

Risk and Performance of Non-Bank Financial Institutions (NBFIs) in Bangladesh: Panel Data Analysis*

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Abstract: Non-bank financial institutions (NBFIs) play a crucial role to resilience the economic activity through the acceleration of additional financial services besides the banking sector which helps to achieve the desired growth and development of a country. Considering the importance of NBFIs, the study attempts to examine the effects of risk levels on the performance and investigate the determinants of performance of NBFIs in Bangladesh. For the empirical analysis, the paper has been applied panel data analysis technique on collected data for the periods of 2014-2018 from 21 selected NBFIs which are listed in Dhaka Stock Exchange (DSE). The estimated results of risk index show that the selected NBFIs are safer that incurs less probability for insolvency. The results of the panel regression analysis show that the performance of NBFIs in terms of Return on Equity (ROE) and Return on Assets (ROA) is significantly influenced by the firm specific-factors like risk index, total assets, squared of total assets, leverage ratio, real interest rate and the interaction between risk levels and total assets, while the macroeconomic specific factors like inflation and GDP growth rate are positively associated with the performance of NBFIs in Bangladesh.

Key Words: Non-Bank Financial Institutions, Risk Index and Probability of Insolvency, Risk and Performance, Determinants of Performance, Bangladesh.

1. INTRODUCTION

Non-bank financial institutions (NBFIs), one of the most crucial participants in the financial sector, function mainly as a supplement industry to the banking industry of any economic system. Non-bank financial institutions operate as an important adjunct to the banking sector in financial intermediation (Vadde, 2011). In Bangladesh, the NBFIs industry also

* Views and analyses expressed here are the authors' own and do not necessarily reflect the views of the authors' institutions.

complements the usual banking institutions for providing financial services to the clients.

The Non-Bank Financial Institutions are licensed under the Financial Institution Act, 1993 and regulated under the Financial Institution Regulation, 1994 & controlled by Bangladesh Bank (Annual Report, Bangladesh Bank, 2017-18). At present, 34 registered NBFIs are operating in the financial sector of Bangladesh. The paid-up capital, deposits and loans and advances of the NBFIs as percent of the financial sector of Bangladesh stood at 12.69 percent, 7.11 percent and 6.36 percent respectively at the end of 2018. For a sound financial system, performance and participation of NBFIs need to be smooth and well managed. So the emerging importance of the NBFIs industry has made it necessary to determine their risk levels as well as the impact of risk on their financial performance.

According to, Sakyi, P. A., Ofoeda, I., Kyereboah-Coleman, A., & Abor, J. Y. 2014, risk plays an important role in NBFIs performance. Risk is uncertainty about future outcomes or events (Glickman & Gough, 1990). Risk can be defined as the possibility of either occurring any events adversely or having a negative impact on any outcomes. According to, Psillaki, M., Tsolas, I. E., & Margaritis, D. 2010, more efficient firms will be less likely to fail. So, NBFIs need to be efficient to mitigate any hindsight shocks as well as sudden deviations. Managing risk efficiently, which works as an ardent idea for any industry throughout the world, can be a possible solution for optimal risky investment, participation, and performance for NBFIs in the financial system.

Managing risk optimally is a must for the continued running of the business of financial institutions and the industry. Economic emergencies in recent times especially the 2008 financial crisis, have caused the turmoil state of financial systems of many countries. These exigency situations crave for the most favorable strategies to manage risk properly that would make the financial system sound and could help the participants of the industry to get better performance than the crisis period.

Extensive research studies and literature point out the impact of risk on the performance of financial institutions. In Bangladesh, the participation of NBFIs in the financial system is increasing and so are the risk levels of them. Therefore, determining the risk levels of NBFIs and the impact of risks on their financial performances need to be studied necessarily. The purposes of this study are to ascertain the risk levels of NBFIs and measure the effect of risk on their performance in Bangladesh using proper and structured econometric technique and analysis with annual data covering the period 2014-2018.

This research work proceeds as the following frame by giving a review of the extent literature regarding this subject in section 2. Then, sections 3 and 4 narrate the rationale and objectives of this study. Section 5 discusses the methodology, section 6 describes the structure and performance of overall NBFIs. After that, section 7 presents empirical analysis and section 8 discusses the findings of the study. Finally, section 9 concludes the discussion with some recommendations.

2. REVIEW OF LITERATURE

The review of literature serves as a guideline to identify the research gap and helps to develop an appropriate theoretical structure of the study. In this section, some of the important studies regarding the study area are reviewed as follows-

Lalon and Hussain (2017) tried to find out the performance of non-bank financial institutions in Bangladesh based on the financial ratio analysis on Lanka-Bangla Finance Limited (LBFL). The study explored that the current ratio was higher till 2013 and after that, this ratio showing declining trend, interest earned ratio was much lower from 2011 to 2015. The study also found that in terms of debt ratio LBFL always had a problem in paying the liabilities with the equity and from 2013 the profit margin ratio was below 1. Return on equity, asset turnover ratio and earnings per share were in declining mode from 2012, 2013 and 2014 respectively. From 2013, the dividend payout ratio and equity multiplier ratio of LBFL were in increasing mode. Finally, the study comments that the company is suffering from using its assets and collecting the receivables, and suggests that LBFL needs to work more aggressively to capture the market and earn a healthy income.

Murari (2012) attempted to determine the insolvency risk for 80 Indian banks (public, private and foreign sector) using a risk-measuring index along with the probabilistic interpretation of their book value bankruptcy throughout for 2005-06 to 2009-10. The study found that the probability of book value bankruptcy of Indian banks has reduced over the years, and the probability of book value bankruptcy is lower in the case of public sector banks, compared to private and foreign sector banks.

Akter, Ahmad, and Islam (2018) tried to explore the soundness and future forecast of rating point of NBFIs in Bangladesh by using the CAMELS model. According to the CAMELS rating the study found that at the end of June 2016, out of 33 NBFIs– only one was “1 or Strong”, 15 were “2 or Satisfactory”, 13 were “3 or Fair” and 3 were “4 or Marginal.”

Khandoker, Raul and Rahman (2013) attempted to identify the major financial features affecting the profitability in the NBFIs of Bangladesh and

to evolve financial strategy by applying correlation matrix, multiple regression, run test and K-W test on the secondary data. The study found the key factors like liquidity, operating expenses, capital structure, and total assets significantly influence the financial performance (net profit) of NBFIs.

Siddiqui, S.S. (2012) examined the important factors affecting the capital structure decisions of Non-bank Financial Institutions in Bangladesh and found that all the leverage ratios increase with the increase in growth rate and firm size. Debt service coverage, operating leverage, and age are negatively related to all of the three debt ratios. The study also found mixed results in case of profitability, liquidity and tangibility ratios. Long term debt ratio increases with the increase in liquidity and tangibility ratios, whereas short term and total debt ratio decrease with the increase in liquidity and tangibility ratios.

Amita (1997) tried to find out the financial performance of non-bank financial companies (NBFCs) in India by applying ANOVA (Analysis of Variance) techniques and found a significant difference in the profitability ratios, leverage ratios and liquidity ratios of various categories of NBFCs.

Vadde (2011) tried to evaluate the performance of non-government financial and investment companies (other than banking, insurance, and chit-fund companies) during the year 2008-09. The study observed that the growth in income and total expenditure of non-government financial and investment companies decelerated, where the growth of total expenditure was higher than the growth in income. The growth in expenditure was mainly driven by the growth in interest payments. As a result, the operating profits of the selected companies declined along with diminishing profitability during the study period.

Imtiaz, Mahmud, and Faisal (2019) tried to find out the major financial factors affecting the profitability of the NBFI industry in Bangladesh and evaluate the aspects of the findings from 2013 to 2017. By using multiple regression analysis and descriptive statistics method on collected data from 12 NBFIs, the study found that capital adequacy ratio, deposit ratio, non-performing loan ratio and net interest margin were significant determinants of profitability of NBFIs. Firm size, loan ratio, net interest margin and non-interest income margin were positively related to profitability whereas capital adequacy ratio, deposit ratio, non-performing loan ratio and cost to income ratio were negatively related to profitability. Non-performing loan ratio and net interest margin were found to have a considerable impact on the profitability of NBFIs.

Gremi and Ballkoci (2016) focused on the development of NBFIs and the role and importance of their growing on Albanian Financial System.

By employing regression and correlation techniques, the study observed that the return on equity significantly influenced by the loans to assets ratio, normally increasing the assets of an institution, increase the basis for the granting of loans and consequently the lending interest income.

Sakyi, et al, (2014) examined the relationship between risk and performance of NBFIs in Ghana and found that risk plays an important role in NBFIs Performance. The study showed that the performance of NBFIs is influenced by their risk-taking incentives, size, capital ratio, real interest rates as well as the macroeconomic conditions prevailing in the country. The study suggests that regulatory authorities of NBFIs must take into consideration these factors in their management policies because they can significantly influence their performance.

Naimy (2005) analyzed the performance of the Lebanese commercial banks in terms of profitability and risks for the period 1993 to 2002 by using ROE model and Risk Index and observed that the general performance of the Lebanese banking system is highly correlated with the economic situation of the country and Lebanese banks are a strong shock absorber given their strength in terms of risk and return.

3. RATIONALE OF THE STUDY

According to, Psillaki et al. 2010, credit risk is still the most significant risk for financial institutions. The current exposure of NBFIs in the financial system of Bangladesh is mentionable as the operational activities of NBFIs are increasing in recent times. Being a formal sector player in the field of the financial venture, the performance of NBFIs needs to be smooth and sound. Here raise two questions that we are seeking in this study– (1) which are the determinants of performances of NBFIs in Bangladesh? and (2) What are the risk levels of NBFIs and their impact on their performance in Bangladesh? This research work tries to answer these two questions by analyzing and suggesting some recommendations for the nourishment of NBFIs in Bangladesh.

The above literature review exhibits some works about measuring the performance of NBFIs in Bangladesh. But these works are not showing the present and updated state of the NBFIs operated currently in Bangladesh. Due to the apparent lack of studies and researches on this topic has made it vital to ascertain the risk levels and their impact on the performance of NBFIs in Bangladesh. This study tries to determine the risk levels and their impact on the performance of NBFIs in Bangladesh.

The contribution of financing activities by NBFIs to the overall economy of Bangladesh has been persistently increasing. In 2018, the industrial credit

provided by NBFIs is 30.0 percent of the total loan and advances of NBFIs in the economy (Financial Institutions Report, 2018-19, Ministry of Finance). However, NBFIs can receive only term deposits with at least three months' tenure or more. Hence, there are so many challenges faced by the NBFIs, like as the huge encashment pressure of deposits, tight liquidity position, fund crisis, slow loan recovery and so on. For smoothing their participation, these challenges faced by NBFIs need to be identified and properly examined. In this study, we try to investigate these challenges faced by the NBFIs for the development of NBFIs in Bangladesh.

4. OBJECTIVES OF THE STUDY

The study is conducted for the evaluation of the performance of NBFIs in Bangladesh. The main objectives of the study are-

- i) To find out the determinants of performance of NBFIs in Bangladesh,
- ii) To examine the risk levels of NBFIs and their effect on performance, and
- iii) To give some possible recommendations based on the findings of the study for the development of NBFIs in Bangladesh.

5. THE METHODOLOGY OF THE STUDY

The methodology of the study provides the guidelines of empirical analysis. It includes population, sample, data sources, variables, and model development for the study.

5.1. Population, sample and data source

The study is entirely based on secondary data. The study considers the NBFIs industry as a population. Up to December 2019, 34 NBFIs are operating in Bangladesh while the maiden one was established in 1981. Out of the total 34 NBFIs, the study selects 21 NBFIs which are listed in Dhaka Stock Exchange (DSE). For the empirical analysis, the study covers the period 2014-2018. The secondary data are collected from the annual report of selected NBFIs, Bangladesh Bank Annual Report, Bangladesh Bureau of Statistics (BBS), and different published reports, Journals, etc.

5.2. Performance Measures

To measure the performance of NBFIs, the study follow the Return on Equity (ROE) model which was applied to analyze the performance of the Lebanese banks in terms of profitability and risks for the period 1993-2002 by Naimy, 2005 and examine the risk and performance of NBFIs for the period of 2006-

2010 by Sakyi et al, 2014. The headlines attest to return on assets (ROA) prominence as the accounting measure of overall bank performance and to the critical importance of loan quality in determining bank performance (Naimy, 2005). Similarly, ROE measures profitability but from the shareholder's perspective. ROE measures accounting profits per taka of book equity capital. It is defined as net income divided by total equity (Sakyi et al 2014). It can be decomposed into a leverage factor or Equity Multiplier (EM) and ROA:

$$\text{ROE} = \text{ROA} * \text{EM}$$

Where, $\text{ROA} = \text{Net Income} / \text{Total Assets}$ and $\text{EM} = \text{Total Assets} / \text{Total Equity}$. It provides a gauge of an institutions' leverage.

The second stage of ROE decomposition analysis splits ROA into: (a) Profit Margin (PM), and (b) Asset Utilization (AU)

$$\text{ROA} = \text{PM} * \text{AU}$$

Where, $\text{PM} = \text{Net income} / \text{Total Revenue}$ and $\text{AU} = \text{Total Revenue} / \text{Average Total Assets}$.

Thus, the ROE model contains three alternative measures of profitability: ROE, ROA, and PM.

5.3. Construction of risk measurement index

The study employs the risk index developed by Hannan and Hanweck (1988) and used by various other researchers such as Sinkey and Blasko (2001), Naimy (2005), Rahman, Ibrahim, and Meera (2009), Odonkor, Osei, Abor, and Adjasi (2011), Ofoeda, Abor, and Adjasi (2012) and Sakyi, et al (2014). The variability of ROA provides a comprehensive measure for capturing the overall risk of a financial institution; ROA reflects not only credit risk but also interest rate risk, liquidity risk, operating risk and any other risk that is realized in the institution's earnings (Naimy, 2005 and Sakyi, et al 2014). The variability of ROA in a financial institution is measured by the calculation of the standard deviation of ROA. The inverse of EM or capital to assets ratio (CAP) is often used as an indicator for risk in financial institutions because high levels of the capital provide safeguard against huge fall in income that indicates other things being equal, higher capitalized financial institutions will incur less risk of insolvency (Sakyi, et al 2014). The risk index (RI) of financial institutions is the combination of ROA, CAP and the standard deviation of ROA. The empirical form of RI is-

$$RI = \frac{(ROA + CAP)}{\sigma ROA}$$

Where, RI is risk index for the various NBFIs under the study, ROA is the return on assets of NBFIs for each year, CAP is capital to assets ratio of NBFIs, and σROA is the standard deviation of ROA for all NBFIs each year which is calculated by

$$\sigma ROA = (ROA - \overline{ROA})^2$$

RI is the measure of risk takes into considerations all the risk that a firm exposed to (Sakyi, et al 2014). The higher the value of RI indicates firms are safer and less probable for insolvency and vice-versa.

5.4. Econometric model

Based on the literature on determinants of performance of NBFIs both in the national and international perspective, the study employs the following econometric model to diagnose the factors influencing the performance of NBFIs in Bangladesh.

$$PER_{i,t} = \alpha_0 + \beta_1 RI_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 SIZE^2_{i,t} + \beta_4 RISIZE_{i,t} + \beta_5 AGE_{i,t} \\ + \beta_6 LEVERAGE_{i,t} + \beta_7 RIR_{i,t} + \beta_8 IR_t + \beta_9 GDP_t + \mu_{i,t}$$

Where, PER is the performance of non-bank financial institutions measured by ROE and ROA, α_0 is the constant term, RI is risk index, SIZE is the size of the firm measured by the log of total assets. $SIZE^2$ is the square of the log of total assets, RISIZE is the interactive between risk and size, AGE is the number of years the institution has been in existence, LEVERAGE is the debt to assets ratio, RIR is real interest rate measured as the difference between the nominal interest rate and inflation rate. IR is the annual rate of inflation, GDP is the annual growth rate of gross domestic product, and μ_t is the error term of the model. In the model, i represents each of the individual NBFIs under the study and t is the time-specific effect. The study expects a positive relationship between RI, SIZE, $SIZE^2$, AGE, RIR, GDP growth, and NBFIs performance; the negative relationship between LEVERAGE and NBFIs performance, and the relationship between inflation and NBFIs Performance are mixed because high inflation is associated with higher costs as well as higher income. If an institution's income rises more rapidly than its costs, inflation is expected to exert a positive effect on profitability. On the other hand, a negative coefficient is expected when its costs increase faster than its income (Sakyi, et al 2014).

6. STRUCTURE AND PERFORMANCE OF OVERALL NBFIs IN BANGLADESH

In this section, the paper represents the recent trends in structure, assets, liabilities, deposits, loan/lease, classified loan/lease and profitability of overall NBFIs in Bangladesh.

Table 1
Trends in Structure of NBFIs in Bangladesh

	2012	2013	2014	2015	2016	2017	2018*
No. of NBFIs	31	31	31	32	33	34	34
Government-owned	2	3	3	3	3	3	3
Joint-Venture	8	10	10	10	11	12	12
Private	20	18	18	18	19	19	19
New Branches	8	7	20	15	14	30	8
Total Branches	168	175	195	210	224	254	262

* As of 30 June, 2018

Source: Annual Report-2017-18, Bangladesh Bank.

Table-1 shows the ownership structure and branches of NBFIs in Bangladesh. In 2012, 31 NBFIs were operating in Bangladesh. Among the 31 NBFIs, 2 was Government Owned, 8 was a joint venture, and 20 were privately owned. In 2018, the total number of NBFIs stood at 34 and the total number of Branches of NBFIs stood at 262. Table-1 indicates the number of NBFIs and their activities in Bangladesh are in increasing trends from 2012 to June, 2018.

Table 2
Trends in Assets, Liabilities, and Deposits of NBFIs (In Billion BDT)

	2012	2013	2014	2015	2016	2017	2018*
Total Assets	333.9	436.3	520.1	611	713.9	841.07	870.3
Total Liabilities	274.3	350.4	424.2	509	606.46	725.95	762.04
Liabilities-Assets Ratio	82.2	80.3	81.5	83.3	84.95	86.36	87.5
Total deposit	145.4	198.3	238.5	318.1	382.43	467.98	480.1
Deposit as % of total liabilities	53	56.6	56.2	62.5	63.1	64.41	63

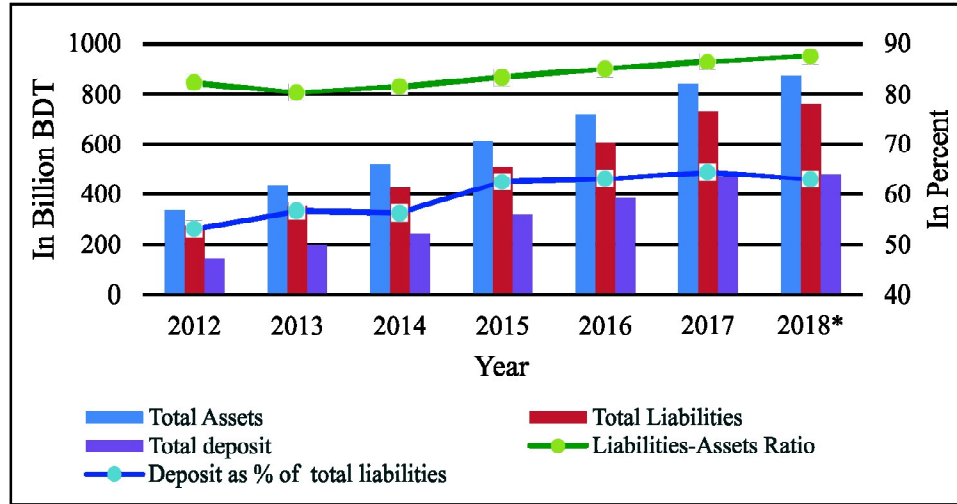
* As of 30 June, 2018

Source: Annual Report-2017-18, Bangladesh Bank.

The assets, liabilities, deposit, liabilities and assets ratio, and deposit as a percent of total liabilities of NBFIs of Bangladesh are depicted in table-2.

The table shows that total assets, liabilities, and deposit of the NBFi industry were BDT333.9 billion, BDT274.3 billion, and BDT145.4 billion respectively in 2012, which are stood at BDT870.3 billion, BDT762.04 billion, and BDT480.1 billion respectively at the end June, 2018.

Chart 1 : Trends in Assets, Liabilities and deposits of NBFIs



* As of 30 June, 2018

Source: Annual Report-2017-18, Bangladesh Bank

The chart-1 depicts the trends of assets, liabilities, and deposits of the NBFi industry of Bangladesh. Over the periods from 2012 to June, 2018, assets, liabilities and deposits steadily increased in the NBFi industry that supports maintaining more or less stable liabilities-assets ratio and deposits as a percent of total assets.

Table 3
Trends in Total Loan/Lease and Classified Loan/Lease(In Billion BDT)

	2012	2013	2014	2015	2016	2017	2018*
Loan/lease	252.1	273.6	372.8	448.5	530.7	580.4	641.9
Classified loan/lease	13.7	16.8	19.7	40	38.7	52.1	59.2
Classified loan/lease as % of total	5.4	6.1	5.3	8.92	7.29	8.97	9.22

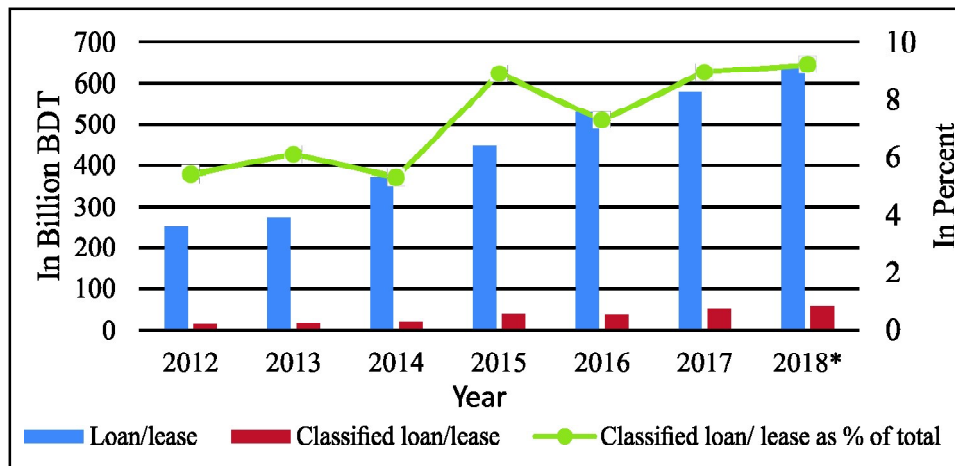
* As of 30 June, 2018

Source: Annual Report-2017-18, Bangladesh Bank.

Table 3 depicts trends of total loan/lease and classified loan/lease of NBFIs from 2012 to June, 2018. Total loan/lease was BDT252.1 billion in

2012 billion which was stood at BDT641.9 billion in June, 2018. With the increase of total loan/lease classified loan/lease also increased from BDT13.7 billion to BDT 59.2 billion. As a percent of total classified loan non-performing loans stood at 9.22 percent at the end of June, 2018 from 5.4 percent in 2012.

Chart 2 : Trends of Total Loan/Lease and Classified Loan/Lease



* As of 30 June, 2018

Source: Annual Report-2017-18, Bangladesh Bank

Chart-2 shows the comparison between total loan/lease and classified loan/lease of NBFIs. Over the periods from 2012 classified loan/lease is an increasing trend with the increase in total loan/lease of NBFIs. The chart also shows that the rate of non-performing loan of NBFIs is increasing in Bangladesh.

Table 4
Trends in Profitability of NBFIs (In Percent)

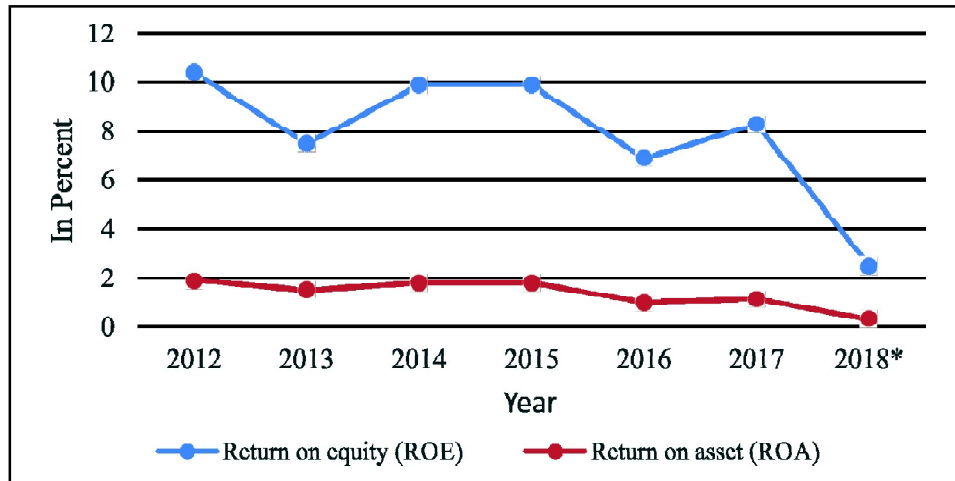
	2012	2013	2014	2015	2016	2017	2018*
Return on equity (ROE)	10.4	7.5	9.9	9.9	6.9	8.3	2.5
Return on asset (ROA)	1.9	1.5	1.8	1.8	1.0	1.14	0.32

* As of 30 June, 2018

Source: Annual Report-2017-18, Bangladesh Bank.

The efficiency of NBFIs can be measured by the ROE and ROA. The table-4 describes the ROE and ROA of NBFIs in Bangladesh from 2012 to

Chart 3: Profitability Trends of NBFIs



* As of 30 June, 2018

Source: Annual Report-2017-18, Bangladesh Bank

June, 2018. In 2012, ROE and ROA of NBFIs were 10.4 percent and 1.9 percent respectively and at the end of June, 2018 ROE and ROA stood at 2.5 percent and 0.32 percent respectively.

The above chart-3 represents the profitability trends of NBFIs in Bangladesh and expressed that both ROE and ROA were in declining trend from 2015 to June, 2018.

7. EMPIRICAL ANALYSIS

7.1. Risk levels and the probability of insolvency of selected NBFIs

The estimated risk levels with the probability of insolvency of selected NBFIs in Bangladesh from 2014 to 2018 are shown in the following table-5.

Table 5
Risk index and the probability of insolvency for selected NBFIs in Bangladesh

Year	Value of Risk Index (RI)	Probability Value of Insolvency (P)
2014	16.71	0.001790
2015	124.32	0.000032
2016	95.21	0.000055
2017	94.08	0.000056
2018	147.43	0.000023

Source: Authors' estimation.

The table-5 shows that the value of risk index of selected NBFIs in Bangladesh for 2014, 2015, 2016, 2017 and 2018 are 16.71, 124.32, 95.21, 94.08 and 147.43 respectively and the corresponding probability of insolvency is 0.001790, 0.000032, 0.000055, 0.000056, and 0.000023 respectively. That indicates there is an inverse relationship between the value of risk index and the probability value of insolvency. In the table-5, the estimated higher values of risk index imply lower insolvency risk for selected NBFIs in Bangladesh because higher values of risk index correspond to higher levels of equity relative to a potential shock to the earnings of NBFIs.

7.2. Descriptive Statistics

Descriptive statistics are used to summarize a given data set, consisting of measures of central tendency and measures of variability. The table-6 has displayed the descriptive statistics utilized in the study, which includes mean value, minimum and maximum, and standard deviation of the variables.

Table 6
Descriptive Statistics

<i>Variables</i>	<i>Mean Value</i>	<i>Standard Deviation</i>	<i>Minimum</i>	<i>Maximum</i>
ROE	8.72	14.43	-86.55	27
ROA	1.30	1.68	-6.78	4
SIZE	4.28	0.29	3.35	5.02
SIZE ²	18.41	2.55	11.20	25.21
RI	0.88	1.04	-3.99	2.92
RISIZE	16.53	17.99	-68.21	55.88
AGE	17.76	3.97	4	25
LEVERAGE	0.82	0.18	0.07	0.97
RIR	7.08	2.69	-1.94	13.01
IR	5.99	0.56	5.51	6.99
GDP	6.97	0.62	6.06	7.86

N=105, n=21, T=5

Source: Authors' estimation through STATA version-14.0

The variables ROE and ROA are used as the dependent variables and measure the performance of NBFIs in the study. The table-6 shows that the mean value, standard deviation, minimum and maximum of ROE and ROA are 8.72, 14.43, -86.55, and 27; and 1.30, 1.68, -6.78 and 4 respectively. That indicates as a measure of performance of NBFIs ROA is more stable than ROE.

7.3. Correlation Analysis

The correlation analysis helps to identify the possible degree of multicollinearity among the independent variables. The estimated results of the Pearson correlation matrix presented in the following table-7.

Table 7
Correlation matrix for the key independent variables

<i>Variables</i>	<i>RI</i>	<i>SIZE</i>	<i>SIZE²</i>	<i>AGE</i>	<i>LEVERAGE</i>	<i>RIR</i>	<i>IR</i>	<i>GDP</i>
RI	1.00							
SIZE	0.16 (0.11)	1.00						
SIZE ²	0.15 (0.12)	0.99 (0.00)	1.00					
AGE	-0.12 (0.21)	0.29 (0.00)	0.29 (0.00)	1.00				
LEVERAGE	-0.44 (0.00)	0.16 (0.01)	0.16 (0.09)	0.59 (0.00)	1.00			
RIR	0.03 (0.73)	-0.54 (0.00)	-0.55 (0.00)	-0.13 (0.17)	0.03 (0.74)	1.00		
IR	0.13 (0.17)	-0.33 (0.00)	-0.32 (0.00)	-0.31 (0.00)	-0.18 (0.06)	0.29 (0.00)	1.00	
GDP	-0.15 (0.13)	0.35 (0.00)	0.34 (0.00)	0.35 (0.00)	0.17 (0.08)	-0.27 (0.00)	-0.89 (0.00)	1.00

Source: Authors' estimation through STATA version-14.0

The correlation matrix in table-7 reveals that there is a high degree positive correlation between SIZE and SIZE². To overcome the multicollinearity problem, the paper estimates two different models; one is for SIZE of NBFIs and another for SIZE² of NBFIs.

7.4. Regression Analysis

For the empirical analysis, the study has used panel data of NBFIs. To check the consistency and to find out the suitable regression model for the panel data analysis, the study has employed Pooled OLS, Fixed and Random effect regression model in the case of four panel regression equations. Then the HAUSMAN test is applied to detect which model is appropriate, which is Fixed-effects or Random-effects. In case four regression equations, the p-value of the HAUSMAN test was less than 0.05 which suggests selecting the Fixed-effects regression model and finally, the study estimates the Fixed-effects regression model with robust standard error. The estimated regression results are discussed as follows-

Table 8
Fixed-effects regression for dependent variable ROE

<i>Independent Variables</i>	<i>Coefficients</i>	<i>Robust Standard Deviation</i>	<i>t-statistics</i>	<i>p-value</i>
RI	32.4837	2.3371	13.90	0.00
SIZE	29.6486	4.8803	6.08	0.00
RISIZE	-1.1525	0.1586	-7.27	0.00
AGE	-1.5362	2.6288	-0.58	0.56
LEVERAGE	8.5915	5.0006	1.72	0.10
RIR	-1.3565	0.2460	-5.51	0.00
IR	0.0296	2.1726	0.01	0.98
GDP	1.1973	7.5379	0.16	0.87
Constant	-106.7013	22.7155	-4.70	0.00

R² = 0.6225
Prob > F = 0.00
Number of Observations = 105

Source: Authors' estimation through STATA version-14.0

Table 8 depicts the result of fixed-effects regression for dependent variable ROE and independent variables RI, SIZE, RISIZE, AGE, LEVERAGE, RIR, IR, and GDP. The R² value is 0.6225 that indicates independent variables are capable to explain 62.25% variation on the regression model. The estimated results show that risk index, total assets,

Table 9
Fixed-effects regression for dependent variable ROE

<i>Independent Variables</i>	<i>Coefficients</i>	<i>Robust Standard Deviation</i>	<i>t-statistics</i>	<i>p-value</i>
RI	33.8815	2.4704	13.71	0.00
SIZE ²	3.4900	0.5750	6.07	0.00
RISIZE	-1.2275	0.1658	-7.40	0.00
AGE	-1.5592	2.6509	-0.59	0.56
LEVERAGE	9.7314	5.1804	1.88	0.07
RIR	-1.4009	0.2416	-5.80	0.00
IR	-0.0532	2.1835	-0.02	0.98
GDP	1.1627	7.5662	0.15	0.87
Constant	-43.4914	22.2304	-1.96	0.06

R² = 0.6258
Prob > F = 0.00
Number of Observations = 105

Source: Authors' estimation through STATA version-14.0

the interaction between risk index and total assets, real interest rate and leverage ratio are significant variables to influence the performance in terms of return on equity of NBFIs in Bangladesh. The study found that risk index, total assets, leverage ratio, inflation rate, and GDP growth rate are positively related to return on equity while the interaction between risk index and total assets, age of NBFIs and real interest rate are negatively related to return on equity.

Table-9 displays the result of fixed-effects regression for dependent variable ROE and independent variables RI, SIZE², RISIZE, AGE, LEVERAGE, RIR, IR, and GDP. The R² value is 0.6258 that indicates independent variables are capable to explain 62.58% variation on the regression model. The estimated results claimed that risk index, squared of total assets, the interaction between risk index and total assets, real interest rate and leverage ratio are significant variables to influence the performance in terms of return on equity of NBFIs in Bangladesh. The study found that risk index, squared of total assets, leverage ratio, and GDP growth rate are positively related to return on equity while the interaction between risk index and total assets, age of NBFIs, real interest rate and inflation rate are negatively related to return on equity.

Table 10
Fixed-effects regression for dependent variable ROA

<i>Independent Variables</i>	<i>Coefficients</i>	<i>Robust Standard Deviation</i>	<i>t-statistics</i>	<i>p-value</i>
RI	1.5926	0.0207	77.06	0.00
SIZE	0.1924	0.0434	4.43	0.00
RISIZE	0.0043	0.0012	3.59	0.02
AGE	-0.0234	0.0111	-2.11	0.05
LEVERAGE	0.0984	0.0994	0.99	0.33
RIR	-0.0048	0.0023	-2.05	0.04
IR	0.0131	0.0070	1.87	0.08
GDP	0.0497	0.0212	2.37	0.03
Constant	-1.0511	0.1276	-8.24	0.00

R² = 0.9855
Prob > F = 0.00
Number of Observations = 105

Source: Authors' estimation through STATA version-14.0

Table-10 represents the result of fixed-effects regression for dependent variable ROA and independent variables RI, SIZE, RISIZE, AGE, LEVERAGE, RIR, IR, and GDP. The R² value is 0.9855 that indicates

independent variables are capable to explain 98.55% variation on the regression model. The estimated results demonstrate that risk index, total assets, the interaction between risk index and total assets, age of NBFIs, real interest rate, inflation rate, and GDP growth rate are significant variables to influence the performance in terms of return on assets of NBFIs in Bangladesh. Therefore risk index, total assets, the interaction between risk index and total assets, leverage ratio, inflation rate, and GDP growth rate are positively related to return on assets while the age of NBFIs and real interest rate are negatively related to return on assets.

Table 11
Fixed-effects regression for dependent variable ROA

<i>Independent Variables</i>	<i>Coefficients</i>	<i>Robust Standard Deviation</i>	<i>t-statistics</i>	<i>p-value</i>
RI	1.6018	0.0205	78.14	0.00
SIZE ²	0.0224	0.0053	4.24	0.00
RISIZE	0.0037	0.0012	3.20	0.00
AGE	-0.0232	0.0113	-2.04	0.05
LEVERAGE	0.1064	0.1015	1.05	0.30
RIR	-0.0051	0.0024	-2.10	0.04
IR	0.0123	0.0068	1.80	0.08
GDP	0.0488	0.0212	2.30	0.03
Constant	-0.6379	0.1091	-5.85	0.00

R² = 0.9858
Prob > F = 0.00
Number of Observations = 105

Source: Authors' estimation through STATA version-14.0

Table 11 shows the result of fixed-effects regression for dependent variable ROA and independent variables RI, SIZE², RISIZE, AGE, LEVERAGE, RIR, IR, and GDP. The R² value is 0.9858 that indicates independent variables are capable to explain 98.58% variation on the regression model. The estimated results found that risk index, squared of total assets, the interaction between risk index and total assets, age of NBFIs, real interest rate, inflation rate, and GDP growth rate are highly significant variables to influence the performance of NBFIs in terms of return on assets. Therefore, risk index, squared of total assets, interaction between risk index and total assets, leverage ratio, inflation rate, and GDP growth rate are positively related to return on assets while the age of NBFIs and the real interest rate are negatively related to return on assets.

8. FINDINGS OF THE STUDY

The findings of the study show that the estimated values of risk index are high and selected NBFIs are less risky for insolvency during the period 2014-2018. The study observed that the performance of NBFIs in terms of ROE and ROA is significantly determined by the risk index that is lower the risk levels lead to higher the performance of NBFIs in Bangladesh. The higher the value of risk index incurs less insolvency risk of NBFIs. Thus, the study found a positive association between performance and risk index of NBFIs in Bangladesh. The size that is the total assets is a significant variable to balloon the performance of NBFIs because larger NBFIs are more diversified, organizational, better managed and financial structures that help to greater access to credit facilities, lower cost of funding and less vulnerable to operate their activities in the financial markets. There was a significant positive relationship between squared of the total assets and performance of NBFIs that indicates, still there is a chance to increase performance by expanding the total assets of NBFIs in Bangladesh. The study found that interaction between risk and total assets is a significant variable and positively related to return on assets and negatively related to return on equity. In the study, the positive relationship between leverage ratio that is debt to equity ratio and performance of NBFIs point out that the debt level of NBFIs is not optimal position and an increase in debt may lead to improve performance of NBFIs in Bangladesh. The estimated regression results show that age is not a significant variable to determine the performance of NBFIs. The study finds a significant negative relationship between the real interest rate and the performance of NBFIs. The findings of the study show that inflation and GDP growth rate positively influence the ROE and ROA of NBFIs in Bangladesh.

9. CONCLUSION AND RECOMMENDATIONS

The financial intermediaries serve as the mobilizer of financial resources from the surplus to the deficit sector which supports to resilience the overall economic activity of a country and helps to achieve the desired growth and development. Besides the dominating banking sector, NBFIs play a crucial role by providing additional financial services that are not usually provided by the banks. The NBFIs, with more multifaceted products and services, have taken their place in the competitive financial market to satisfy the changing demands of the customers. NBFIs also play an important role in the capital market as well as in the real estate sector of the country (Annual Report, Bangladesh Bank, 2017-18). Considering the contribution of NBFIs in economic development, the paper examines the effects of risk levels on the performance and investigates the determinants of performance of NBFIs

in Bangladesh. The findings of the study show that in terms of risk index the selected NBFIs are safer and less probable to fall into insolvency. The risk levels are significantly associated with the performance in terms of ROE and ROA of NBFIs in Bangladesh. The study also observed that firm-specific factors like risk index, total assets, squared of total assets, leverage ratio, real interest rate and interaction between risk levels and total assets are the significant determinants while the macroeconomic specific factors like inflation and GDP growth rate are positively associated with the performance of NBFIs in Bangladesh. The findings of the study suggest that the policy-makers and the authority of NBFIs should consider these significant factors in case of decision making, regulating, operating and controlling of NBFIs that would help to ensure efficient operation and better performance of NBFIs in Bangladesh. The main intention of this study is to show the effects of risk on the performance of NBFIs in Bangladesh

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