Predicting Financial Distress in Bangladesh's Private Commercial Banks: An Altman Z-Score Approach

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ABSTRACT

The research study focuses on evaluating the financial distress of the private commercial banking industry in Bangladesh. This research focuses on 11 crisis-hit private commercial banks in Bangladesh, spanning the period from 2018 to 2023, and employs the Altman Z-score approach. The study applies key financial ratios, including working capital to total assets, retained earnings to total assets, operating earnings to total assets, and book value of equity to total liabilities, to examine financial soundness. The research has revealed that 10 out of 11 selected banks fall within the distress zone, with Bangladesh Commerce Bank Limited and National Bank Limited being the most distressed. Only one bank, under the Grey Zone, indicating financial instability but not immediate trouble, is Union Bank PLC. The primary reasons for financial instability are liquidity shortages and declining profitability, indicating a pressing need for improved risk management and regulatory guidelines. The researchers aim to provide policymakers, investors, and banking professionals with enhanced policy considerations and critical insights to mitigate risks and promote financial stability in Bangladesh's private commercial banking sector. Future researchers should focus on all banks operating in Bangladesh and cover a broader range of data.

Key words: Financial Distress, Altman Z-Score Model, Financial Ratios, Private Banking Sector

INTRODUCTION

Predicting financial distress in the banking sector is crucial, particularly in emerging markets where financial institutions often lack the buffers to withstand economic shocks (Altman, 1968). Banks in Bangladesh, particularly private ones, play a substantial role in the nation's financial system, making the ability to foresee financial distress crucial for economic stability (Rahman et al., 2021). Financial distress, defined as a bank's failure to meet its debt commitments, can lead to reduced lender confidence, financial losses, and potential systemic crisis (Beaver, 1966)

The private banking sector in Bangladesh has faced various economic and operational challenges in recent years. Notably, high levels of non-performing loans (NPLs) significantly impact banks' profitability and capital adequacy, increasing their risk of distress (Mostofa et al., 2016). For instance, as NPLs increase, banks may experience liquidity shortages, making it challenging to sustain normal operations (Ahmed & Alam, 2019). As Bangladesh's private banks expand their role in the national economy, a robust predictive model for financial distress is becoming increasingly valuable in mitigating potential risks (Stewart & Chowdhury, 2021).

Prediction Models for Financial Distress

Multiple models have been applied to assess financial distress, each offering unique insights. The Altman Z-score, widely recognized in this domain, combines financial ratios to gauge bankruptcy risk in various industries, including banking (Altman, 1968). Despite its wide application, this model has limitations, particularly when applied in complex environments such as the banking sector, where traditional ratios may not capture all risk factors (Ahmed et al., 2022). Recent studies suggest that while the Z-score provides a foundation for distress prediction, it frequently requires customization to fit the particular financial area of the institution being analyzed (Rahman et al., 2021).

Machine learning techniques, including Support Vector Machines (SVMs) and Artificial Neural Networks (ANNs), have shown promise in enhancing distress prediction accuracy. SVMs, for instance, can handle non-linear data, making them suitable for the complex financial data in banking (Tania et al., 2017). ANNs also offer advantages, particularly for large datasets, as they adapt to changing patterns in financial data and can enhance predictive performance beyond traditional models (Hossain et al., 2020). For example, a study on Bangladeshi banks found that ANN models achieved better prediction accuracy, enabling earlier identification of financial distress (Mostofa et al., 2016).

Factors Contributing to Financial Distress in Bangladeshi Banks

Several internal and external factors contribute to financial distress in Bangladesh's private banking sector. Internally, high NPL ratios are a primary indicator, often resulting from weak lending practices, governance challenges, and inadequate risk management (Rahman et al., 2021). A high NPL ratio typically leads to reduced profitability and, subsequently, a decrease in capital adequacy, making banks more vulnerable to external shocks (Ahmed et al., 2022). Governance quality is another factor; banks with stronger internal controls and transparent management practices tend to be more resilient (Hossain et al., 2020).

Externally, macroeconomic factors like inflation and currency volatility also impact bank stability. For instance, inflation reduces the real value of assets, while currency devaluation affects foreign currency-denominated loans, increasing the risk of financial distress (Stewart & Chowdhury, 2021). The economic implications of such factors underscore the importance of predictive models that incorporate both micro-economic and macro-economic indicators for more accurate results (Ahmed et al., 2022).

Significance of the Study

Developing an accurate predictive model for financial distress in Bangladesh's private banking sector is essential. The outcomes of this research can support regulators and decision-makers, enabling them to implement timely interventions and stabilize the sector (Bangladesh Bank, 2023). As machine learning techniques continue to improve, there is potential for creating a more reliable and comprehensive distress prediction framework tailored to the Bangladeshi banking environment (Tania et al., 2017). Ultimately, this research could help private banks mitigate risks, maintain financial health, and contribute to the country's economic growth (Stewart & Chowdhury, 2021).

Objective of the Study

The purpose of this study is to predict the financial distress of the private banking sector in Bangladesh.

Literature Review

Financial distress refers to circumstances that include bankruptcy or a significant organizational restructuring, where a company is unable to maintain its current position (Steyn & Hamman, 2006). These situations are most frequently termed as 'bankruptcy', 'failure', 'insolvency', and 'default' (Geng et al., 2015). It can be described as submitting a bankruptcy petition (Zmijewski, 1984) when companies face challenges in meeting their financial obligations (Khaliq et al., 2014), especially in the case of a liquidity crisis (Drescher, 2014).

Distress Prediction Models

Researchers have offered differing opinions on predicting financial distress. Some researchers stated that bankruptcy cannot be predicted as it often results from uncertain events (Morris, 1998). In contrast, several researchers (Altman, 1968; Shirata, 1998; Shumway, 2001; Zmijewski, 1984) found several methods that were applied to forecast insolvency or financial difficulties before they actually take place, such as the Altman Z Score, Zmijewski model, Grover model, Springate model, and Fulmer model. To inspect financial distress, Hantono (2019) undertook a study using Altman, Grover, Springate, and Zmijewski's score on a sample of 24 consumer goods companies listed on the ISE, and concluded that all of these predictive methods can forecast a firm's bankruptcy. Among these models, the most famous and widely used tool is still the Altman Z-Score (Niresh & Pratheepan, 2015; Mizan et al., 2011). Altman's model, known as the Z-score, serves as a Multiple Discriminant Analysis (MDA) that consists of financial ratios derived from financial statements. Twenty-two financial ratios were applied to analyze 33 failed companies and 33 successful companies. The research identified 94 percent of distressed companies as effectively distressed before the failure occurred (Altman, 1968). This model demonstrated a high predictive capability in anticipating distress levels, based on a sample of 17 retail companies in the USA (Keener, 2013). Springate models are also a Multiple Discriminant Analysis, where four ratios are used to predict financial health (Springate, 1978). A study by Husein & Pambekti (2014) was conducted on a sample of 40 companies, achieving a 92.5% accuracy level. The Altman Z Score and Springate models were applied in a study, and the analysis showed that the Altman Z Score achieved a 69% accuracy rate, while the Springate model achieved only 57% (Turk & Kurklu, 2017). To examine financial distress, a comparative analysis of distress anticipation models was conducted among the Altman, Springate, Zmijewski, Ohlson, and Grover models. The study found a significant difference among the models and indicated that Altman's model is the most helpful model for predicting challenges (Tanjung, 2020).

Predicting Financial Distress

Onyiri (2014) has investigated how well the Altman Z-Score Model can forecast the financial soundness of a firm

when the sustainable growth rate of a company exceeds the growth rate of its reported revenues. Researchers have found that financial difficulties can be anticipated using both the Alman's z-score and the sustainable growth rate, and they remain independent in terms of concept. A sample of 105 Romanian manufacturing companies was tested to predict their financial health, and the results showed that 37 of those companies were in a safe zone, 39 companies were in a grey zone, and 29 companies were in a distress zone (Siekelova et al., 2019). The Altman Z-Score was calculated in a research study to predict bankruptcy and indicated that 15 firms among the 17 firms from various industries were predicted accurately, which denotes a 94% accuracy level (Hayes et al., 2010). (Chotalia, 2012) has investigated the financial soundness of the private banking sector and found that all six sampled banks under the research fall into the 'Grey Zone' according to the Altman Z-Score criteria. (Chen & Du, 2009) Evaluated artificial neural network (ANN) and data mining (DM) models to improve the accuracy level of the insolvency testing model, and the analysis of the feasibility and validity of the proposed models was tested, resulting in a satisfactory result. Again, the Altman-Z Score and Springate Model were applied to a sample of 8 construction companies out of 13 to explore financial distress in Construction Companies in Indonesia. The study found that under both models, four companies were in a state of distress (Tahu, 2019). Logistic Regression and Discriminant Analysis were studied to evaluate the implications of financial ratios in forecasting distress of publicly listed firms in Jordan. The researchers have concluded that the results of the research indicate that both the assessment and Return on Equity (ROE) and Return on Assets (ROA) are the two financial indicators that can significantly assist in forecasting financial challenges (Al-khatib & Al-Horani, 2012).

Previous studies in Bangladesh

In Bangladesh, several research studies have been conducted to predict the financial difficulties of various banking and non-banking financial institutions. A study by Mizan & Hossain (2014), conducted on listed cement firms in Bangladesh, applied the Altman Z-Score model. The study found that only two firms, Heidelberg Cement and Confidence Cement, are financially sound; the others are not in a good position. In another study, Altman's Z-score model was used to forecast the financial soundness of the banking industry in Bangladesh and to conduct a comparative analysis of financial health between state-owned commercial banks and private commercial banks. The research outcome reveals that the Z scores of state-owned banks and private commercial banks differ significantly, and the financial soundness position of state-owned banks is improving relative to that of private commercial banks, primarily due to government assistance (Parvin et al., 2016). Researchers have studied the financial performance of the Islamic Banking sector in Bangladesh and applied the Altman Z-score model and the Emerging Economy Z-score model to a sample of 7 out of 11 Islamic Banks. They discovered that three banks fall within the safe zone, while another three banks are categorized in the grey area according to the Altman Z-score. According to the Emerging Economy Z-score model, 86% of the banks are financially sound. However, one bank in our sample, ICB Islamic Bank Ltd (ICBIBL), falls into the distress area under both methods (Farzana & Majumder, 2020). To explore the possibility of financial distress for each share under the Z category of companies listed on the Dhaka Stock Exchange, Chowdhury & Barua (2009) applied the Altman Z-Score model. They conducted their study on 53 companies and found that 41 of these companies were in a distressed zone. They argued about the accuracy of this model in the case of Bangladesh. However, it demonstrates its significance and reliability in forecasting the risk status of Z-category companies in Bangladesh.

METHODOLOGY OF THE STUDY

Sample Size

In Bangladesh, 62 banks are listed as scheduled banks, among which 43 banks are categorized as private commercial banks (BB). To analyze the banking sector, we have selected eleven crisis-hit private commercial banks based on current reports. The sample size represents around 26% of private commercial banks in Bangladesh. For the study, the banks we have taken as samples are as follows:

S.L	Name
1	National Bank Limited
2	Mutual Trust Bank PLC
3	Southeast Bank PLC
4	AB Bank PLC
5	Jamuna Bank PLC
6	Global Islami Bank PLC
7	Union Bank PLC
8	Social Islami Bank PLC
9	Islami Bank Bangladesh PLC
10	First Security Islami Bank PLC
11	Bangladesh Commerce Bank Limited

The study covers 6 years of financial data from 2018 to 2023, including short-term assets, short-term liabilities, total assets, total liabilities, EBIT, and Book value of equity from the selected banks across each category.

Data source and type

Secondary data served as the basis for this research, collected from the audited financial reports (including notes to the financial statement). These reports were directly collected from the official websites of the selected banks.

Instrumentation

The study employed quantitative analysis to assess the financial health of the selected sample banks. Firstly, various financial ratios were calculated, and then the financial distress was analyzed using the Altman Z-score model.

According to the Altman Z-score model (Altman, 1968), the equation below is used to predict distress or the likelihood of financial difficulties.

$$Z = .012X_1 + .014X_2 + .033X_3 + .006X_4 + .999X_5$$

Where,

X_1 =Working capital/Total assets
X_2 = Retained Earnings/Total assets
X_3=Earnings before interest and taxes/Total assets
X_4 =Market value equity/Book value of total debt
X_5=Sales/Total assets
Z = Overall Index

The Altman Z-score model was initially developed for small and medium-sized US manufacturing companies, both insolvent and solvent. It has now been applied in various industries for multiple purposes worldwide. The modified version of the Z-score model is used for private and non-manufacturing firms, as well as manufacturing firms (Casey et al., 1984). Altman (Casey et al., 1984) noted that the Z-Score Model was designed for publicly traded companies, and ad hoc modifications lack scientific validity. As a result, Altman (1983) suggested a full re-estimation of the model, considering the book value of equity instead of the market value in X4.

Using the same data, Altman developed the following revised Z'-Score Model:

$$Z' = 0.717 \cdot X_1 + 0.847 \cdot X_2 + 3.107 \cdot X_3 + 0.420 \cdot X_4 + 0\ .998 \cdot X_5$$

Where,

X_1 = Working capital/Total assets
X_2 = Retained Earnings/Total assets
X_3 = Earnings before interest and taxes/Total assets
X_4 = Book value of equity/Book value of total liabilities
X_5 = Sales/Total assets
Z' = Overall Index

The Z'-Score model cannot be used to examine the secondary sample because a private firm database is not available. Therefore, Altman eliminated the Sales/Total Assets ratio X_5 from the modified model to minimize the impact of potential industry-specific effects. (Altman et al., 2014) A model designed for the non-manufacturing firms is utilized in this study. The Z-score model is presented below.

$$Z = 6.56*X_1 + 3.26*X_2 + 6.72*X_3 + 1.05*X_4$$

Working capital / total assets: Working capital is the amount that measures a company's capacity to fulfill its current requirements. Total assets comprise both short-term and long-term assets. The ratio can be categorized as a liquidity ratio, indicating a firm's ability to invest after meeting its creditors' obligations.

Retained earnings / total assets: Retained earnings refer to the amount remaining after paying dividends from net income, which measures the accumulated profitability of a bank. If the amount of retained earnings is low, it can increase the possibility of bankruptcy, as it may need to finance itself through borrowed funds.

Operating earnings / total assets: Earnings before Interest and Taxes can be termed as the operating profit of banks. The ratio EBIT/Total assets can be used to assess a company's ability to generate profit through its operations.

Book value of equity / Total liabilities: The ratio of book value of equity to total liabilities measures a company's financial leverage and stability. The ratio represents the proportion of a company's equity that is financed by its liabilities.

All four ratios are required to determine the Z-score, and the higher the Z-score, the stronger the bank's financial position.

Zone of Z-Score model:

Z-score above 2.6: The firm can be said to be in a safe zone.
Z-score between 1.1 and 2.6: known as the "Grey" zone.
Z-Score below 1.1: "distress" zone.

ANALYSIS AND RESULTS

Table 1 presents the discriminant zones of 11 selected commercial banks from 2018 to 2023. The researchers examined the collected data to determine the Z-score for each bank, which measures the financial health of the banks. The model indicates that a bank with a negative score falls in the "distress zone," while a positive score suggests financial stability. A positive but low z-score indicates "grey zone". The study reveals that 10 out of 11 selected commercial banks are in the "distress zone," and one bank is found to be in the "grey zone," indicating it is not fully financially stable. The average z-score for these 11 banks ranges from -1.4973 to 1.3631. The analysis finds that Bangladesh Commerce Bank Limited has a negative Z score for each year over the studied period from 2018 to 2023. In contrast, Mutual Trust Bank PLC, AB Bank PLC, Global Islami Bank PLC, Islami Bank Bangladesh PLC, and First Security Islami Bank PLC exhibit positive but lower z-scores (below the zone 1.1); for this reason, these banks are also classified in the distress zone. Only Union Bank PLC has a better score compared to other banks and falls within the grey zone.

Table 1: Bank-wise Average Z-score of selected Commercial Banks

SN	Bank Name	2018	2019	2020	2021	2022	2023	Avg Z-score	Distress Zone
1	National Bank Limited	-0.2277	-0.1496	0.0338	0.1615	-0.8030	-2.1045	-0.5149	Distress Zone
2	Mutual Trust Bank PLC	0.2352	0.2005	0.2814	0.3232	0.4939	0.3437	0.3130	Distress Zone
3	Southeast Bank PLC	-0.0603	0.0480	0.4358	-0.0083	-0.3168	-0.0372	0.0102	Distress Zone
4	AB Bank PLC	0.2390	0.2489	0.2374	0.3645	0.1977	0.1784	0.2443	Distress Zone
5	Jamuna Bank PLC	0.5788	0.0849	-0.1247	-0.4643	-0.1766	-0.7341	-0.1394	Distress Zone
6	Global Islami Bank PLC	0.3650	0.3694	0.4340	0.4751	0.6056	0.5992	0.4747	Distress Zone
7	Union Bank PLC	1.0446	1.7113	1.4236	1.2369	1.4157	1.3469	1.3631	Grey Zone
8	Social Islami Bank PLC	0.3319	0.3182	0.2510	0.2275	0.2538	0.2253	0.2679	Distress Zone
9	Islami Bank Bangladesh PLC	0.5265	0.5053	0.4549	0.3186	-1.8140	-0.3312	-0.0567	Distress Zone
10	First Security Islami Bank PLC	0.2277	0.1924	0.2942	0.3406	0.3565	0.3166	0.2880	Distress Zone
11	Bangladesh Commerce Bank Limited	-0.2697	-0.0837	-1.8323	-2.0274	-2.6840	-2.0866	-1.4973	Distress Zone

Source: Author's calculation

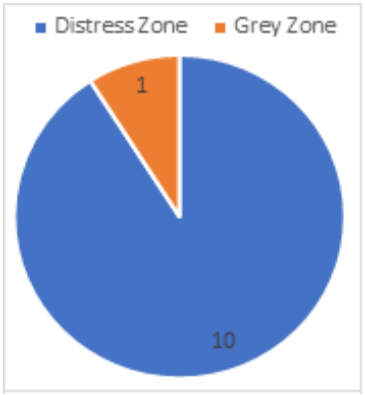


Figure 1: Graphical representation of discriminant zones of selected Commercial Banks

Table 2 presents the ranking of the selected banks based on the average z-score for the period from 2018 to 2023, where a higher score indicates better financial soundness and a lower score suggests a greater likelihood of bankruptcy. The study assigned the top rank to the banks with the most financial distress. Researchers have found that Bangladesh Commerce Bank Limited is the most distressed bank, with an average z-score of -1.4973, and National Bank Limited holds the second position, falling into a critical zone of distress.

Table 2: Bank-wise Ranking Based on Average Z-Score

Bank	Average Z score	Rank
Bangladesh Commerce Bank Limited	-1.4973	1
National Bank Limited	-0.5149	2
Jamuna Bank PLC	-0.1394	3
Islami Bank Bangladesh PLC	-0.0567	4
Southeast Bank PLC	0.0102	5
AB Bank PLC	0.2443	6
Social Islami Bank PLC	0.2679	7
First Security Islami Bank PLC	0.288	8
Mutual Trust Bank PLC	0.313	9
Global Islami Bank PLC	0.4747	10
Union Bank PLC	1.3631	11

Source: Author's calculation

Among the selected banks, Union Bank is the highest performer with a positive z-score of 1.3631. Although Union Bank is categorized as being in the grey zone, it is not in a severe critical position in terms of financial distress.

Figure 2: Graphical Representation of Bank-wise Ranking

Table 3 presents the year-wise analysis of the average Z-score of banks from 2018 to 2023. The average z-scores for the years 2018 and 2019, 0.2719 and 0.3132, respectively, suggest that the financial position during these years was favorable, albeit low, but relatively less risky. A declining trend was reflected in the years 2020 and 2021, with average scores of 0.1717 and 0.0862, respectively. This indicates that the financial health of the banks was facing challenges, probably due to the COVID-19 pandemic. The average z-scores for 2022 and 2023 were -0.2247 and -0.2076, indicating an increasing vulnerability. This declining trend highlights continuous financial instability for the selected banks and the growing risk of bankruptcy.

Table 3: Analysis of Year-wise Average Z-Scores

Year	2018	2019	2020	2021	2022	2023
Average Z score	0.2719	0.3132	0.1717	0.0862	-0.2247	-0.2076

Source: Author's Calculation

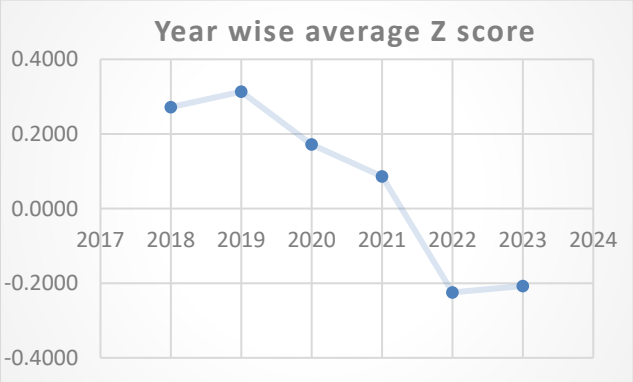
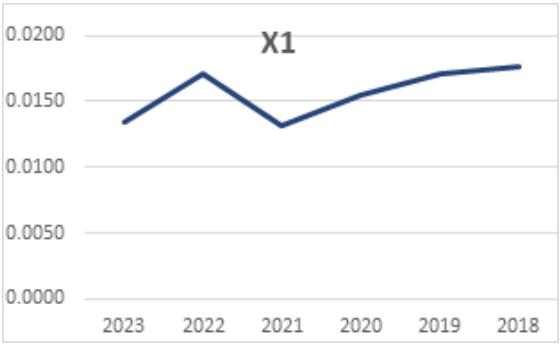
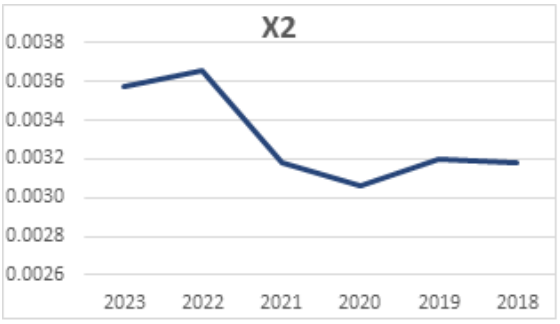
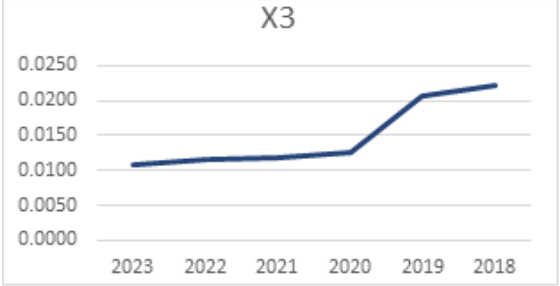


Figure 3: Graphical Representation of Year-wise Average Z-Scores

Figure 4 shows the trend of four ratios using the z-score over the studied period from 2018 to 2023, and concludes that X1 (Working capital/Total assets) and X3 (Operating earnings / total assets) ratios have a declining trend for the years 2018 to 2022 and an upward trend for the year 2023 with a negative score. The X2 (Retained Earnings/Total Assets) ratio has a declining trend over the entire studied period from 2018 to 2023. The trend of ratio X4 (Book value of equity/Book value of total liabilities) has fluctuated during the period 2018 to 2023.







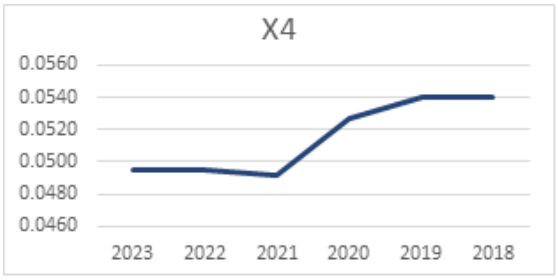
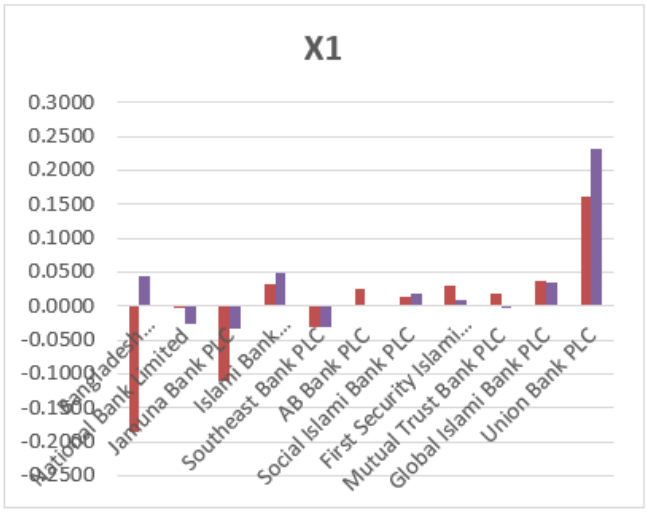


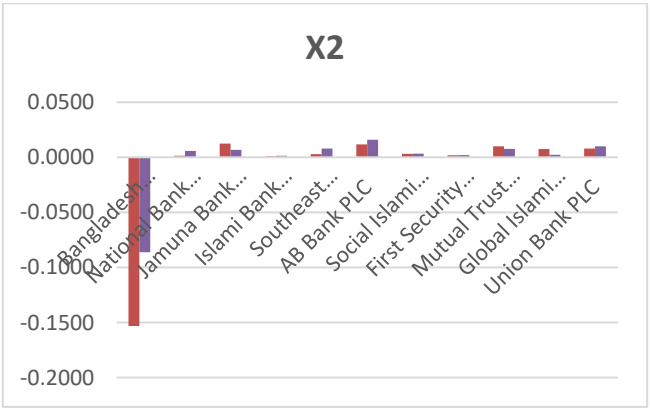
Figure 4: Graphical Representation of Year-wise average X1, X2, X3, and X4

Where,

X_1 = Working capital/Total assets
X_2 = Retained Earnings/Total assets
X_3 = Earnings before interest and taxes/Total assets
X_4 = Book value of equity/Book value of total liabilities

Figure 5 shows the trend of ratio analysis based on data from individual banks, and it is found that Union Bank PLC, Global Islami Bank PLC, Mutual Trust Bank PLC, First Security Islami Bank PLC, Social Islami Bank PLC, and AB Bank PLC have maintained a positive average for all the ratios. Again, Bangladesh Commerce Bank Limited and National Bank Limited have negative values for all the ratios.





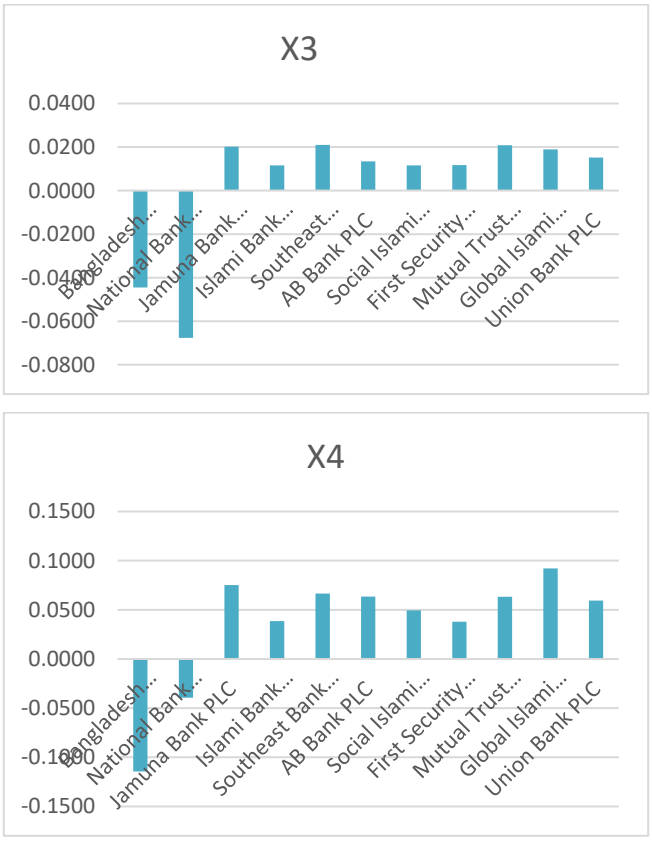


Figure 5: Graphical Representation of Bank-wise average X1, X2, X3, and X4

Furthermore, five banks out of 11 have a negative average for the ratio X1, indicating that these banks faced working capital management challenges and liquidity crises during the period. The majority of banks have a lower positive value in cases of the X2, which is retained earnings/total, indicating that these banks generate profits. All the banks, except Bangladesh Commerce Bank Limited and National Bank Limited, present positive scores for the remaining two ratios, X3 (operating profit/total assets) and X4 (book value of equity/total liabilities).

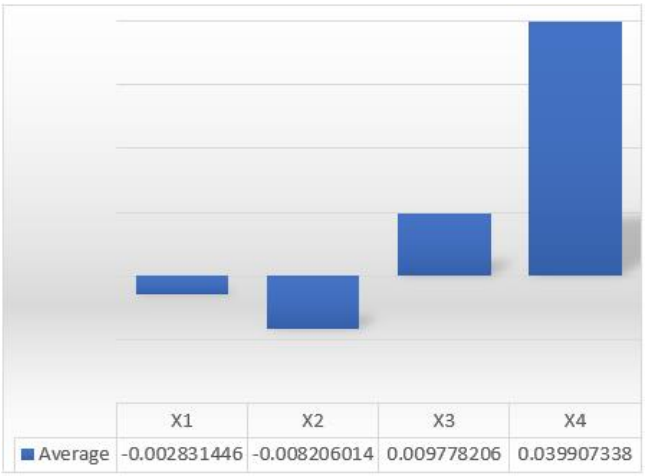


Figure 6: Graphical Representation of average X1, X2, X3 & and X4

Figure 6 represents the average of four ratios for all banks over the studied period. It was found that the X1 and X2 ratios, which indicate liquidity and accumulated profitability, respectively, have a negative average during the period for all selected banks. Again, the X3 and X4 ratios, which measure profitability and financial leverage, have low but positive averages during the period.

Discussion

The research aimed to predict the financial distress of selected private commercial banks in Bangladesh using the Altman Z-score model and found that all the sampled banks, except Ubell Bank, fell within the zone of distress. Bangladesh Commerce Bank Limited is the most distressed bank, and Union Bank PLC is the only bank that falls under the grey zone among the selected banks. Researchers have found that Bangladesh Commerce Bank Limited and National Bank Limited, the two most distressed banks, have negative values for all the ratios. Furthermore, five banks out of 11 are struggling with their working capital to total assets ratio, a liquidity metric, indicating that these banks are unable to manage their liquidity position and face challenges in paying their short-term obligations. The higher the net working capital to total asset ratio, the better the financial stability it indicates, and vice versa. The average working capital to total assets ratio of -0.0028 for all the selected banks during the period 2018-2023 suggests that current liabilities exceed current assets in relation to total assets, which can lead to financial instability. This study aligns with Khan (2017), who found that a higher net working capital-to-total assets ratio has a negative influence on a company's financial position. The study also found that most of the selected firms are unable to manage their liquidity ratios. As a result, companies fall into the distress zone according to Altman's Z score computation. The liquidity ratio in Altman's Z-score analysis shows a notable adverse effect on the likelihood of financial challenges (Pratiwi et al., 2022). A higher liquidity ratio has a positive impact on the firm's financial difficulties, indicating that it is declared no financial distress (Supriyanto & Darmawan, 2018). Another ratio in Z-score analysis is Retained Earnings/Total Assets, a measure of profitability that shows a declining trend with an average of -0.0082 during the period, indicating that these banks were unable to generate sufficient profit. Bangladesh Commerce Bank Limited and National Bank Limited exhibit negative values. At the same time, the rest of the banks display favorable but lower rates for this ratio, indicating a significant relationship between accumulated profitability and financial distress. Similarly, Supriyanto & Darmawan (2018) found a positive impact and concluded that the higher a company's ability to generate retained earnings compared to the previous year, the better its financial soundness and the more likely it is to be declared financially stable. Again, this outcome does not align with Pratiwi et al.'s (2022) assertion that retained earnings are

not an asset but an element of shareholders' equity, and therefore, retained earnings to total assets do not have any impact on financial distress. The majority of the sample banks represent positive values for the other two ratios, namely the Operating Earnings/Total Assets ratio and the Book Value of Equity/Total Liabilities, which measure profitability and leverage, respectively.

LIMITATIONS AND IMPLICATIONS OF THE STUDY

This research was conducted on 13 private commercial banks from 2018 to 2023, using the Altman Z-score as the sole measure of financial health. The research is based solely on quantitative analysis. Despite this paper having some limitations, the study can guide investors in making future investment decisions and management in improving their financial condition. Furthermore, this study can contribute to the formulation of policy regarding financial distress in the banking sector. Again, future researchers are recommended to study the entire banking sector or other relevant sectors, and they are also encouraged to utilize other distress prediction models in their analysis to compare the findings. Further research can be conducted through qualitative analysis or a combination of both to reduce the research gap. They could also focus on all banks operating in Bangladesh and cover a broader range of data.

CONCLUSION

The objective of this research is to assess the financial distress of 11 selected private commercial banks in Bangladesh using the Altman Z-score for the period from 2018 to 2023. The study reveals that all the selected banks, except one, are in a distress zone, and only one bank, Union Bank PLC, falls in the grey zone. Based on the analysis, it is found that the working capital-to-total assets ratio, which is a liquidity ratio, can predict financial distress more accurately. The findings indicate that the majority of the sampled banks are facing financial challenges due to liquidity and profitability crises. These banks were unable to manage their working capital effectively and lacked the capacity to generate sufficient earnings. Bangladesh Commerce Bank Limited and National Bank Limited are among the most distressed banks, and their management should take necessary steps to manage net working capital and profit.

REFERENCES

Al-Khatib, H. B., & Al-Horani, A. (2012). Predicting financial distress of public companies listed in Amman Stock Exchange. *European Scientific Journal, 8*(15), 1–17.

Altman, E. I. (1968). Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy. *The Journal of Finance*, *23*(4), 589–609. https://doi.org/10.1111/j.1540-6261.1968.tb00843.x

Altman, E. I., Iwanicz-Drozdowska, M., Laitinen, E. K., & Suvas, A. (2014). Distressed Firm and Bankruptcy Prediction in an International Context: A Review and Empirical Analysis of Altman's Z-Score Model. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.2536340

Beaver, W. H. (1966). Financial Ratios as Predictors of Failure. *Journal of Accounting Research*, *4*, 71. https://doi.org/10.2307/2490171

Casey, C. J., Bibeault, D., & Altman, E. I. (1984). Corporate financial distress: A complete guide to predicting, avoiding, and dealing with bankruptcy. *Journal of Business Strategy (Pre-1986)*, *5*(000001), 102.

Chen, W.-S., & Du, Y.-K. (2009). Using neural networks and data mining techniques for the financial distress prediction model. *Expert Systems with Applications*, *36*(2), 4075–4086. https://doi.org/10.1016/j.eswa.2008.03.020

Chotalia, P. (2012). Evaluation of financial health of sampled private sector banks with Altman Z-score model. *Circulation in More than 85 Countries*, *7*. https://www.academia.edu/download/36740041/August_2014.pdf#page=12

Chowdhury, A., & Barua, S. (2009). Rationalities of Z-category shares in Dhaka Stock Exchange: Are they in financial distress risk? *BRAC University Journal, 6*, 45–58.

Drescher, F. (2014). Financial Distress and Insolvency Timing. In: *Insolvency Timing and Managerial Decision-Making*. Springer Gabler, Wiesbaden. 23-52. https://doi.org/10.1007/978-3-658-02819-0_3

Farzana, S., & Majumder, B. (2020). Predicting financial distress of the Islamic banking sector of Bangladesh. *Journal of Banking & Financial Services, 12*(2).

Geng, R., Bose, I., & Chen, X. (2015). Prediction of financial distress: An empirical study of listed Chinese companies using data mining. *European Journal of Operational Research*, *241*(1), 236–247. https://doi.org/10.1016/j.ejor.2014.08.016

Hantono, H. (2019). Predicting financial distress using Altman score, Grover score, Springate score, Zmijewski score (case study on consumer goods company). *Accountability*, *8*(1), 1–16.

Hayes, S. K., Hodge, K. A., & Hughes, L. W. (2010). A study of the efficacy of Altman's Z to predict bankruptcy of specialty retail firms doing business in contemporary times. *Economics & Business Journal: Inquiries & Perspectives*, *3*(1), 122–134.

Husein, M. F., & Pambekti, G. T. (2014). Precision of the models of Altman, Springate, Zmijewski, and Grover for predicting the financial distress. *Journal of Economics, Business, and Accountancy Ventura*, *17*(3), 405–416.

Keener, M. H. (2013). Predicting the financial failure of retail companies in the United States. *Journal of Business & Economics Research (Online)*, *11*(8), 373.

Khaliq, A., Altarturi, B. H. M., Thaker, H. M. T., Harun, M. Y., & Nahar, N. (2014). Identifying financial distress firms: A case study of Malaysia's government linked companies (GLC). *International Journal of Economics, Finance and Management*, **3**(3), 141–150. https://www.ejournalofbusiness.org/archive/vol3no3/vol3no3_4.pdf

Khan, M. (2017). Z-Score Analysis on Efficiency of Working Capital Management: An Evidence of Selected Indian Food Processing Companies Listed in NSE. *Pacific Business Review International*, *10*(1), 106–113. https://www.pbr.co.in/2017/2017_month/July/11.pdf

Mizan, A. N. K., & Hossain, M. M. (2014). Financial Soundness of Cement Industry of Bangladesh: An Empirical Investigation Using Z-score. *American Journal of Trade and Policy*, *1*(1), 16-22. https://doi.org/10.18034/ajtp.v1i1.357

Mizan, A. N. K., Amin, M. R., & Rahman, T. (2011). Bankruptcy prediction by using the Altman Z-score model: An investigation of the pharmaceutical industry in Bangladesh. *Bank Parikrama*, *36*(2–4), 33–56.

Morris, R. (1998). Bankruptcy prediction models: Just how useful are they? Credit Management (British Institute of Credit Management), *March 1998*, 43–45.

Mostofa, M., Rezina, S., & Hasan, M. (2016). Predicting the financial distress in the banking industry of Bangladesh: A case study on private commercial banks. *Australian Academy of Accounting and Finance Review*, *2*(1). https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2814922

Niresh, A. J., & Pratheepan, T. (2015). The Application of Altman's Z-Score Model in Predicting Bankruptcy: Evidence from the Trading Sector in Sri Lanka. *International Journal of Business and Management*, *10*(12), 269. https://doi.org/10.5539/ijbm.v10n12p269

Onyiri, S. (2014). Predicting Financial Distress using Altman's Z-score and the Sustainable Growth Rate. *Northcentral University ProQuest Dissertations & Theses, 2014*. 3669729. https://www.proquest.com/openview/41ffa504f7a3c22fc66e0c6ab065c8d3/

Parvin, A., Rahman, B., & Nitu, A. A. (2016). Prediction of Financial Health of Banking Industry in Bangladesh Using Altman's Z Score: A Comparison Between State-Owned Commercial Banks and Private Commercial Banks. *Proceedings of the International Conference for Bankers and Academics*, 335-344.

Pratiwi, A. S., Satoto, S. H., Wahyu, S. B., & Suprapti, S. (2022). The Effect of Financial Ratio in the Altman Z-Score on Financial Distress. *International Journal of Economics, Business and Accounting Research (IJEBAR)*, *6*(1), 902. https://doi.org/10.29040/ijebar.v6i1.4736

Rahman, M., Sa, C. L., & Masud, M. A. K. (2021). Predicting firms' financial distress: An empirical analysis using the F-score model. *Journal of Risk and Financial Management*, *14*(5), 199.

Shirata, C. Y. (1998). Financial ratios as predictors of bankruptcy in Japan: An empirical research. *Proceedings of the Second Asian Pacific Interdisciplinary Research in Accounting Conference*, 437–445. https://www.researchgate.net/profile/Cindy-Shirata/publication/228604054

Shumway, T. (2001). Forecasting Bankruptcy More Accurately: A Simple Hazard Model. *The Journal of Business*, *74*(1), 101–124. https://doi.org/10.1086/209665

Siekelova, A., Kovalova, E., & Ciurlau, F. C. (2019). Prediction Financial Stability of Romanian Production Companies through Altman Z-Score. *Ekonomicko-Manazerske Spektrum*, *13*(2), 89–97. https://doi.org/10.26552/ems.2019.2.89-97

Springate, G. L. (1978). *Predicting the possibility of failure in a Canadian firm: A discriminant analysis* [PhD Thesis]. Simon Fraser University.

Stewart, R., & Chowdhury, M. (2021). Banking sector distress and economic growth resilience: Asymmetric effects. *The Journal of Economic Asymmetries*, *24*, e00218. https://doi.org/10.1016/j.jeca.2021.e00218

Steyn, B. W., & Hamman, W. D. (2006). Company failure in South Africa: Classification and prediction by means of recursive partitioning. *South African Journal of Business Management*, *37*(4), 7–18.

Supriyanto, J., & Darmawan, A. (2018). The Effect of Financial Ratio on Financial Distress in Predicting Bankruptcy. *Journal of Applied Managerial Accounting*, *2*(1), 110–120. https://doi.org/10.30871/jama.v2i1.727

Tahu, G. P. (2019). Predicting financial distress of construction companies in Indonesia: A comparison of Altman Z-Score and Springate methods.

International Journal of Sustainability, Education, and Global Creative Economic (IJSEGCE), *2*(2), 7–12.

Tanjung, P. R. S. (2020). Comparative analysis of Altman Z-Score, Springate, Zmijewski and Ohlson models in predicting financial distress. *EPRA International Journal of Multidisciplinary Research (IJMR)*, *6*(3), 126–137.

Turk, Z., & Kurklu, E. (2017). Financial Failure Estimate in Bist Companies with Altman (Z-Score) and Springate (S-Score) Models. *Journal of Economics and Administrative Sciences, 1*(1), 1-14. https://dergipark.org.tr/tr/download/article-file/319546

Zmijewski, M. E. (1984). Methodological Issues Related to the Estimation of Financial Distress Prediction Models. *Journal of Accounting Research*, *22*, 59. https://doi.org/10.2307/2490859

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