created by Professor Edward I. Altman in 1968, is as follows:

$$Z = 1.2A + 1.4B + 3.3C + 0.6D + 1.0E$$

Where:
- A represents the liquidity ratio (current ratio);
- B represents the profitability ratio (earnings before interest and taxes divided by total assets);
- C represents the debt ratio (shareholders' equity divided by total assets);
- D represents the liquidity ratio (current assets divided by total liabilities);
- E is the operating efficiency ratio (net sales divided by total assets).

After calculating specific ratios for a company, the ratios are adjusted based on the coefficients in the formula to derive the final Z score. This score is then used to evaluate financial risk: A Z-score below 1.81 indicates a high likelihood of bankruptcy, while a score above 2.99 suggests a low risk of bankruptcy. A score between 1.81 and 2.99 is considered uncertain and necessitates further analysis. The Z-score enables investors, lenders, and financial analysts to promptly assess a company's financial health and make well-informed investment or lending decisions.

e. *Estimation of Discretionary Accruals by Jones (1991) Model*

According to the Jones (1991) [45] model, total accruals are divided into discretionary and non-discretionary categories. Jones' formula for estimating discretionary accruals is derived by following these steps:

i. *Calculate total accruals (TA)*

$$TA_t = \Delta CA_t - \Delta CL_t - \Delta CandST_t + \Delta D_t - Dept$$

Where:
- ΔCA_t = change in current assets in period t;
- ΔCL_t = change in current liabilities in period t;
- $\Delta CandST_t$ = change in cash and short-term investments in period t;
- ΔD_t = change in debt included in current liabilities in period t;
- $Dept$ = depreciation and amortization expense in period t.

ii. *Calculate non-discretionary accruals (NDA)*

$$NDA_t = \beta_1 \left(\frac{1}{A_{t-1}}\right) + \beta_2 \left(\frac{\Delta REV_t - \Delta REC_t}{A_{t-1}}\right) + \beta_3 \left(\frac{PPE_t}{A_{t-1}}\right)$$

Where :

- A_{t-1} = total assets in period $t-1$;
- ΔREV_t = change in revenues in period t;
- ΔREC_t = change in receivables in period t;
- PPE_t = gross property, plant, and equipment in period t.

iii.   *Calculate Coefficients* $(\beta_1, \beta_2, \beta_3)$

The following regression is to be performed:

$$\frac{TA_t}{A_{t-1}} = \beta_1 \left(\frac{1}{A_{t-1}}\right) + \beta_2 \left(\frac{\Delta REV_t - \Delta REC_t}{A_{t-1}}\right) + \beta_3 \left(\frac{PPE_t}{A_{t-1}}\right) + \varepsilon_t$$

: $\frac{TA_t}{A_{t-1}}$ = total accruals scaled by lagged total assets;

- ε_t = error term (residuals).

The estimated coefficients $(\beta_1, \beta_2, \beta_3)$ of the regression are used to calculate the NDA for each observation.

iv.   *Calculate Discretionary Accruals (DA)*

DA is calculated by subtracting NDA from TA for each observation:

$$DA_t = TA_t - NDA_t$$

By following these steps, an estimate of discretionary accruals can be made using Jones' (1991) [45] model, which can then be used to analyze earnings management practices.

f. Governance Score

A governance variable combining several criteria is used to assess the governance of a small company. These criteria include:

- Board structure and independence;
- Transparency and communication;
- Risk management;
- Ethics and compliance;
- Compensation and incentives;
- Sustainability;
- Social responsibility.

Each criterion is rated from 1 to 5, with 1 representing the lowest performance and five the highest. Specific criteria include:

- Size and diversity of the board of directors;
- Regularity and clarity of financial reporting;
- Existence of risk management policies and independent audit committees;
- Adoption of ethical codes of conduct;
- Remuneration policies aligned with long-term performance;
- Environmental sustainability initiatives.

The average of the scores for these criteria is calculated to obtain an overall governance variable. This variable is then used with other financial and operational variables to analyze and predict the company's overall performance and economic stability.

3.4. Distribution of Companies and Insights

The distribution of companies across different criteria provides valuable insights into potential factors influencing financial distress:

- Approximately 30% of businesses are under five years old, indicating a notable presence of relatively young enterprises susceptible to instability.
- The technology and service sectors comprise 20-25% of the sample, suggesting diverse economic activities.
- Small businesses represent 40% of the sample, highlighting their vulnerability to economic fluctuations.
- Analysis of financial information quality and governance reveals a mixed landscape, with around 25% exhibiting excellent financial quality but varying governance scores.
- Metrics such as Z-score, liquidity, and return on capital show dispersed distributions, potentially reflecting differing financial health across the sample.

Overall, this nuanced understanding of business demographics underscores the complexity of factors influencing financial distress, warranting careful consideration in interpreting regression outcomes.

Table1.
Descriptive statistics

By age	Bus*	By sector	Bus	By size	Bus	By financial information quality	Bus	By governance score	Bus	By Z score	Bus	By liquidity	Bus	By return on capital	Bus
		Technology	22%	Small (<50 employees)	40%	Excellent	26%	High	21%	High	33%	Very Liquid	26%	Very Profitable	25%
< 5 years old	30%	Finance	13%	Medium (50-200 employees)	30%	Good	36%	Medium	42%	Medium	42%	Liquid	41%	Profitable	45%
5 to 10 years old	40%	Services	24%	Large (>200 employees)	30%	Average	24%	Low	22%	Low	25%	Less Liquid	22%	Less Profitable	25%
>10 years old	30%	Industry Others	21% 20%			Poor	14%	Very Low	15%			Illiquid	11%	Non-profitable	5%

Source: Authors' compilation

This table summarizes descriptive statistics. It highlights the distribution of companies and the various criteria affecting financial stability. These statistics should help researchers understand the factors contributing to financial distress and develop strategies to mitigate these risks.

4. Results and Discussion

4.1. Model Performance

The AUC-ROC results for the model are 0.9694. This high value, generally above 0.8, indicates that the model effectively distinguishes between the different classes. The model can accurately differentiate between financially distressed and healthy companies.

The accuracy of the model is 0.9644. This indicates the proportion of correct predictions made by the model. With a score of 0.9644, the model correctly classified around 96.5% of the companies (distressed or healthy) in the dataset.

The model's Recall value is 0.8616, which measures its ability to identify companies in financial difficulty (true positives) correctly. A score of 0.8616 corresponds to the model's identification of around 86% of companies in financial difficulty in the data set.

The F-measure is 0.9143. This combined metric takes into account both precision and recall. A score of 0.9143 indicates a good balance between these two measures, reflecting the overall effectiveness of the model.

According to an overall analysis, the high AUC-ROC score and precision rate demonstrate that the model can differentiate between financially distressed and healthy companies. The slightly lower recall rate (0.8610) suggests that the model may fail to detect some companies in financial difficulty (false negatives). However, specific priorities may be of crucial importance in this respect. If early detection of distressed situations is essential, adjusting the model to improve recall may be worth considering, even if this results in a slight reduction in precision.

Table 2.
Model performance metrics.

AUC-ROC	0,9694
Accuracy	0,9644
Recall	0,8616
F-measure	0,9143

Source: Authors' compilation, R

This evaluation reveals that the financial distress prediction model performs very well. It can effectively distinguish distressed companies from those in good financial health. Nevertheless, the trade-off between accuracy and recall according to specific priorities must be considered.

4.2. Logistic Regression Analysis

For the logistic regression model used in R, the specification was as follows:

$$glm(formula = Distress{\sim}Jones + Ogov + Indebtness + RendKP + TypeActivity + Size + RLiquidity = binomial, data = DET)$$

The Intercept is the probability of financial distress when all independent variables equal zero. With an intercept value of 4.204, the baseline probability of financial distress is relatively high.

The Jones variable has a negative and significant coefficient, indicating that higher values of the Jones indicator, which reflect better quality of financial information, are associated with a lower probability of financial distress. This confirms the importance of accurate and transparent financial information in helping investors assess a company's financial health.

The Qgov variable also has a negative and significant coefficient, suggesting that better corporate governance quality reduces the probability of financial difficulties. This finding supports the idea that

solid governance practices improve risk management and informed decision-making, thereby reducing the risk of bankruptcy.

The coefficient for the Debt variable is positive and highly significant, meaning that higher debt ratios significantly increase the likelihood of financial distress. This observation is consistent with the idea that excessive debt increases financial vulnerability.

The RendKP variable, relating to return on equity (ROE), has a negative and significant coefficient at the 5% level (0.0426). This suggests that higher profitability is associated with a lower probability of financial distress, highlighting the protective role of profitability in financial stability.

The TypeActivity variable, for its part, has a positive and highly significant coefficient at the 0.1% level (5.45e-05), indicating that specific sectors present a higher inherent risk of financial distress. This may be due to factors such as the regulatory environment, competition, and technological change.

Thus, the coefficient on the Size variable is positive and significant at the 5% level (0.0460), suggesting that larger companies may present a slightly higher risk of financial distress. This could be due to the complexity and inefficiency of managing larger organizations.

The Liquidity variable displays a negative but insignificant coefficient (0.94927), indicating the absence of a clear relationship between liquidity and financial distress in this model. Other variables, such as the debt-to-equity ratio, may already account for the impact of liquidity.

Table 3.
Logistic regression results.

Coefficients	Estimate	Std. error	Zvalue	Pr(>|z|)	Signif.
(Intercept)	4.204e+03	1.503e+03	2.798	0.00515	**
Jones	-2.107e+00	7.528e-01	-2.799	0.00512	**
Qgov	-5.723e-02	1.900e-02	-3.011	0.00260	**
Indebtedness	5,80E-07	1,45E-07	4,009	6,11E-05	***
RendKP	-2.020e+02	9.959e+01	-2.028	0.0426	*
Type activity	5.812e-07	1.440e-07	4.036	5.45e-05	***
Size	9.880e-02	4.952e-02	1.995	0.0460	*
RLiquidity	-4.213e-09	6.622e-08	-0.064	0.94927	

Note: Significance codes : 0 '***', 0.001 '**', 0.01 '*', 0.05 '.', 0.1 '',1
Source: Authors' compilation, R.

After conducting thorough data collection and analysis using R statistical programming software, we identified several significant relationships between financial variables and corporate financial distress, aligning with and complementing the existing literature results.

The negative and significant coefficient of the **Jones** variable emphasizes the vital importance of high-quality financial information in decreasing the risk of financial distress. This finding is consistent with the proposition by Dechow and Dichev (2002) [21], which highlights the influence of accrual quality on corporations' financial well-being. According to their viewpoint, transparent and high-quality financial information effectively diminishes information asymmetry and reduces the risk of making incorrect investments.

In the same way, the variable **Qgov** has a negative coefficient, indicating that effective corporate governance practices help prevent financial distress. This result aligns with the findings of Jensen and Meckling (1976) [17], who showed that good governance reduces conflicts of interest and enhances decision-making, thereby improving financial stability.

Moreover, the Debt variable's positive and highly significant coefficient confirms the risks associated with high debt levels, which aligns with Modigliani and Miller's (1958) [38] leverage theory. Although leverage can boost return on equity, it raises financial risk and can result in distress if not managed properly.

Regarding the **RendKP** variable and its negative coefficient, our findings align with the financial principle that links higher profitability to a lower risk of bankruptcy, as studied by Fama and French

(1993) [40]. They argue solid profit margins buffer against economic shocks, enhancing a company's financial resilience.

Additionally, the results of the TypeActivity and Size variables indicate that specific industries and larger companies are more susceptible to financial risks. This observation is supported by Porter's (1985) [42] research on competitive advantage and industry structure and Jensen & Meckling's (1976) [17] study on the agency costs of large firms. These studies demonstrate that size and industry factors can exacerbate financial vulnerabilities due to complex structures and unique market dynamics.

These results highlight the importance of financial information quality, governance, prudent debt management, and profitability's protective role. They also reflect the specific risks and challenges related to the company's size within the sector. Therefore, they empirically confirm economic and financial theories and recommend appropriate financial management practices.

5. Conclusion

In conclusion, this study offers valuable insights into the intricate dynamics of financial distress within companies. Using a logistic regression model, we identified several key factors that significantly influence the probability of financial distress. The results of this study robustly validate the hypotheses put forward while emphasizing the critical importance of financial information quality, debt management, profitability, sectoral characteristics, and company size in predicting and preventing financial distress.

The study findings have significant implications for both practitioners and researchers. The key focus areas for practitioners include improving financial reporting quality, implementing sound corporate governance practices, prudently managing debt, enhancing profitability, assessing and managing industry-specific risks, and optimizing firm structure and operations. By adopting these practices, firms can proactively manage their financial risks, improve their financial health, and reduce the likelihood of encountering financial distress.

Nevertheless, this study has certain limitations. Due to data unavailability, using a traditional logistic regression model instead of machine learning-based models may not encompass all predictive factors. Analyzing firm-specific factors, conducting longitudinal studies, and developing more effective tools to predict and prevent corporate failures might be beneficial. Furthermore, financial and governance indicators can sometimes be misleading, as this study does not integrate economic and political aspects.

In future research, it would be beneficial to consider additional variables and investigate non-linear relationships to understand financial distress better. Furthermore, further analysis should consider specific characteristics of companies, such as management practices, corporate culture, and historical financial performance, to provide more detailed insights. Finally, longitudinal studies that track firms over time could offer a dynamic perspective on the risk of financial distress and the effectiveness of mitigation strategies.

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References

[1]   M. Dance and S. Imade, "Financial ratio analysis in predicting financial conditions distress in Indonesia Stock Exchange," *Russian Journal of Agricultural and Socio-Economic Sciences*, vol. 86(2), pp. 155-165, 2019.

[2]   E. I. Altman, M. Iwanicz-Drozdowska and E. Laitinen, "Financial Distress Prediction in an International Context: A Review and Empirical Analysis of Altman's Z-Score Model," *Journal of International Financial Management & Accounting*, vol. 28(2), pp. 131-171, 2017.

[3]   S. P. Kothari, X. Li and J. E. Short, "The Effect of Financial Reporting Quality on Debt Contracting: Evidence from Internal Control Weakness Reports," *Journal of Accounting Research*, vol. 47(1), pp. 57-99, 2009.

[4]   E. I. Altman, "Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy," *Journal of Finance*, vol. 23(4), pp. 589-609, 1968.

[5]   B. Pietrzak, "The Use of Financial Health Indicators in Predicting Corporate Bankruptcy: A Study of Polish Companies," *Journal of Risk and Financial Management*, vol. 14(3), p. 120, 2021.

[6]   J. Coffinet, A. Pop and M. Tiesset, "Monitoring Banks through Analysis of Market Signals: The Case of France," *Journal of Financial Stability*, vol. 6(3), pp. 130-144, 2010.

[7]   I. Distinguin, P. Rous and A. Tarazi, "Market Discipline and the Use of Stock Market Data to Predict Bank Financial Distress," *Journal of Financial Services Research*, vol. 28(2), pp. 151-176, 2005.

[8]   E. J. Kane, "Incentives for Banking Megamergers: What Motives Might Regulators Infer from Event-Study Evidence?," *Journal of Money, Credit and Banking*, vol. 32(3), pp. 671-701, 2000.

[9]   M. Chamon and C. Crowe, "Predictive indicators of financial crises," *The Evidence and Impact of Financial Globalization*, pp. 499-505, 2013.

[10]   A. Gaytán and C. A. Johnson, "A Review of the Literature on Early Warning Systems for Banking Crises," *Central Bank of Chile Working Papers*, p. 183, 2002.

[11]   K. Ma'aji, M. Khairul Anuar and N. Husaini, "Predicting Financial Distress of SMEs in Malaysia," *International Journal of Economics and Management*, vol. 12(S2), pp. 469-481, 2018.

[12]   F. Ikpesu, J. O. Chukwu and U. G. Agbontaen, "Financial Distress and Corporate Recovery: A Review of the Literature," *Asian Economic and Financial Review*, vol. 10(12), pp. 1429-1441, 2020.

[13]   J. Harrop Galvão and F. C. Vasconcelos, "Selecting Financial Ratios to Develop a Classification Model of Distressed Companies: A Discriminant Analysis Approach," *Brazilian Business Review*, vol. 3(1), pp. 39-56, 2006.

[14]   J. L. Poortstra and K. Marton, "Corporate Governance Variables and Financial Distress in U.S. Manufacturing Firms," *The International Journal of Business in Society*, vol. 19(4), pp. 711-732, 2019.

[15]   B. Santoso and S. Wibowo, "Predicting Financial Distress in Indonesian Industrial Companies Using Linear Discriminant Analysis and Support Vector Machine," *Journal of Finance and Banking*, vol. 22(2), pp. 109-125, 2018.

[16]   P. M. Dechow and R. G. Sloan, "Executive Incentives and the Horizon Problem," *Journal of Accounting and Economics*, vol. 14(1), pp. 51-89, 1991.

[17]   M. C. Jensen and W. H. Meckling, "Theory of the Firm: Managerial Behavior, Agency Costs, and Ownership Structure," *Journal of Financial Economics*, vol. 3(4), pp. 305-360, 1976.

[18]   R. Wittenberg-Moerman, "The Role of Information Asymmetry and Financial Reporting Quality in Debt Trading: Evidence from the Secondary Loan Market," *Journal of Accounting and Economics*, Vols. 46(2-3), pp. 240-260, 2008.

[19]   S. Rosmawati, "Financial Reporting Quality, Information Asymmetry, and Earnings Management," *Journal of Finance and Accounting*, vol. 10(2), pp. 67-82, 2022.

[20]   W. H. Beaver, "Financial Ratios as Predictors of Failure," *Journal of Accounting Research*, vol. 4, pp. 71-111, 1966.

[21]   P. M. Dechow and I. D. Dichev, "The Quality of Accruals and Earnings: The Role of Accrual Estimation Errors," *The Accounting Review*, Vols. 77(s-1), pp. 35-59, 2002.

[22]   J. Francis and K. Schipper, "Have Financial Statements Lost Their Relevance?," *Journal of Accounting Research*, vol. 37(2), pp. 319-352, 1999.

[23]   J. A. Ohlson, "Financial Ratios and the Probabilistic Prediction of Bankruptcy," *Journal of Accounting Research*, vol. 18(1), pp. 109-131, 1980.

[24]   T. Shumway, "Forecasting Bankruptcy More Accurately: A Simple Hazard Model," *Journal of Business*, vol. 74(1), pp. 101-124, 2001.

[25]   K. H. Chung, J. C. Kim, W. S. Kim and S. Yoo, "Financial Reporting Quality, Corporate Governance, and Earnings Management: Evidence from Korea," *Asia-Pacific Journal of Financial Studies*, vol. 50(1), pp. 77-108, 2021.

[26]   Y. Chen and Y. Hou, "Financial Distress Prediction with Machine Learning: An Application of LightGBM," *Finance Research Letters*, vol. 32, pp. 101-110, 2020.

[27]   R. Lu, C. J. Lee and S. L. Chang, "Corporate Governance, Earnings Management, and Financial Distress: Evidence from Taiwan," *Journal of Business Ethics*, vol. 83(3), pp. 407-423, 2008.

[28]   Q. Liu and Z. Lu, "Corporate Governance and Earnings Management in the UK: The Role of Financial Reporting Quality," *Journal of Business Finance & Accounting*, Vols. 45(3-4), pp. 308-330, 2018.

[29]   R. Zainudin and H. A. Hashim, "Detecting Fraudulent Financial Reporting Using Financial Ratio Analysis," *Journal of Financial Crime*, vol. 23(4), pp. 1141-1148, 2016.

[30]   O. Almwajeh and A. M. Nassir, "Predicting Financial Distress in Jordanian Listed Firms Using Artificial Neural Networks and Logistic Regression," *Journal of Financial Reporting and Accounting*, vol. 18(4), pp. 681-706, 2020.

[31]   S. Y. Agustin, T. Widyastuti and D. Susilowati, "Institutional Ownership and Financial Distress: The Moderating Role

of Audit Committee Independence and Board Size," *Journal of Business and Management*, vol. 17(3), pp. 257-268, 2023.

[32] A. Caroline and M. Sari, "Accounting Conservatism and Financial Distress: The Impact of Information Asymmetry," *International Journal of Accounting Research*, vol. 14(1), pp. 42-53, 2023.

[33] M. Farooq, T. Ahsan and M. Naeem, "Corporate Social Responsibility and Financial Distress: The Moderating Role of Corporate Governance," *Journal of Financial Reporting and Accounting*, vol. 21(2), pp. 124-137, 2023.

[34] R. Septriana, "Financial Ratios and Financial Distress: The Moderating Effect of Managerial Ownership," *Asian Journal of Finance & Accounting*, vol. 15(1), pp. 87-100, 2023.

[35] Y. Williansyah and L. Meiliana, "Concentrated Ownership, Board Education, and Financial Distress: Evidence from Indonesia," *Journal of Corporate Governance*, vol. 13(4), pp. 301-314, 2022.

[36] A. Tron, M. Picconi and S. Venturini, "Predictive Models of Financial Distress: The Role of Corporate Governance Variables," *European Journal of Finance*, vol. 28(5), pp. 659-682, 2022.

[37] Z. Yousaf, N. Hussain and A. Ahmed, "Contextual Analysis of Corporate Governance and Financial Distress," *Global Business Review*, vol. 23(1), pp. 89-104, 2022.

[38] F. Modigliani and M. H. Miller, "The Cost of Capital, Corporation Finance and the Theory of Investment," *The American Economic Review*, vol. 48(3), pp. 261-297, 1958.

[39] H. P. P. Minsky, "Stabilizing an Unstable Economy," *Hyman P. Minsky Archive, LEVY ECONOMICS INSTITUTE OF BARD COLLEGE*, p. 144, 1986.

[40] E. F. Fama and K. R. French, "Common Risk Factors in the Returns on Stocks and Bonds," *Journal of Financial Economics*, vol. 33(1), pp. 3-56, 1993.

[41] R. A. Brealey, S. C. Myers and F. Allen, Principles of Corporate Finance, McGraw-Hill Education, 2017.

[42] M. E. Porter, The Competitive Advantage of Nations, NY: The Free press. A Division of Macmillan Inc, 1990, p. 855.

[43] D. B. Bibeault, Corporate Turnaround: How Managers Turn Losers into Winners!, McGraw-Hill, 1982.

[44] E. D. Hess, Smart Growth: Building an Enduring Business by Managing the Risks of Growth, New York Chichester: West Sussex: Columbia University Press, 2010.

[45] J. J. Jones, "Earnings Management During Import Relief Investigations," *Journal of Accounting Research*, vol. 29(2), p. 193, 1991.