

# Relationship Between Banking Performance and Financial Distress: A Study on Banks of Bangladesh

Ajaan Rahman Khan (Corresponding Author)

Lecturer of Accounting

Army Institute of Business Administration, Sylhet

E-mail: [ajaan.r.khan@gmail.com](mailto:ajaan.r.khan@gmail.com)

Chinmoy Das Gupta

Lecturer of Finance

Army Institute of Business Administration, Sylhet

E-mail: [ronee.das@gmail.com](mailto:ronee.das@gmail.com)

Md. Ali Ashraf

Lecturer of Finance

Army Institute of Business Administration, Sylhet

E-mail: [mdaliashrafaiba@gmail.com](mailto:mdaliashrafaiba@gmail.com)

Received: April 20, 2021   Accepted: May X, 2021   Published: June X, 2021

doi:10.5296/ieb.v7i1.

URL: <https://doi.org/10.5296/ieb.v7i1>.

## Abstract

Banking is said to be one of the most successful industries in the economy of Bangladesh. The aim of this study is to check the existence of a relationship between the financial strength (or distress), measured through Altman Z-score, and banking performance, measured using Return of Equity (ROE), of the banks of Bangladesh listed in the Dhaka Stock Exchange (DSE). The paper thoroughly analyzes and describes the data associated with these two variables, and a linear regression has been conducted between these two variables to ascertain the level and direction of their relationship. The trends of Z-score over the five years from 2015 to 2019 (inclusive) have been tested. The analysis discloses that the z-score is a statistically significant predictor of the ROE in the banking industry. Although, the industry shows a low level of Z-score indicating a high level of financial distress among the banks

studied, this study implies that an increase in Z-score will result in an increase of ROE.

**Keywords:** Financial Distress, Bank Performance, Altman Z-Score, Return on Equity, Banking Industry

## 1. Introduction

A strong financial market is a precondition for the development of any economy. A financial market is basically split into two sectors - money market and capital market. The money market is mostly represented by the banking sector (in terms of value of assets) of the economy (Saunders & Cornett, 2012, p. 346). A bank is a financial institution that operates to earn profit by collecting money as deposits from a party of customers and then lending them as loans to others along with various other financial activities. The aim of banking business, like any other business, is to maximize the wealth of shareholders while ensuring sustainability (Hamilton & Nickerson, 2003). Bank profitability, among any other type of financial institutions, have played a vital role in the growth of any economy over recent years (Klein & Weill, 2018).

Investigators tend to believe that firms that are performing well in terms of profitability are to be considered as good banks with probable sustainability. Gandhi, Loughran, McDonald (2019) believe that in recent times, most of the practitioners, financial analysts, and banking regulators have been using established finance and accounting literature (Altman, 1968; Beaver, 1966; Libby, 1975; Ohlson, 1980) used either calculated financial ratios from annual reports or CAMELS (capital adequacy, asset quality, management quality, earnings, liquidity, and sensitivity to market risk) ratings as early signals to measure bank distress and bankruptcy. According to Joshi, P. D. (2019), bankruptcy is the legal situation of an entity that is unable to repay the debt to the lenders, and where the firm's total liabilities exceed total assets.

Chowdhury and Ahmed (2009) found the banking industry to be bright and prospective but only considering parameters (ratios) that focus on measuring financial performance ignoring the criteria that represent overall financial health of the banking industry. Robin, Salim and Bloch (2018) found the main drivers of profitability in the banking industry of Bangladesh that also ignore the factors relevant to financial health, like working capital, retained earnings etc. Islam et al. (2017) found that non-performing loan and diversified banking activities have a positive impact on the ROE of private commercial banks.

According to Modigliani and Miller (1958) the financial status of a firm is irrelevant in real investment decisions in a world of perfect and complete capital markets. However, that does not work in the real world as investors consider multiple financial and psychological factors before making any investment decisions. Aren and Aydemir (2015) found that many investors think that businesses with better corporate reputation would become good investment opportunities and produce higher investment returns. Some also tend to consider firms' social responsibility and environmental control level while making investment decisions. Apart from profit on deposits, investors primarily focus on religious values (mostly Islamic) associated with a bank before getting involved with that bank (Sayani & Miniaoui, 2013).

The profitability of a bank can be influenced by internal determinants like factors that management can control such as liquidity, investment in securities, investment in subsidiaries, loans, non-performing loans, overhead expenditure, and other determinants such as savings, current account deposits, fixed deposits, total capital and capital reserves, and money supply (Rasiah, 2010).

Islam et al. (2017) suggested that if a bank expects increased returns (profitability) and takes up more risks, the chances of covering the equity by assets will be reduced, which may lead to a potential financial distress or worse, bankruptcy. Bankruptcy is the legal status of a person who is unable to repay the debt to the creditors, and where the firm's total liabilities exceed total assets. (Joshi, P. D. (2019). Altman (1968) Z-score is one model that can help the investors foresee the bankruptcy of a certain company. He analysed 33 publicly held US manufacturing bankrupt companies and their corresponding matches. Furthermore, he based his research on five variables, and by running a discriminant analysis on the data, he was able to develop a model that enhances bankruptcy prediction for publicly held US manufacturing companies.

This excessive dependency of judging the banks based on financial performance alone, while making investment decisions, arises the question whether banks that are performing well are similarly financially healthy or not. So, the focus of this paper is on the relationship between the chances of financial distress and bank performance.

## **2. Review of Literature**

### *2.1. Altman Z- Score Model*

Earliest study by Beaver (1966), used univariate technique to differentiate healthy and failing firms, and calculated six accounting ratios separately (Cash flow ratios, Net-Income ratios, Debt to total assets ratios, Liquid-asset to total asset ratios, Liquid asset to current debt ratios and Turnover ratios) to assess financial health of firms. To minimize any misclassification, these ratios were used on the basis of individual cut off scores. Beaver (1966) assumed single ratio can predict financial condition of a firm, but he found there are number of indicators that can discriminate firms' ability to predict. Altman (1968) argues Beaver's method is less effective to understand firms' health because there are many other factors with which financial condition of a company can be understood.

Later Altman (1968) developed Z-score model using Multiple Discriminant Analysis (MDA) by combining various ratios into single score. This score is good indication of a firm going into bankruptcy in two years. This model has been adopted by researchers in various industries and in different economies and produced reliable results and this has led researchers to rely on this model. Altman (1983, 1993) has also suggested that the management of distressed firms can utilize the Z-Score model as a guide to a financial turnaround.

Hernandez (2018) used Z score in his study to understand small and medium firm health in Mexico. He found 75% of the firms are healthy and rests are in danger. Similar study by (Sanesh, 2016; Celli, 2015; Khaddafi, 2017) used Z score model and confirmed reliability of this model. Some researchers on the other hand suggested for further improvements. Muminovic (2013), found inaccurate result for Siberian capital market. He suggested revision

of coefficients and cut-off ranges of the Z-score model. Thai et al. (2014) used four ranges instead of the original three ranges in their study on Malaysian firms and they found reliable results on firm's bankruptcy forecasts. A recent study in Canada by (Mahbobi, 2017) derived Forecasted Artificial Neural Network (FANN) from Altman model, and considered this derivation to be successful, however, the Z Score model was found to be a better estimation.

Grice and Ingram (2001) found that the relation between financial ratios and financial distress changes over time. They suggest that Altman's model is more beneficial for predicting financial distress of manufacturing firms than for predicting financial distress of non-manufacturing firms. Coats and Fant (1993) have found that bankruptcy is only one outcome of financial distress. Others include reorganization, liquidation, and acquisition by a viable firm.

Mostofa, Rezina and Hasan (2016) analyzed 25 banks in Bangladesh to check the level of financial distress using data for five years from 2010 from financial statements by using the Altman Z score model. They found that 24% in the safe zone, 20% in the distress zone and 56% in the grey zone during the study period.

Anjum (2012) found that Altman Z-score model is a safe and secure way of predicting financial distress and bankruptcy from one to three years in advance. According to her, Altman's Z-score model has 90.9% efficiency in predicting financial distress for one year prior to the company's bankruptcy which may work as sign for the potential investors.

## *2.2. ROE as a Measure of Performance*

The performance of bank as a financial institution in both developing and developed economies is vital for financial sectors growth (Saha & Anjum, 2020). Out of several ways to measure company performance, financial ratios are widely used by researchers to measure performance. Accounting based performance indicators ROE and ROA are frequently used by investors in order to calculate firm profitability (Masadeh, 2015). Monteiro (2006) confirmed and stated that perhaps ROE is the most important ratio an investor should consider.

ROE represents DU Pont analysis; Du Pont equation expresses ROE as three terms: profit margin, total asset turnover and equity multiplier. The reason for ROE to be chosen to be expressed is that ROE is the return to the common equity holders. Therefore, investor's priority should be to analyze Du Pont equation first to understand overall financial condition of a firm (Arslan, 2017).

Return on equity is calculated by dividing net income by shareholders' equity. However, ROE does not tell how much cash an investor gets in return because it depends on company's dividend policy and stock price. Instead, ROE stipulates the percentage of profit the company makes for each monetary unit of shareholder' equity invested in the company. Therefore, ROE is a good indicator to understand a firm's ability to turn investment into profit. Thus, much like Goddard et al. (2004), this paper uses ROE as a measure of bank profitability, representing the financial performance.

## **3. Hypothesis**

In this regard, we have developed our hypothesis.

H<sub>1</sub>= There is a relationship between the financial performance and level of financial distress within the banking industry of Bangladesh.

## 4. Methodology

### 4.1 Sample Size

For the analysis of the banking industry, all the public limited companies were chosen to be analyzed. However, 1% of the bottom outlier banks were excluded from the analysis to get a true and fair view of the overall banking industry. There are a total of 59 banks operating in Bangladesh as of now among which 30 banks are publicly enlisted in the Dhaka Stock Exchange (DSE). The authors worked on 29 of these enlisted banks for the purpose of the analysis. The worked-on sample size represents around 97% of the enlisted banks and almost half of the running banks of Bangladesh (some of which are specialized banks).

### 4.2 Data Collection

In order to understand the trend of the financial performance and health of these banks and the industry all together, financial data of 5 years from 2015 to 2019 (inclusive) were collected and analyzed. The data was from the published financial statements (including notes to the financial statement). These statements were readily available on the websites of the respective banks.

### 4.3 Data Analysis

After collection and cleansing of the data, three (3) major types of analysis were done using the financial data of the banks from 2015 to 2019.

#### 4.3.1. Return on Equity

The first analysis was to calculate the ROE of all the banks for all the selected years. The net income of each year was divided by the total equity of that year to find the ROE.

#### 4.3.2. Altman Z-Score

Professor Edward Altman first developed Z-Score in an effort to measure firm's health and its probability of bankruptcy. Since then, this model has been employed as a tool for financial assessment by professionals and lenders. Widely used Altman Z-Score model (2014) developed for the non-manufacturing businesses is used in this study. Below presented Z-Score model.

$$Z = 6.56*X1 + 3.26*X2 + 6.72*X3 + 1.05*X4$$

Here,

X1= Working Capital/ Total Assets

X2= Retained Earnings/ Total Assets

X3= EBIT/ Total Assets

X4= Market Value of Equity/Total Liabilities

Result of Z-Score model can be interpreted as:

Z-Score above 2.6: The firm is safe

Z-Score between 1.1 to 2.6: known as "Grey" zone.

Z-Score below 1.1: "distress" zone.

Even though the Z-Score model was developed more than 45 years ago, and many alternative failure prediction models exist, the Z-Score model continues to be used worldwide as a main or supporting tool for bankruptcy or financial distress prediction and analysis both in research

and in practice (Altman et al., 2017).

#### 4.3.3 Regression Analysis

Using the calculated figures of ROE and Z score from the collected data, a simple linear regression analysis was run to check the relationship between the financial performance of a bank and the level of financial distress. The formula used was:  $Y = \beta_1 Z_1 + C$  where dependent variable (Y) is return on equity (ROE), ( $\beta_1$ ) is coefficient, independent variable ( $Z_1$ ) is the calculated Altman Z-Score and (C) is the constant.

### 5. Empirical Results

The collected and cleansed data was analyzed to get the Z-score and ROE of individual banks for the years from 2015 to 2019.

In case of Z-score, only one bank (Eastern Bank Ltd.) was found to be out of the distress zone throughout the period studied. Based on this study, the situation of the banking industry for those five years is found to be under financial distress with an average between .18 to .37 for the given period (Table 1). The median values of each year show that the average Z-score was almost always (in 4 out of 5 years) below the middle most Z-score (Figure 1). The standard deviation is also not too high that means that the individual results are not too high or low from the average.

Table 1. Descriptive Statistics of Z-score

Values	2015	2016	2017	2018	2019
Average of Z-score	0.33	0.37	0.33	0.20	0.18
Median of Z	0.48	0.44	0.31	0.31	0.29
Standard Deviation of Z-score	0.62	0.61	0.71	0.69	0.69

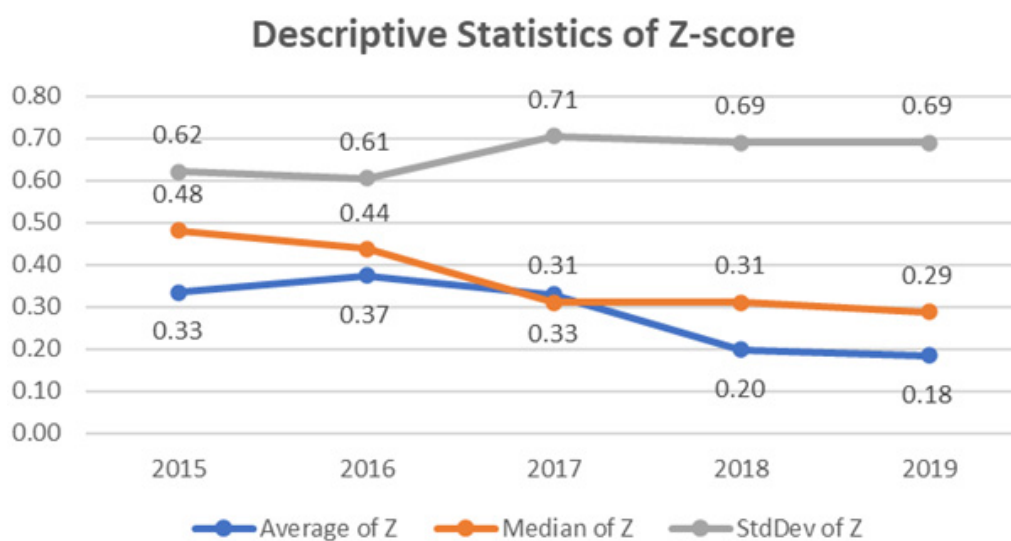


Figure 1. Descriptive Statistics of Z-score

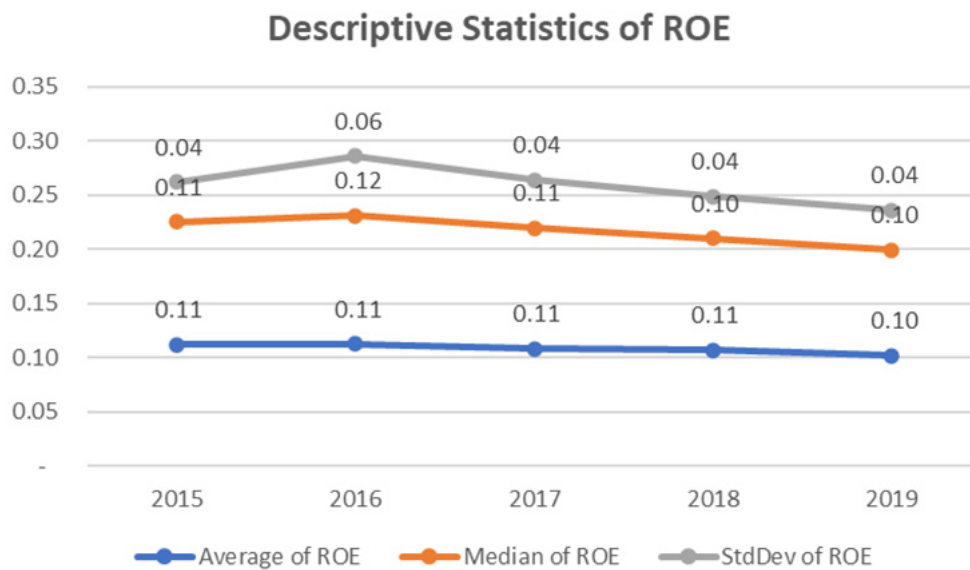


Figure 2. Descriptive Statistics of ROE

As for ROE, the banking industry seems to be quite stable as almost all the banks during the period had an ROE near to 11% (Table 2), which almost the same as the median of all ROEs (Figure 2). The standard deviation is quite low which implies that the average presents a fairly correct view of the banking industry.

Table 2. Descriptive Statistics of ROE

Values	2015	2016	2017	2018	2019
<b>Average of ROE</b>	0.11	0.11	0.11	0.11	0.10
<b>Median of ROE</b>	0.11	0.12	0.11	0.10	0.10
<b>Standard Deviation of ROE</b>	0.04	0.06	0.04	0.04	0.04

Our regression analysis corroborates that the relationship between ROE, as a measure of financial performance, and Z-score, as an indicator of financial health, is statistically significant. The regression showed a positive relationship between ROE and Altman Z score. A low p value ( $<.05$ ) indicates that Z score is a statistically significant predictor of ROE (Table 5). The model was able to account for almost 3 percent of the variation in ROE (Table 3). From the regression equation, it can be stated that all other held constant, if the Z score of a bank increased by 1 unit, the ROE of the respective bank would go up by 1 percent. Calculated t-statistic of 2 or greater means the corresponding coefficient is less likely to be zero (Table 5). The F-statistic also indicates that the model as a whole can be used to predict or explain the variability of ROE of banks (Table 4). We can accept our alternate hypothesis that says that there is a relationship between the financial performance and financial health of the banking industry.

Table 3. Summary of Regression

Regression expression	<b>ROE = 0.1053289 + 0.0111032*Z Score</b>
R Square	0.029611
R Square Adj	0.022826
Root Mean Square Error	0.041993
Mean of Response	0.108485
Observations (or Sum Weights)	145

Table 4. Analysis of variance

Source	DF	Sum of Squares	Mean Square	F Ratio (F statistic)
Model	1	0.00769482	0.007695	4.3637
Error	143	0.25216437	0.001763	<b>Prob &gt; F</b>
C. Total	144	0.25985918		0.0385*

Table 5. Parameter estimates

Term	Estimate	Std Error	t statistic	Prob> t  (p value)	Lower 95%	Upper 95%	VIF
Intercept	0.1053289	0.0038	27.71	<.0001*	0.0978166	0.1128412	
Z Score	0.0111032	0.005315	2.09	0.0385*	0.0005966	0.0216097	1

## 6. Conclusion

Altman (1983) suggested that the management of distressed firms can utilize the Z-Score model as a guide to financial turnaround. Although most of the firms are not financially healthy, this does not mean that they are going to be bankrupt soon as prediction of financial distress in a firm does not necessarily mean bankruptcy (Kumar & Anand, 2013).

Based on the analysis, the investors should just be careful before investing as the financial health might not be how they expect it to be. Considering this study, the existing or potential investors can use the Z-score model to know about the return on their investments as well, since Z-score can predict the ROE. The existing banks can also benefit from this study by being more cautious about proper utilization of the money that they are dealing with.

The findings of this study also have future research directions for studies related to possibilities of bankruptcy in other industries and countries. This study is not without its limitations. Due to some limitations, this study does not include the causes of poor financial health of the banking industry, that can be studied in future studies. Further suggestions for future research may also include making a cross-industry or cross-country analysis to find out the causes as well as other factors that may have an impact on Z-score and ROE and their



relationship.

## References

Altman, E. (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-Droazdowska, M., Laitinen, E. K., and Suvas, A. (2017). Financial distress prediction in an international context: A review and empirical analysis of Altman's Z-Score model. *Journal of International Financial Management and Accounting*, 28(2), 131-171. <https://doi.org/10.1111/jifm.12053>

Anjum, S. (2012). Business bankruptcy prediction models: A significant study of the Altman's Z-score model. *Available at SSRN 2128475*.

Aren, S., & Aydemir, S. D. (2015). The factors influencing given investment choices of individuals. *Procedia-Social and Behavioral Sciences*, 210, 126-135. <https://doi.org/10.1016/j.sbspro.2015.11.351>

Beaver, W. (1966). Financial Ratios as Predictors of Failure. *Journal of Accounting Research*, 4, 71-111. <https://doi.org/10.2307/2490171>

Celli, M. (2015). Can Z-Score Model Predict Listed Companies' Failures in Italy? An Empirical Test. *International Journal of Business and Management*, 10(3), 57-66. <https://doi.org/10.5539/ijbm.v10n3p57>

Chávez, M., & Hernández, C. (2018). Small and Medium Size Companies Financial Durability Altman Model Application. *Mediterranean Journal of Social Sciences*, 9(2), 9-15. <https://doi.org/10.2478/mjss-2018-0021>

Gandhi, P., Loughran, T., & McDonald, B. (2019). Using annual report sentiment as a proxy for financial distress in US banks. *Journal of Behavioral Finance*, 20(4), 424-436. <https://doi.org/10.1080/15427560.2019.1553176>

Goddard, J., Molyneux, P., & Wilson, J. O. (2004). Dynamics of growth and profitability in banking. *Journal of money, credit and banking*, 1069-1090. <https://doi.org/10.1353/mcb.2005.0015>

Grice, J. S., & Ingram, R. W. (2001). Tests of the generalizability of Altman's bankruptcy prediction model. *Journal of Business Research*, 54(1), 53-61. [https://doi.org/10.1016/S0148-2963\(00\)00126-0](https://doi.org/10.1016/S0148-2963(00)00126-0)

Hamilton, B. H., & Nickerson, J. A. (2003). Correcting for endogeneity in strategic management research. *Strategic organization*, 1(1), 51-78. <https://doi.org/10.1177/1476127003001001218>

Islam, M. A., Sarker, M. N. I., Rahman, M., Sultana, A., & Prodhan, A. S. (2017). Determinants of profitability of commercial banks in Bangladesh. *International Journal of Banking and Financial Law*, 1(1), 1-11. <https://doi.org/10.5296/ifb.v1i1.5161>

- Joshi, D. (2019). A study on application of Altman's Z score model in predicting the bankruptcy of Reliance Communication. *International Journal of 360 Management Review*, 7(02), 35-47.
- Klein, P. O., & Weill, L. (2018). Bank profitability and economic growth.
- Kumar, M., & Anand, M. (2013). Assessing Financial Health of a Firm Using Altman's Original and Revised Z-Score Models: A Case of Kingfisher Airlines Ltd (India). *Journal of Applied Management and Investments*, 2(1), 36-48.
- Masa'deh, Ra'Ed., Tayeh, Mohammad., Jarrah, Idries., & Tarhini, Ali. (2015). Accounting Vs. Market-based Measures of Firm Performance Related to Information Technology Investments. *International Review of Social Sciences and Humanities*, 9, 129-145.
- Mohammad Mahbobi, R. S. (2017). Likelihood of financial distress in Canadian oil and gas market: An optimized hybrid forecasting approach. *Journal of Economic and Financial Studies*, 5(03), 12-25. <https://doi.org/10.18533/jefs.v5i3.272>
- Monteiro, A. (2006). A quick guide to financial ratios. *The Citizen, Moneyweb Business Insert*, 6 May.
- 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).
- Muammar Khaddafi, F. M. (2017). Analysis Z-score to Predict Bankruptcy in Banks Listed in Indonesia Stock Exchange. *International Journal of Economics and Financial Issues*, 7(3), 326-330.
- Muminović, S. (2013). Revaluation and Altman's Z-score- The Case of the Serbian Capital Market. *International Journal of Finance and Accounting*, 2(1), 13-18.
- Ohlson, J. A. (1980). Financial ratios and the probabilistic prediction of bankruptcy. *Journal of accounting research*, 109-131. <https://doi.org/10.2307/2490395>
- Rahman, M. R., Rahman, M. M., & Subat, A. (2020). Measuring financial distress of non-bank financial institutions of Bangladesh using Altman's Z-Score model. *International Business Education Journal*, 13, 15-28.
- Rasiah, D. (2010). Review of Literature and Theories on Determinants of Commercial Bank Profitability. *Journal of Performance management*, 23(1).
- Robin, I., Salim, R., & Bloch, H. (2018). Financial performance of commercial banks in the post-reform era: Further evidence from Bangladesh. *Economic Analysis and Policy*, 58, 43-54. <https://doi.org/10.1016/j.eap.2018.01.001>
- Saha, J., & Anjum, N. (2020). Are Foreign Bank Subsidiaries More Profit Efficient Than Domestic Ones? - An Analysis on Earning Approach of Private Sector Banks, Bangladesh. *EPRA International Journal of Research and Development (IJRD)*, 5(1), 39-45. <https://doi.org/10.36713/epra3904>

Sanesh, C. (2016). The analytical study of Altman Z score on NIFTY 50 Companies. *IRA-International Journal of Management and Social Sciences*, 3(3), 2455-2267. <https://doi.org/10.36713/epra3904>

Saunders, A., & Cornett, M. M. (2012). *Financial markets and institutions*. The McGraw-Hill/Irwin.

Sayani, H., & Miniaoui, H. (2013). Determinants of bank selection in the United Arab Emirates. *International Journal of Bank Marketing*. <https://doi.org/10.1108/02652321311315302>

Tabachnick, B. G., Fidell, L. S., & Ullman, J. B. (2007). *Using multivariate statistics* (Vol. 5). Boston, MA: Pearson.

Thai, S., Goh, H., Teh, B., Wong, J., & Ong, T. (2014). A Revisited of Altman Z - Score Model for Companies Listed in Bursa Malaysia. *International Journal of Business and Social Science*, 5(12), 197-207.

### **Copyright Disclaimer**

Copyright for this article is retained by the author(s), with first publication rights granted to the journal. This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).