Jahangirnagar University Journal of Business Research (JUJBR), Vol. 23, June, 2023
ISSN 1681-9748

DOI: 10.53461/jujbr.v23i.1

JUJBR

Financial Soundness and Determinants of Profitability of Non-Bank Financial Institutions of Bangladesh

Sams Saiyadena Zeesha[*]
K. M. Zahidul Islam[**]

Abstract: *The proposed study aims to evaluate the financial soundness of the NBFIs as well as to identify the firm-specific and macroeconomic factors that exert significant impact on the profitability. The bankruptcy classification model-Fulmer H-score model-was used in this study to examine financial soundness by using NBFI financial statements from 2014 to 2019. To identify the factors that influence a company's profitability, we have decided to use return on assets (ROA) as the measure of profitability and have studied numerous company-specific variables as independent factors. The findings demonstrate that over the period under consideration, six NBFIs have been operating efficiently and are in better financial condition and other 11 NBFIs have shown substandard performance and are nearer to bankruptcy. The results show that firm size, deposit ratio, capital adequacy ratio (CAR), net interest margin (NIM), non-performing loan (NPL) ratio as well as cost to income ratio substantial effect on profitability; and therefore, the study recommends NBFIs to consider increasing their capital, look for opportunities to increase their client base and identify profitable projects to invest into. The study's results further suggest a set of policy recommendations to promote transparency and manage non-performing loans effectively.*

Keywords: *profitability determinant, non-bank financial institution, financial performance, Bangladesh*

JEl Classification: *C5, G20, G21, G23, L25.*

1. Introduction

Primarily commercial banks are the dominant players in Bangladesh in mobilizing resources and utilizing them in investments; but the various rigid regulations imposed on the commercial banks have set limitations on their operations and have confined them in a limited sphere of financial services. Due to the risk of asset-liability mismatch commercial banks were not able to offer a variety of new and innovative financial products that fulfil the current needs of different consumers. And these limitations resulted in the emergence of non-bank

[*] Management Trainee Officer, Dhaka Bank Limited, Bangladesh.
E-mail: saiyadena@gmail.com.

[**] Professor, Institute of Business Administration (IBA-JU), Jahangirnagar University, Bangladesh. E-mail: kmz@juniv.edu.

financial institutions (NBFIs) in Bangladesh. According to Pirtea et al. (2008), the rise of NBFIs leads to overall growth of the financial system including the domestic capital market, which in turn promotes the country's overall economic development. The study also opined that both banks and NBFIs are required for the country to have a strong and stable financial system.

NBFIs complement the existing banking system by mitigating the financial intermediation gap; by creating new capital formation and providing various services, NBFIs significantly contributes in the proper functioning of the financial system. Bangladesh has thirty-four NBFIs, of which three are government-run, nineteen are consortiums with foreign participation, and nineteen are privately owned (Bangladesh Bank, 2018).

It is critical for the advancement of the financial system and therefore can contribute to the acceleration of overall economic expansion to ensure the sustainability and prosperity of NBFIs. If the NBFI sector is efficient then it would majorly contribute to the financial stability in the economy (Ahmed & Chowdhury, 2008). Hossain & Shahiduzzaman (2002) finds a direct correlation between NBFIs and NBFIs and a country's economic growth. On the contrary, Islam and Osman (2011) find that per capita real GDP and NBFIs' investment has a long-term stable association.

Therefore, it is indeed critical to monitor the financial condition of the NBFIs to maintain the sound health of the financial and economic sector. Alongside with monitoring the financial soundness of the sector, it is essential to determine the variables that have a substantial influence on profitability as enhancing these factors may increase the profitability and improve overall financial condition.

NBFIs' business units are constrained in contrast to financial institutions in the country, and also facing unequal competition with banks. They are exposed to high-risk activities and in recent years the sector has suffered and most NBFIs have experienced massive decline in their earnings and profitability. Due to this, anytime a good number of NBFIs may shut their operations just like "Peoples Leasing & Financial Service Limited", that was announced to be liquidated in 2019. As a result, it is critical to regularly assess NBFI performance so that NBFIs may be directed to do well in the future. Bankruptcy prediction models can be used to determine whether the NBFIs are solvent and thus financially sound and in a good financial position.

There have been several studies in Bangladesh where the researchers have studied or analyzed the financial soundness of different sectors such as the banking sector, tannery industry, ceramic industry, pharmaceutical industry etc. (Mahbuba, 2015; Masum and Johora 2012; Mizan et al. 2011; Parvin et al. 2016; Saha & Biswas, 2021). But to the researchers' best knowledge, only three studies were found to be on the distress level of the NBFIs. Hamid et al. (2016) used the Altman Z Score Model on fifteen NBFIs which were listed in Dhaka Stock Exchange (DSE) between 2011 to 2015 and found that 13 NBFIs are in distressed zone. Rahman et al. (2020) also used Altman Z-score model on 20 NBFIs over the period of 2014 to 2018 and found that 19 of them were in

distressed zone. Another study by Noor and Mustafa (2020) analysed the solvency of 20 NBFIs utilising Fulmer H score model along with Springate Z score model. Under Springate Z score model all the NBFIs under consideration are insolvent whereas according to the Fulmer H Score Model, merely four of the NBFIs failed to achieve the minimal H score and were classed as unsustainable, while the remaining sixteen were stable. The researchers also opined that Fulmer H Score Model is better suited for predicting the solvency of NBFIs in Bangladesh. Mohammadi (2016) suggests to use Fulmer model as it incorporates more variables than other existing models of bankruptcy prediction and exhibits higher ability and accuracy to predict the financial solvency.

NBFIs are involved in a wide array of profit-seeking activities and are exposed to higher risk than banking financial institutions. Consequently, it is important to determine the firm specific and macroeconomic variables that impact the revenue of the NBFIs. Boyd et al. (1997) opined that inflation and financial market performance display a strong and economically substantial association. Bourke (1989) utilised cross-country data to separate commercial bank profitability variables into two categories: internal and external factors. Kosmidou (2008) examined the factors of Greek bank performance, using ROA as the dependent variable, and discovered that GDP had a substantial positive influence on ROA while inflation had a considerable negative effect. Another research by Kamran, et al. (2016) on financial institutes situated in Pakistan, showed that bank size, leverage ratio, and GDP significantly impact the banks in Pakistan.

Several studies were conducted in Bangladesh to identify firm-specific variables that affect the success of non-bank financial institutions (Rahman & Farah, 2012; Imtiaz et al., 2019; Mazumder, 2015; Khandoker, et al., 2013). However, none of the researchers considered macro-economic factors in their researches on determinants of profitability of NBFIs in Bangladesh. The current analysis addresses both organisational and macroeconomic factors as predictors of profitability of NBFIs in Bangladesh, which provides a greater chance for both shareholders and stakeholders to comprehend changes in NBFI and industry growth rate. The purpose of this research is to examine the financial soundness of Bangladesh's NBFIs using financial information as well as identify the firm-specific and macroeconomic variables that influence the performance of NBFIs of Bangladesh.

The remaining portion of the study is organised as follows: Section 2 describes the literature review, followed by section three outlining the construction of variables as well as hypothesis development. Section four discusses the methodology, specifies the models to be used and lists the diagnostic tests to run for the analysis of the study. Section five includes the empirical findings with discussion, followed by the last section, which concludes the study.

2. Literature Review

Financial soundness is a condition where the company is financially solvent to meet its obligations. Financial health demonstrates a company's capacity to fulfil

its long-term debt and other financial responsibilities. Through solvency analysis, it is easier to determine the financial soundness of a company and to evaluate the performance of a NBFI over the years and compare its performance with its competitors. It would also be easier for the clients to take decision before engaging into business with the NBFIs.

The prediction of financial solvency is done by taking useful information from the financial statements of the companies. Lemus et al. (2012) opined that, by knowing the level of financial soundness of the company, early signs of bankruptcy can be predicted and effective measures can be implemented to improve the company's financial condition.

In a study Rahayu (2020) suggested that, to check a company's financial soundness, a prediction tool or model needs to be developed first. The company's financial distress level can be identified through a certain model and according to the financial state of the company, the management then can make decisions that would improve the current financial state and tackle the conditions that might result in bankruptcy.

There are several models available to predict bankruptcy such as Altman Z-score Model, Grover Model, Zmijewski Model, Springate Z-score Model, and Fulmer H-score Model. According to previous research conducted, there are significant differences among these models to predict solvency. Furthermore, Rao et al. (2013) conducted a study by taking a sample of nine Indian companies that filed for bankruptcy was selected and their financial information for 5 years prior to their listing for bankruptcy was analyzed using Altman Z-score Model and KMV Merton Distance to Default Model to see which model can more accurately predict the bankruptcy of these 9 companies. It was concluded that Altman Z-score model was more appropriate in the Indian context. Andriani and Sihombing (2021) examined the financial statements of twenty Indonesian Stock Exchange organizations from 2017 to 2019. The researchers used Altman Z-score, Zmijewski Model and Springate Z-Score models to help predict the solvency of the companies. Among the total of 60 samples, the Altman Z-score method showed that 13 companies are in a safe zone, the Springate method showed 26 companies are in the safe zone and the Zmijewski X-Score method showed 56 companies are in the safe zone.

Altman Z score has been used by many researchers in Bangladesh to predict the failure, financial distress, and possibility of bankruptcy and insolvency of companies (Parvin et al., 2013; Rahman et al., 2019; Arman and Arefin, 2019). Hamid et al. (2016) in a study to predict the financial soundness of publicly traded NBFIs took a sample of 15 particular NBFIs registered on DSE and calculated the Altman Z- score of those NBFIs over the five years period from 2011 to 2015. In addition to suggesting that Altman's Z score model would not be relevant in the context of Bangladesh, the researchers discovered that only 7% of the companies were in the safe zone in 2013 and 0% in the other sample years.

It is noticeable from the previous studies that numerous researchers have implemented Altman Z-score to measure financial solvency, and only a few have

incorporated the Fulmer model. Noor and Mustofa (2020) predicted the solvency of NBFIs in Bangladesh by applying Springate Z-score and Fulmer H-score method. In other words, the different outcomes of these two models, the researchers opined that, for predicting solvency, the Fulmer model is more appropriate in the Bangladesh context because this model uses more variables compared to other existing models. The present study ventures to predict the economical solvency of the NBFIs in Bangladesh utilising the Fulmer H-score model.

Firm-specific and macro-level variables can disrupt the normal operation of an entity. Wong (2019) explained that both firm-specific and macro-economic variables influence the company performance and its ability to meet its financial goals; predicting change and fluctuations in all these variables may help to improve the company's profitability. Ceylan (2021) opines that it is important to determine the variables (both firm-specific and macro-level variables) that influence the profitability of the organization to decide the strategies and set a course of action to be followed for further development of the firm. According to McNamara et. al. (2011) incorporating both firm-specific and macro-economic variables to analyse how these variables influence profitability of the organization may help the stakeholders to get a clearer, more accurate and relevant risk rating of the organization. Incorporating both organisational and macroeconomic factors as predictors of profitability of NBFIs in Bangladesh will help the stakeholders to comprehend the changes and gradual development of the sector and provide a direction on adoption of procedures to deal with specific situations. Several studies have been conducted in Bangladesh to estimate the firm-specific and macroeconomic variables which effect the profitability of the financial institutions (Abdullah et al., 2014; Karim and Alam, 2013; Matin 2017; Sufian and Kamarudin, 2012). But as banking sector of Bangladesh is more developed, most of these concentrate on commercial banks while only a few studies relied on NBFIs.

Khan et al. (2015) found that EPS, capital ratio, firm size, and GDP have a substantial influence on the profitability of the banks in Pakistan. Isayas and Yitayaw (2020) took a sample of 25 financial institutions (14 commercial banks and 11 insurance companies) operating in Ethiopia and concluded that liquidity ratio, asset tangibility, leverage, firm's age and inflation rate significantly impact profitability. Sufian and Chong (2008) opined that firm specific variables significantly impact the profitability whereas macroeconomic variables are not essential in explaining profitability. Sufian and Kamarudin (2012) found that macroeconomic determinants- growth in inflation, GDP, and concentration have significant influence on profitability. Samad (2015) opined that capital risk, loan deposit ratio, bank efficiency, and credit jeopardy are influential factors for determining the profitability of Bangladeshi banks. Sufian (2009) surveyed the NBFIs in Malaysia and concluded that NBFIs with higher risk showed a lower profitability level and NBFIs with higher operational expenses showed a higher profitability level. Farah and Rahman (2012) found that operating efficiency and liquidity condition have significant impact on profitability. Mazumder (2015)

examined the stimulants of profitability on NBFIs in Bangladesh and found that Total Assets, Total Equity, Operating Revenue, Total Liabilities and Term Deposit have a statistically significant impact on net profit of the NBFIs. Khandokar et al. (2013) concluded that Total Asset, Operating Revenue, Term Deposit, Operating Expense expressively impact the success of the listed NBFIs of Bangladesh. The study also inferred that if the NBFIs improve total equity and operating proficiency, it would be possible for them to increase their profitability and flourish fast.

To the researcher's best knowledge there is a lack of empirical evidence related to the financial soundness of the NBFIs and the determination of the factors affecting the profitability of the NBFIs in Bangladesh. This study tries to fill this research gap and aims to provide valuable information to different parties by adding empirical evidence in the analysis. Considering the recent advancements and the growing competitions among the NBFIs, if the firm-specific and macroeconomic factors affecting the profitability can be identified it will help the management to make decisions that will maximize the profitability; and the analysis of financial soundness will help the investors to make more informed decisions regarding their investments, assist the management to improve the firms' financial position, and the regulators to reform rules and regulations to ensure development and growth of the sector.

3. Variables Construction

To investigate the association between profitability and performance indicating variables, ROA has been used as dependent variable and several other firm-specific and macroeconomic variables have been selected as independent variables. The variables used in this research, which are both dependant and independent, are analysed and discussed in the following sections.

Dependent Variable

Return on Asset (ROA): For measuring the profitability of the NBFIs of Bangladesh, this study uses ROA as dependent variable. ROA is determined by dividing income after tax by average total asset. Hagel et al. (2013) stated that ROA is the most competent and broadly available measure of profitability of a company. It assesses both the income statement performance and the assets of the company which makes it a holistic approach. Other measures of profitability such as return on equity or return to shareholders can be manipulated through financial engineering or debt leverage. ROA can give a comprehensive picture of business operations and management can be held accountable if they keep using resources in the projects that yields little value rather than utilizing assets in projects that would create value more optimally.

Independent Variables

Both internal and external factors influence the revenue and profitability. Giving consideration to the independent variables used in the previous studies related to the prediction of profitability of different financial institutions, the current study selected 8 firm-specific variables and 2 macro-economic variables that may

influence the profitability of the NBFIs of Bangladesh. The internal or firm-specific variables as well as external or macroeconomic variables are discussed below.

Firm-specific Variables

Firm Size: In different contexts researchers have used firm size as an indicator of profitability; according to different studies by Babalola (2013), Shubita and Alsawalhah (2012), Vijayakumar and Tamizhselvan (2010) firm size has a substantial impact on profitability. In the research to study the effect of firm size on profitability of 200 listed companies in Istanbul Stock Exchange, Dogan (2013) found that the listed firms have higher profitability as their size expands and are more effective as they utilize scale economy. In this study natural logarithm of the total asset value of NBFIs has been applied as a predictive measure for firm capacity. It is anticipated that a firm's size and profitability will have a positive correlation.

Capital Adequacy Ratio (CAR): Capital adequacy emphasizes on the total position of the NBFIs' capital and represents the stability and strength of the firm. According to Imtiaz et al. (2019), the higher CAR ratio demonstrates that the firm's dependence on external equity is lower which results into lower risk of bankruptcy and this gives the depositors protection against any potential shocks of losses that the NBFI may incur. CAR is measured by dividing total equity by total asset and is projected to have a significant impact on profitability.

Loan Ratio: In the study, loan ratio is measured by total loan as a percentage of total asset. NBFIs provide retail loans and commercial loans to the customers which are a major source of income for the NBFIs. Interest assembled from the loans are expected to generate income for the entity and therefore it is anticipated to have a positive corelation on profitability. But if majority of NBFIs funds are tied up in loans, this may cause a long-term detrimental effect on the profitability of the firm.

Non-performing Loan Ratio: Non-performing loan ratio represents the asset quality and is measured as the ratio of non-performing loans to total loans. Berrios (2013) opined non-performing loans, also known as impaired loans have a high probability of being bad debt and is a risk factor for financial institutions. This ratio measures the credit default risk which means higher value of this ratio increases the probability of incurring losses from default risks and eventually results in lower profitability.

Deposit Ratio: The deposit ratio is measured as deposits held by the NBFIs in proportion to their asset. Deposits are considered as the primary and lowest cost source of fund for NBFIs. Securing more funds as deposits ensures a higher interest spread thus a higher profit margin whereas decrease in deposits results in decrease in profitability. So, it is anticipated that deposit ratio and profitability will exhibit a positive relationship in the research.

*Net Interest Margin***:** Net interest margin is calculated by dividing net interest income by total average earning asset and is anticipated to show a positive

impact on profitability. As NBFIs mainly depend on interest generating activities, net interest margin directly impacts the firm's profitability. Saksonova (2014) opines that net interest margin is appropriately fit to understand the effectiveness and stability of financial institutions and it complements the overall profitability of the firm.

Non-interest Income Margin: The non-interest income margin ratio helps to measure the degree of diversification into non-traditional activities of financial institutions; and defined as non-interest income divided by total assets and contemplated to have a positive influence on profitability.

Cost to Income Ratio: Cost to income ratio shows the operational efficiency of a firm and is defined by dividing operating costs by operating income. Pervan et al. (2015) explained as operating expenses has a negative and statistically significant impact on profitability, the lower value of cost to income ratio represents more profitability and efficient management of the firm. It is expected that cost-to-income ratio and profitability may have a negative correlation.

Macroeconomic Variables

Gross Domestic Product: GDP is an extensively used macroeconomic variable that exhibits the magnitude of economic activity of a country. According to Sufian and Chong (2008), decrease in economic activity results in decrease in the demand for loans and deposits and eventually negatively affects the profit margin of financial institutions. GDP growth translates into economic growth that results in expansion in economic activities and strengthened fiscal conditions; as a consequence, the activities of financial institutions also increase, services offered to customers brings in more income and positively impact the profitability.

Inflation Rate: Inflation significantly impacts NBFIs as they mostly deal with financial instruments. Choi et al. (1996) opined that high rate of inflation results in a decrease in return on financial asset; whereas Perry (1992) explained how financial institutions can take measures by adjusting their interest rate in terms of anticipated inflation and reduce their costs so that firm's profitability doesn't suffer due to inflation.

The measures of all the variables considered in the research and the expected impact of independent variables on the dependent variable are displayed in Table 1.

Table 1: Notation, Measurement and Expected Impact of Different Variables

Variable	Notation	Description	Expected Sign
Return on Asset	ROA	Net profit after tax divided by average total assets	
Firm Size	SIZE	Natural Logarithm of Total Asset	+
Capital Adequacy Ratio	CAR	Total equity by total asset	+
Loan Ratio	LR	Total loan as percentage of total asset	+/-

Variable	Notation	Description	Expected Sign
Non-performing Loan Ratio	NPLR	Ratio of non-performing loans to total loans	-
Deposit Ratio	DR	Total deposits to total asset	+
Net Interest Margin	NIM	Net interest income to average earning asset	+
Non-interest Income Margin	NIIM	Non-interest income to average earning asset	+
Cost to Income Ratio	CIR	Ratio of operating cost to operating income	-
Gross Domestic Product	GDP	Growth in annual gross domestic products	+
Inflation	INFL	Annual inflation rate	+/-

4. Methodology

Sampling and Data Collection

The majority of the data used in this study are secondary data. Firm specific data were collected from the audited and published annual reports of NBFIs; and macroeconomic data were collected from the website of Bangladesh Bank. A balanced panel dataset of 17 NBFIs registered in the DSE have been considered in this study based on the accessibility of data and the time frame considered is 2014-2019. For predicting the financial soundness of the NBFIs, the famous solvency prediction model-Fulmer H Score Model is used in this study. To identify the factors influencing the profitability of the NBFIs, the study is centred on a test of panel data and the prediction of the regression equations is conducted by using the STATA13. Moreover, the time variant data is transformed into panel data by taking in this time variant data for each cross-sectional unit for the macroeconomic variables.

Fulmer H Score Model

In the paper "A Bankruptcy Classification Model for Small Firms" by Fulmer et al. (1984) the bankruptcy classification model Fulmer H score was first developed. If the score is below zero then a firm should be classified as a struggling company or close to being bankrupt and if the score is above zero then the firm should be classified to be in the non-bankrupt category. This model is used as a guide to understand which stocks to be deemed as safer to invest in.

$$H = 5.528 * V1 + 0.212 * V2 + 0.73 * V3 + 1.27 * V4 - 0.12 * V5 + 2.335 * V6 + 0.575 * V7 + 1.083 * V8 + 0.894 * V9 - 6.075$$

If $H < 0$, then the firm is classified as 'failed' Here, V1 = Retained Earnings / Total Assets;

V2 = Sales / Total Assets; V3 = Net Income before Taxes (EBIT) / Equity; V4 = Cash Flow / Total Debt; V5 = Total Debt / Total Assets; V6 = Current Liabilities / Total Assets; V7 = Log Tangible Total Assets; V8 = Working Capital / Total Debt; V9 = Log EBIT / Interest

Specification of Model for Regression Analysis

Pooled OLS Model:

Pooled ordinary least square model pools data of different entities over different time period and estimates regression without considering the distinction among different cross-sectional units; that is pooled OLS method ignore the panel structure of data. According to Park (2011), OLS can be an efficient estimator if individual effect of u_{it} that is cross-sectional of time specific effect doesn't exist, $u_i = 0$.

$ROA_{it} = \alpha + \beta 1SIZE_{it} + \beta 2CAR_{it} + \beta 3LR_{it} + \beta 4NPLR_{it} + \beta 5DR_{it} + \beta 6NIM_{it} + \beta 7NIIM_{it} + \beta 8CIR_{it} + \beta 9GDP_{it} + \beta 10INFL_{it} + e_{it}$ ……. (1)

Here, e_{it} represents the error or disturbances term. i = 1,2,3,4….., N; t= 1,2,3,4…, N

Two important assumptions of pooled OLS method are homoskedasticity and no autocorrelation; that is, each disturbance terms in the model have the same variance and the disturbance terms are not correlated with each other. If there is individual effect in the data, u_i is not equal to zero, then the mentioned assumptions may be violated due to individual specific characteristics. As panel data include observations of different cross-sectional entities over a period of time, some unobserved heterogeneity is bound to be present in the dataset. In this case, due to the violation of homoscedasticity and no autocorrelation, pooled OLS fails to produce unbiased and efficient estimates.

Park (2011) suggests that this issue can be addressed by using panel data models where individual-specific effects, time effects or both effects are considered to manage heterogeneity and based on the characteristics of these effects, researchers decide to use either fixed effect model or random effect model.

Fixed Effect Model:

Fixed effect model allows heterogeneity among entities that is the intercept in the regression model is allowed to vary across cross-sections but is not allowed to vary across time. The relationship between dependent and independent variables within an entity is examined in this model. This model assigns different intercepts for each different entities and thus the slope coefficients are assumed to be constant for all.

$ROA_{it} = (\alpha + u_i) + \beta 1SIZE_{it} + \beta 2CAR_{it} + \beta 3LR_{it} + \beta 4NPLR_{it} + \beta 5DR_{it} + \beta 6NIM_{it} + \beta 7NIIM_{it} + \beta 8CIR_{it} + \beta 9GDP_{it} + \beta 10INFL_{it} + e_{it}$ ……... (2)

i = 1,2,3,4….., N; t= 1,2,3,4…, N

Here, u_i represents individual characteristics specific to NBFIs which are excluded from regression. Due to the individual heterogeneity, one unit change in the regressor will result in different impact on individual NBFI's performance.

Random Effect Model:

According to Islam et al. (2019), random effect models assume a global intercept α which is treated to be uniform across the entities over the time periods and

individual intercepts are allowed to deviate from the common intercept (α) by a random variable which is the composite error term equal to sum of the variances in idiosyncratic error e_{it} and unobserved component u_i.

$ROA_{it} = \alpha + \beta 1 SIZE_{it} + \beta 2 CAR_{it} + \beta 3 LR_{it} + \beta 4 NPLR_{it} + \beta 5 DR_{it} + \beta 6 NIM_{it} + \beta 7 NIIM_{it} + \beta 8 CIR_{it} + \beta 9 GDP_{it} + \beta 10 INFL_{it} + (u_i + e_{it})$ ..... (2)

Here, $(u_i + e_{it})$ is a composite error term and i = 1,2,3,4….., N; t= 1,2,3,4….., N

Park (2011) explains, one of the assumptions of random effect model is that individual effect (heterogeneity) is not correlated with any regressor and u_i is randomly distributed across group or time or both with mean 0 and variance σ^2. In this model intercept and slopes of regressors remain the same across individual. The difference among individuals (or time periods) lies in their individual specific errors, not in their intercepts.

Diagnostic Tests

Multicollinearity Test:

Multicollinearity problem arises when the independent variables are significantly correlated with each other. Product Moment Correlation Coefficient proposed by Pearson (1896) can be used to detect multicollinearity. Presence of high multicollinearity means the coefficients cannot be predicted with great precision or accuracy.

For the assessment of multicollinearity problem, Tolerance and Variance Inflation Factor (VIF) can be put into use. As the collinearity of a regressor with other regressors increases, VIF also increases and approaches to infinity in the presence of perfect collinearity.

$$VIF = \frac{1}{1 - r^2_{23}}$$

Tolerance is the reciprocal value of VIF. $TOL = \frac{1}{VIF} = (1 - R^2)$

There is serious multicollinearity if VIF is equal or more than 10 and tolerance is equal or less than 0.10 (Gujarati, 2009, P. 341).

Test for Serial Autocorrelation:

Drukker (2003) explains the outcome of serial autocorrelation in panel-data data model is biased estimates of standard error and thus inefficient coefficients estimations. To detect autocorrelation, Wooldridge (2002) proposed the Wooldridge test and Drukker (2003) argues that Wooldridge test can have fair size and power properties in a reasonably sized sample.

Test for Heteroskedasticity:

Groupwise heteroscedasticity exists when the error process is homoscedastic within cross sectional units, but its variance differs across units; thus, it violates

the assumption of error term having constant variance across all the cross-sections. In the presence of heteroskedasticity, the OLS estimator remains unbiased but it no longer remains efficient with minimum variance. Greene (2003) suggested Modified Wald Statistic to calculate groupwise heteroskedasticity.

Test for Cross Sectional Dependence:

If the residuals are correlated cross-sectionally then the data suffer from the problem of cross- sectional dependence. Panel dataset sometimes shows mutual interdependence among cross- sectional entities thus common shocks experienced by the entities might be excluded from the model and become a part of the error term. For example, if all the NBFIs in the cross-sectional units have business dealings with one large NBFI, then any shock in the large NBFI will eventually affect all other NBFIs. And if these excluded common factors are correlated with the regressors then the model might provide biased and inconsistent estimators. Pesaran (2004) proposed Pesaran CD test for detecting cross-sectional dependence when the observed period is less than the number of cross- sectional units.

F-Test for Detecting Fixed Effect:

Fixed effect models incorporate individual heterogeneity in the intercepts of each entity and if individual heterogeneity is not present, then pooled OLS models can be used to estimate the parameter efficiently. F-test is used to know if there is a compelling fixed group effect.

Test for Random Effect:

The Breusch and Pagan Lagrange Multiplier (LM) test is applied to explore whether any random effect exists and select the best suited model between pooled OLS and random effects model.

Hausman Test:

If significant fixed effects and random effects both are found, then Hausman test is used to compare fixed and random effects and determine which effect is more significant and therefore is the best suited model than the other. According to Park (2011), when individual effects are uncorrelated with regressors then both fixed effect model and random effect model provide unbiased and consistent estimates; but if individual effects are correlated then random effects estimator becomes inconsistent as in the random effects model, individual effects are part of error term.

Methods to Deal with Heteroscedasticity, Autocorrelation and Cross-sectional Dependence in the Model

Panel datasets are likely to show cross-sectional and temporal dependency and in the presence of autocorrelation, heteroskedasticity and cross-sectional dependence may produce biased estimates (Islam, 2019). The standard error estimates of frequently used methods for estimating covariance matrices are

biased, resulting in the invalidity of statistical inference based on these standard errors. Park and Kmenta (1997) suggested feasible generalized least squares (FGLS) based algorithm. According to Greene (2012), FGLS can handle cross-sectional dependence problem, correct heteroskedasticity and autocorrelation problem and can provide unbiased estimate for the variables. Because the FGLS method becomes infeasible when the panel's time dimension (T) is smaller than the cross-sectional dimension (N), Beck and Katz (1995) explain that it is inappropriate for medium- and large-scale micro-econometrics panels. Additionally, this method frequently results in unacceptable small standard error estimates. Kmenta (1997) suggests panel corrected standard errors (PCSE) model as an alternative to FGLS model as it performs well in small panels and is used to provide estimate of pooled OLS controlling problems (cross-sectional dependence, heteroscedasticity and autocorrelation).

5. Empirical Result and Discussions

The study uses Fulmer *H*-score model proposed by Fulmer et al. (1984) to predict the solvency of 17 listed NBFIs in Bangladesh for the period of 2014 to 2019. The H score represent the solvency of the company; if H score is below 0 then the company is classified as failed and above zero score concludes that the company is financially solvent. The Table 2 contains the H score of the NBFIs for the time period of 6 years.

The results show that Bay leasing and Investment Ltd, International Leasing & Financial Services Ltd, Prime Finance & Investment Ltd and Union Capital Limited have constantly produced scores that are below the required H score. These scores reflect the substandard financial performance of these four NBFIs. The negative retained earnings, negative cash flow amount, and losses incurred by the NBFIs have caused the negative *H*-score. From 2013 to 2017 the negative H-score of Bangladesh Finance and Investment Co. Ltd. exhibit financial weakness but the years after 2017, the NBFI is doing better and have shown increase in the *H*- score, representing its financial soundness. IPDC Finance Ltd performed well over the years but showed negative H-score in 2017 and 2018; this is because their cash flow amount was on the negative side, but in 2019 company's performance was back at track as before and this generated a positive *H*-score. Premier Leasing and Finance Ltd was not performing well in 2014 and 2015 but it has gradually improved its financial position as the H-score for the following four years are on the positive side.

FAS Finance & Investment Limited, First Finance Ltd, National Housing Finance and Investment Ltd and Phoenix Finance and Investments Ltd, were initially doing well but have negative H-score in the recent years; this shows financially the companies are not performing well.

Table 2: Fulmer H-score of NBFIs

List of NBFIs	2014	2015	2016	2017	2018	2019	Mean
Bay Leasing & Investment Limited	-0.48192	0.08001	-0.08601	-0.18605	-0.24144	-0.02386	-0.11442
Bangladesh Finance and Investment Co. Ltd	-0.27301	-0.46571	-0.44675	-0.04527	0.17164	0.12803	-0.15518
FAS Finance & Investment Limited	0.73895	0.36265	0.14109	0.82615	0.15884	-9.34307	-1.18589
First Finance Limited	-0.08046	0.04522	0.21313	0.18475	-0.39253	-0.74268	-0.12876
GSP Finance Company (Bangladesh) Limited	0.24587	0.69422	0.41407	0.20140	0.29182	0.33935	0.36446
IDLC Finance Ltd.	0.73413	0.89680	0.61437	0.95407	0.81402	0.64058	0.77566
International Leasing & Financial Services Ltd.	-0.27033	-0.53237	-0.70330	-0.07393	-0.46096	-0.66158	-0.45041
IPDC Finance Limited	0.60955	0.82882	0.45836	-0.02804	-0.18528	0.22127	0.31744
Islamic Finance & Investment Ltd.	0.03939	0.09506	0.85404	0.93987	0.41722	0.25306	0.43311
LankaBangla Finance Ltd.	0.44563	0.36426	0.54877	0.28907	0.66414	1.05284	0.56079
National Housing Finance and Investment Ltd.	0.12024	0.12007	0.22525	0.29265	-0.12463	-0.24986	0.06395
Phoenix Finance and Investments Ltd.	0.38005	0.38759	-0.01331	-0.14015	-0.09763	-0.03755	0.07983
Premier Leasing & Finance Limited	-0.45977	-0.26279	0.57021	0.73353	1.20741	0.83840	0.43783
Prime Finance & Investment Ltd.	0.46687	-0.02576	-0.70835	-0.82781	-1.04357	-1.03997	-0.52976
Union Capital Limited	-0.24748	-0.17264	-0.50573	-0.42818	-0.28820	-2.06013	-0.61706
United Finance Limited	0.42192	1.58709	0.61435	0.42579	0.53714	0.72018	0.71774
Uttara Finance and Investments Limited	0.73918	0.27984	0.92313	1.25442	1.06426	1.34747	0.93472

Source: Authors' own calculation

The other six NBFIs have H scores above the required minimum score over the period of last 6 years. This represents the operational efficiency and overall financial soundness of these NBFIs. If we look at the previous researches, only three studies were found to be on the distress level of the NBFIs and all three used Z-score to predict the solvency of the NBFIs (Hamid et al., 2016; Rahman, 2020; Noor and Mustafa, 2020). As, no prior studies used Fulmer H-score, we proceeded to discern whether the findings of this study conform to the previous studies that followed Z-score in their analysis. Similar to the findings from the present study, Noor and Mustafa (2020) also found four NBFIs to be insolvent; the six NBFIs that have consistent Z-score in the present study were found to be in the solvent category in the aforementioned study. In the recent years, there have been continuous reports on the substandard performance and volatile condition of the NBFI sector. Due to major irregularities and lack of proper governance, 13 NBFIs were in risky zone in 2020 (Bangladesh Bank, 2020). The results from the present study also conforms to the weakened state of the sector

as according to the Z-scores most of the NBFIs in the study are found to have shown substandard financial performance in the recent years.

The table below shows degree of correlation between the independent variables using the Pearson's Product-Moment Correlation Coefficient matrix.

Table 3: Pearson's Product-Moment Correlation Coefficient matrix

	Size	CAR	LR	NPLR	DR	NIM	NIIM	CIR	GDP	INFL
Size	1.00									
CAR	-0.4311*	1.00								
LR	0.2211*	-0.1911	1.00							
NPLR	-0.1487	-0.5397*	0.0523	1.00						
DR	0.3341*	-0.4043*	-0.0260	-0.1111	1.00					
NIM	-0.0691	0.7072*	-0.0304	-0.6761*	0.0533	1.00				
NIIM	0.1133	0.2276*	-0.1521	-0.1788	-0.0829	0.1256	1.00			
CIR	0.1165	0.0680	-0.0841	-0.4547*	0.190	0.1637	0.1357	1.00		
GDP	0.3170*	-0.2942*	0.1331	0.2338*	0.0983	-0.2443*	-0.3109*	-0.1134	1.00	
INFL	-0.3102*	0.2618*	-0.1575	-0.0788	-0.1595	0.1628	0.3034*	0.0684	-0.8535*	1.00

Note: *denotes correlations are significant at 5% level of significance

As a general rule, multicollinearity challenges are indicated when the correlation coefficient between two independent variables is 0.80 or higher. The outcome demonstrates that, with the exception of the correlation coefficient between GDP and inflation, none of the pair-wise correlation coefficients is 0.80 or higher. So, multicollinearity problem may exist in the data set. Now to check the seriousness of multicollinearity Variance Inflating Factors (VIF) and tolerance (TOL) are calculated for each of the independent variables. TOL is calculated by 1/VIF and there is a negative relationship between seriousness of multicollinearity and level of TOL.

Table 4: VIF and TOL of independent variables

Variable	VIF	TOl
Size	2.31	0.433121
CAR	6.34	0.157783
LR	1.18	0.845474
NPLR	3.64	0.274935
DR	1.96	0.509606
NIM	3.53	0.282939
NIIM	1.38	0.722698
CIR	1.48	0.674128
GDP	4.56	0.157783
INFL	4.14	0.241578
Mean	3.05	0.430005

Gujrati (2009, P. 341) suggests, if the VIF is equal or more than 10, there exists serious multicollinearity and if the value TOL is less or equal to 0.10, it also

indicates serious multicollinearity. As, in the table above shows that the value VIF of each independent variable is less than 10 and none of the TOL value is less or equal to 0.10 so there is no serious multicollinearity in the data set.

Different diagnostics tests like Wooldridge test, Modified Wald test and Pesaran Cross-Sectional Dependence (CD) test. have been run on the dataset to detect autocorrelation, heteroscedasticity and cross-sectional dependence. The table below summarizes the result of these diagnostic tests.

Table 5: Summary of Wooldridge Test, Modified Wald Test, and Pesaran CD Test (dependent variable: ROA)

Test Groups			
	Wooldridge Test	Modified Wald Test	Pesaran CD Test
Null Hypothesis	No first order autocorrelation	Data shows homoscedasticity (constant variance)	The residuals are not correlated (no cross-sectional dependence)
Test Statistics	F (Prob> F)	Chi-Square	Pesaran's CD Statistic
Results	20.035 (0.0004)	1620.58 (0.0000)	-1.269 (0.2044)

Note: The numbers in parentheses are the associated *p*-values related to the tests.

The result of Wooldridge test shows p value of less than 0.05 and suggests the rejection of the null hypothesis, that is, here is strong indication of first-order autocorrelation in the data set. The Modified Wald test shows p value of less than 0.05 and rejects the null hypothesis. The rejection of null hypothesis depicts the presence of heteroscedasticity in the data set. Pesaran CD test have been run in this study to detect cross-sectional dependence. The Pesaran CD test shows p-value of 0.2044 which is more than 0.05; so, we accept the null hypothesis. Acceptance of the null hypothesis indicates that there is no cross-sectional dependence in the data set.

Park (2011) states that selection of the best fitted model ensures the accuracy of panel data analysis and provides the best estimate.

Table 6: Summary of F-test, Breusch and Pagan Lagrange Multiplier Test, Hausman Test

Test Groups			
	***F*-Test**	**Breusch and Pagan Lagrange Multiplier Test**	**Hausman Test**
Null Hypothesis	There are no individual specific effects (Pooled OLS)	Variance across entities is zero (Pooled OLS)	Individual heterogeneity is not correlated with any regressor (Random effect)
Test Statistics	F (Prob> F)	Chi-Square	Chi-Square
Results	13.58 (0.0000)	40.81 (0.0000)	18.36 (0.0492)

Note: The numbers in parentheses are the associated p-values related to the tests.

The result of *F*-test shows a probability value of less than 0.05; so, we reject the null hypothesis. In the nature of the analysis, Fixed effect model is better suitable than Pooled OLS. Again, in the Breusch and Pagan Lagrange Multiplier Test the result supports the rejection of null hypothesis as the p-value is small. So, Random effect model is preferred to Pooled OLS. In both tests the null hypothesis was rejected. So, now the Hausman test will provide direction for whether to choose fixed effect model or random effect model. As the probability value of Hausman test is less than 0.05, we will reject the null hypothesis and concluded that the fixed effect model is appropriate for the analysis.

The diagnostic tests showed presence of autocorrelation and heteroskedasticity in the dataset. As the time dimension (T) is less than cross-sectional dimension (N), Panel Corrected Standard Error (PCSE) will provide the best estimates and handle the autocorrelation and heteroskedasticity problem. Therefore, PCSE is the final model for this study.

Table 7: Diagnostic Statistic of the Estimated Models

Variables	Coefficients of Variables				
	Pooled OLS	**Fixed Effect Model**	**Random Effect Model**	**FGLS Model**	**PCSE Model**
R-Sq	0.8151	0.9426	0.9385	N/A	0.9205
F/Wald Test	40.10	123.23	928.24	553.29	520.78
Prob>Chi2	0.0000	0.0000	0.0000	0.0000	0.0000

The PCSE model has a significant explanatory power with a significant R-Square value of 92.05% and a very small probability value (0.0000) of Wald test.

Table 8: Result of PCSE Model (ROA as dependent variable)

Hypotheses	Estimated Coefficient	Robust Standard Error	t-ratio	p- Value	Decision
H_1: Firm size has significant impact on profitability	0.0177	0.0074	2.38	0.017	Accepted
H_1: Capital adequacy ratio has significant impact on profitability	0.5026	0.0809	6.21	0.000	Accepted
H_1: Loan ratio has significant impact on profitability	-0.0189	0.0208	-0.91	0.364	Rejected
H_1: Non-performing loan ratio has significant impact on profitability	-0.1307	0.0465	-2.81	0.005	Accepted
H_1: Deposit ratio has significant impact on profitability	0.1284	0.03601	3.57	0.000	Accepted
H_1: Net interest margin has significant impact on profitability	0.9139	0.2101	4.35	0.000	Accepted

Hypotheses	Estimated Coefficient	Robust Standard Error	t-ratio	p- Value	Decision
H_1: Non-interest income margin has significant impact on profitability	0.0337	0.3561	0.90	0.924	Rejected
H_1: Cost to income ratio has significant impact on profitability	-0.0084	0.0032	-2.61	0.009	Accepted
H_1: GDP has significant impact on profitability	0.0035	0.0063	0.56	0.573	Rejected
H_1: Inflation has significant impact on profitability	-0.0005	0.0070	-0.07	0.941	Rejected

From Table 8 it is observed that the expected signs of all the explanatory variables are consistent with the researcher's prior expectation in the model where ROA is used as the profitability measure. Six variables are found statistically significant.

The estimated model shows that firm size & ROA have a significant positive relationship at 5% significance level. The coefficient is 0.0177662 which means assuming all other variables constant, one unit change in firm size will increase the profitability by 0.0177662 unit. This supports the argument made by Smirlock (1985) that a positive and significant relationship between firm size and profitability indicates that firms with larger size results in higher profitability. Capital adequacy ratio, net interest margin and deposit ratio also positively impact ROA at 1% significance level and is aligned with the prior expectation of the researcher. The higher value of these ratios will result in higher profitability. This is consistent with the results of the study by Imtiaz et al. (2019); the aforementioned variables along with non-performing loan ratio expressively influence the profitability of NBFIs in Bangladesh.

Non-performing loan ratio and cost to income ratio negatively affect the ROA at 5%; the result shows that lower value of these ratios will translate to higher value of profitability, that is ROA. Shoaib et al. (2015) also have similar findings where they found that profitability of financial institutions is adversely affected by liquidity, non-performing loan and administrative expenses.

Two macroeconomic variables, GDP and Inflation, were found to be statistically insignificant in the estimated result. Isayas and Yitayaw (2020) also concluded that GDP is not a significant determinant of profitability as they found no significant relationship between GDP and ROA. Other explanatory variables used in this study are- loan to total asset ratio and non-interest margin are found to have no statistically significant impact on the profitability of NBFIs in the context of Bangladesh. This outcome is consistent with the findings of Imtiaz et al. (2019).

6. Conclusion

Stakeholders are concerned with financial soundness as it demonstrates the future growth and prospect of an organization and indicates its solvency. This also helps the investors to determine if the organization is worthy of investment. On the other hand, for future sustainability, organizations must identify the factors that have the most contribution to profitability. In this backdrop the present study attempted to assess the financial soundness of 17 listed NBFIs of Bangladesh using the popular bankruptcy model- Fulmer H-score model and also tried to identify the elements which significantly impact the growth of the NBFIs of Bangladesh. The data used in this study was acquired from the NBFIs' annual reports, which covered the years 2014 through 2019. For identifying the determinants of profitability, return on asset (ROA) is selected as the profitability measure of the NBFIs and subsequently running the diagnostic tests, Panel Corrected Standard Error (PCSE) is selected to estimate the results.

The findings reveal that over the 6 years period under consideration, six NBFIs have been operating efficiently and are in better financial condition. The worst financial condition was observed in four NBFIs- Bay leasing and Investment Ltd, International Leasing & Financial Services Ltd., Prime Finance & Investment Ltd. and Union Capital Limited. The H-score for these NBFIs has constantly been on the negative side which predicted that among other NBFIs, they are nearer to bankruptcy if strict measures are not taken. The NBFIs with negative H-score should strategically analyse their whole business operation to find out the area of improvement for a better financial condition and take actions accordingly. After analysing the overall financial condition of these NBFIs, the government should offer funds to inject capital and liquidity in them to ensure their financial soundness. The findings on factors affecting profitability show that firm size, capital adequacy ratio, net interest margin, deposit ratio, cost-to-income ratio, and non-performing loan ratio significantly affect profitability. Keeping these factors in consideration, the small NBFIs or the NBFIs that are not financially sound may go for merging with other NBFIs, so that they can improve their profitability; the NBFIs should consider increasing their capital through available sources and develop a sustainable strategy to maintain the capital adequacy ratio at such a level that ensures higher profitability. On the other hand, loan ratio, non-interest income ratio, and macroeconomic variables- GDP and inflation lack considerable effect on the profitability of NBFIs in Bangladesh. Nevertheless, these factors can be kept in consideration before taking strategic decisions. For example, unanticipated inflation adversely impacts profitability, so NBFIs should always assess the economy to predict the inflationary movements and keep updating their interest rates so that inflation doesn't negatively hit the profitability in the unforeseeable future.

If the NBFIs that have shown negative H-score in current years, do not take necessary steps to improve their financial condition, they will find themselves in greater financial distress in the future and this will adversely impact the overall sector. The results of the study will help the NBFIs to take efficient and

necessary measures to increase the profitability and improve their financial condition. This will guide them to assess their overall financial position and develop strategies for efficient operation. The study also helps the regulatory authority to understand the factors to give importance to so that better supervision and monitor of NBFIs can be ensured. As the study is conducted on the listed NBFIs of Bangladesh, the investors in capital market will also benefit from the findings.

The period of consideration in the present study is short and it has considered only two macroeconomic factors as determinants of profitability. For future studies, more dynamic dataset can be used and other various firm-specific and macroeconomic factors can be incorporated in the model. As the study presented the results of financial soundness depending on one model, better measures of financial soundness can be incorporated in further studies to get a clearer idea of the sector's overall financial stability. This study can be extended in another way to see the influence of recent interest rate restrictions on the NBFIs of Bangladesh by incorporating data from the present study with future observations.

References

Abdullah, M. N., Parvez, K. & Ayreen, S. (2014). Bank Specific, Industry Specific and Macroeconomic Determinants of Commercial Bank Profitability: A Case of Bangladesh. *World Journal of Social Sciences, 4(3),* 82-96.

Ahmed, M.N., & Chowdhury, M. I. (2008). Non-bank Financial Institutions in Bangladesh: An analytical review. *Working Paper Series: WP 0709, Bangladesh Bank.* Retrieved from https://www.bb.org.bd/pub/research/ workingpaper/ wp0709.pdf

Andriani, F., & Sihombing, P. (2021). Comparative Analysis of Bankruption Prediction Models in Property and Real Estate Sector Companies Listed on the IDX 2017-2019. *European Journal of Business and Management Research, 6(1),* 170-173.

Arman, M., & Arefin, A. (2019). Assessing the Risk of Insolvency: An empirical Analysis using Altman Z-Score Bankruptcy Model. *International Conference on Management and Information Systems,* 111-116.

Babalola, Y. A. (2013). The Effect of Firm Size on Firms Profitability in Nigeria. *Journal of Economics and Sustainable Development, 4(5),* 90–94.

Bangladesh Bank (2018). *Banks and FIs.* Retrieved from https://www.bb.org.bd/ pub/puball.php

Bangladesh Bank (2020). *Financial Stability Report.* Retrieved from https://www.bb.org.bd/ pub/puball.php

Beck, N., & Katz, J. N. (1995). What to do (and not to do) with time-series cross-section data. *American political science review, 89(3),* 634-647.

Berríos, M. R. (2013). The relationship between bank credit risk and profitability and liquidity. *The International Journal of Business and Finance Research, 7(3),* 105-118.

Bourke, P. (1989). Concentration and Other Determinants of Bank Profitability in Europe, North America and Australia. *Journal of Banking and Finance, 13(1),* 65–79.

Boyd, J. H., Levine, R. & Smith B. D. (1997). Inflation and Financial Market. *Working paper573D, Federal Reserve Bank of Minneapolis Research Department.* Retrieved from https://citeseerx.ist.psu.edu/viewdoc/ download?doi=10.1.1.31. 88&rep=rep1&type=p df

Ceylan, I. E. (2021). The Impact of Firm-Specific and Macroeconomic Factors on Financial Distress Risk: A Case Study from Turkey. *Universal Journal of Accounting and Finance, 9(3),* 506 - 517. DOI: 10.13189/ujaf.2021.090325.

Choi, S., Smith, B. D., & Boyd, J. H. (1996). Inflation, financial markets, and capital formation. *Review-Federal Reserve Bank of Saint Louis*, *78*, 9-35. Retrieved from https://core.ac.uk/download/pdf/6755324.pdf

Drukker, D.M. (2003). Testing for serial correlation in linear panel-data models. *The Stata Journal, 3(2),* 168-177.

Fulmer, J.G., Moon, J.E., Gavin, T.A., & Ervin, M.J. (1984). A bankruptcy classification model for small firms. *Journal of commercial Bank Lending,* 25-37.

Greene, W. H. (2012). *Econometric Analysis.* 7th ed. Upper Saddle River, NJ: Prentice Hal.

Gujarati, D. N. (2009). *Basic Econometrics*. India: Tata McGraw-Hill Edition.

Hagel, J., Brown, J. S., Samoylova, T., & Lui, M. (2013). Success or struggle: ROA as a true measure of business performance. *Deloitte Centre for the Edge, 2013 (3).*

Hamid, T., Akter, F., & Rab, N. B. (2016). Prediction of Financial Distress of Non-Bank Financial Institutions of Bangladesh using Altman's Z Score Model. *International Journal of Business and Management, 11(12),* 261-270. Retrieved from https://pdfs.semanticscholar.org/c587/c09316dbc637579344 fa035485031fe456cc.pdf

Hossain, M., & Shahiduzzaman, M. (2002). Development of non-bank financial institutions to strengthen the financial system of Bangladesh. *Journal of Bangladesh Institute of Bank Management (BANK PARIKRAMA), 28(1).* Retrieved from https://ssrn.com/sol3/papers.cfm?abstract_id=574481

Imtiaz, M. F., Mahmud, K., & Faisal, M. S. (2019). The Determinants of Profitability of Non- Bank Financial Institutions in Bangladesh. *International Journal of Economics and Finance, 11(6),* 25. https://doi.org/10.5539/ ijef.v11n6p25

Isayas, Y. N., & Yitayaw, M. K. (2020). Firm Specific and Macroeconomic Determinants of Financial Institutions' Profitability: Evidence from Banks and Insurances in Ethiopia. *Journal of Economics and Business, 3(3),* 1136-1147. https://doi.org/10.31014/aior.1992.03.03.269

Islam, K. M., Alam, M. B., & Hossain, M. M. (2019). Impact of Credit Risk Management on Bank Performance: Empirical Evidence from Bangladesh. *South Asian Journal of Management, 26(2).*32-64.

Islam, M. A., & Osman, J. B. (2011). Development impact of non-bank financial intermediaries on economic growth in Malaysia: An empirical investigation. *International Journal of Business and Social Science, 2(14),* 187- 198.

Kamran, H.W., Johnson, Z. and Sammer, M. (2016). Determinants of profitability in Banking Sector. *International Journal of Information Research and Review, 3(5),* 2258-2264.

Karim, AI, R., & Alam, T. (2013). An evaluation of financial performance of private commercial banks in Bangladesh: Ratio analysis. *Journal of Business Studies Quarterly*, *5*(2), 65.

Khan, Q. M., Kauser, R., & Abbas, U. (2015). Impact of Bank Specific and Macroeconomic Factors on Banks Profitability: A Study on Banking Sector of Pakistan. *Journal of Accounting and Finance in Emerging Economies*, *1(2),* 99-110.

Khandoker, S., Rahman, S. M., & Raul, R. K. (2013). Determinants of Profitability of Non- bank Financial Institutions Evidence from Bangladesh. *International Journal of Management Sciences and Business Research, 2(4)*. Retrieved from https://ssrn.com/abstract=2711155

Kmenta, J. (1997). *Elements of Econometrics*. 2nd ed. Ann Arbor: University of Michigan Press

Kosmidou, K. (2008). The Determinants of Banks' Profits in Greece during the Period of EU Financial Integration. *Managerial Finance, 34(3),* 146-159. Retrieved from https://doi.org/10.1108/03074350810848036

Lemus, J. S., Corredor-Waldron, A., & Gutiérrez Rueda, J. (2012). Fragility determinants of the private corporate sector in Colombia. *Temas, 66.*

Mahbuba, S. (2015). Assessing Financial Soundness of Tannery Industry in Bangladesh: An Empirical Investigation Using Z-Score. *European Journal of Business and Management, 7(23).* Retrieved from https://core.ac.uk/ download/pdf/23462 6723.pdf

Masum, A., & Johora, F. (2015). Performance Evaluation of Selected Ceramic Companies of Bangladesh. *Asian Business Review, 1(1),* 37. Retrieved from http://dx.doi.org/10.18034/abr.v1i1.335

Matin, K. A. (2017, April). Determinants of bank profitability in Bangladesh. *20th Biennial Conference on Economics and Ethics of the Bangladesh Economic Association*, 1-20. Retrieved from https://bea-bd.org/site/images/pdf/ new17/72.pdf

Mazumder, M. A. (2015). Stimulants of Profitability of Non-bank Financial Institutions: Evidence from Bangladesh. *International Journal of Business and Management Review, 3(10),*32-41.

McNamara R., Duncan K., and Kelly S. (2011) Micro and macro determinants of financial distress, *Proceedings of the 15th International Business Research Conference, World Business Institute Australia, 1*, 25.

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,).*33-56.

Mohammadi, S. (2016). Studying the Efficiency and the Power of Predicting Bankruptcy of Firms Listed on the Stock Exchange using Springate, Fulmer, and Zavgren Models. *Mediterranean Journal of Social Sciences,9(4).* https://doi:10.5901/mjss. 2016.v7n4s2p124

Noor, M. F., Mustofa, S. (2020). Predicting Solvency of Non-Banking Financial Institutions in Bangladesh by Using Springate & Fulmer Model. *Journal of Management and Economic Studies, 2(1),* 51-69. DOI: 10.26677/ TR1010.2020.427

Park, H. M. (2011). Practical Guides to Panel Data Modeling: A Step-by-step Analysis Using Stata. Tutorial Working Paper. *Graduate School of International Relations, International University of Japan*.

Parvin, A., Rahman, B., & Nitu, A. A. (2013). 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. *In Proceeding of the International Conference for Bankers and Academics*, 335-344. Retrieved from https://www.researchgate.net/profile/Benazir-Rahman/publication/326689734.pdf.

Pearson, K. (1896). Mathematical Contributions to the Theory of Evolution-III, Regression, Heredity and Panmixia. *Philosophical Transactions of the Royal Society of London, Series A-187*, 253-318.

Perry, P. (1992). Do Banks Gain or Lose from Inflation. *Journal of retail banking, 14(2),* 25- 31.

Pervan, M., Pelivan, I., & Arnerić, J. (2015). Profit persistence and determinants of bank profitability in Croatia. *Econ. Res. Ekonomska Istraživanja, 28,* 284-298. https://doi.org/10.1080/1331677X.2015.1041778.

Pesaran, M. H. (2004). General diagnostic Tests for Cross Section Dependence in Panels. University of Cambridge, Faculty of Economics, *Cambridge Working Papers in Economics* No. 0435.

Pirtea, M., Iovu, L. R., & Milos, M. C. (2008). Importance of non-banking financial institutions and of the capital markets in the economy: The Case of Romania. *Theoretical and Applied Economics, 5(5),* 3-10. Retrieved from http://store.ectap.ro/articole/302.pdf

Rahayu, D. S Ahmed., & Suhartanto, H. (2020). Financial Distress Prediction in Indonesia Stock Exchange's Listed Company Using Case Based Reasoning Concept. *IEEE 7th International Conference on Industrial Engineering and Applications (ICIEA)*. 1009-1013. https://doi:10.1109/ICIEA49774.2020.9101948.

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(2),* 15-28. https://doi.org/10.37134 /ibej.vol13.2.2.2020

Rahman, S., & Farah, T. (2012). Non-Bank Financial Institutions' Profitability Indicators: Evidence from Bangladesh. *International Journal of Applied Research in Business Administration and Economics, 1(1).* 26-32.

Rao, N. V., Atmanathan, G., Shankar, M., & Ramesh, S. (2013). Analysis of bankruptcy prediction models and their effectiveness: An Indian perspective. *Great Lakes Herald, 7(2).* Retrieved from https://www.greatlakes.edu.in/ pdf/BANKRUPTCY.pdf.

Saha, N.K. & Bishwas,P.C, (2021). Determinants of Financial Performance of Commercial Banks in Bangladesh: An Empirical Study on Private Commercial Banks. *Global Journal of Management and Business Research.*

Saksonova, S. (2014). Net Interest Margin as An Indicator of Bank Asset and Liability Management. *8th International Days of Statistics and Economics, 1314-1325.*

Samad, A. (2015). Determinants bank profitability: Empirical evidence from Bangladesh commercial banks. *International journal of financial research, 6(3),* 173-179.

Shoaib, N., Wang, S., Jaleel, A. and Peng, K. (2015). Determinants of bank's profitability in Pakistan: A latest panel data evidence. *International Journal of Economics, Commerce and Management*, 3(4).

Shubita, M. F., & Alsawalhah, J. M. (2012). The relationship between capital structure and profitability. *International Journal of Business and Social Science*, *3(16).*

Smirlock, M. (1985). Evidence on the (non) relationship between concentration and profitability in banking. *Journal of Money, Credit and Banking, 17*, 69–83.

Sufian, F. (2008). The efficiency of non-bank financial intermediaries: Empirical evidence from Malaysia. *The International Journal of Banking and Finance, 5(2),* 149-167.

Sufian, F. (2009). Determinants of non-bank financial institutions' profitability: empirical evidence from Malaysia. *Global Business and Economics Review, 11 (2).*

Sufian, F., & Chong, R. R. (2008). Determinants of bank profitability in a developing economy: Empirical Evidence from the Philippines. *Asian Academy of Management Journal of Accounting & Finance, 4(2),* 91-109.

Sufian, F., & Kamarudin, F. (2012). Bank-specific and macroeconomic determinants of profitability of Bangladesh's commercial banks. *The Bangladesh Development Studies*, 1-28.

Vijayakumar, A., & Tamizhselvan, P. (2010). Corporate Size and Profitability: An Empirical Analysis. *College Sadhana-Journal for Bloomers of Research, 3(1),* 44–53.

Wong, Y.J. (2019), The Impacts of Firm-Specific Factors and Macroeconomics Factors towards Salesforce's Performance. *Munich Personal RePEc Archive,* Retrieved From *https://mpra.ub.uni-muenchen.de/97283/*

Wooldridge, J. M. (2002). Econometric Analysis of Cross Section and Panel Data.