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Determinants of efficiency of non-bank financial institutions: an empirical evidence from Bangladesh

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Abstract

Purpose – The purpose of this study is to evaluate the effect of some internal features that influence the efficiency of non-bank financial institutions (NBFIs) in Bangladesh.

Design/methodology/approach – The study selected the top 15 Dhaka Stock Exchange (DSE)-listed NBFIs according to purposive sampling. The study period was from 2016 to 2020. Secondary data were collected from annual reports. The cost-to-income ratio was a dependent variable that was used as a proxy of operational efficiency. The ordinary least square regression technique was applied to measure the impact of firm-specific factors on efficiency.

Findings – Results showed that number of employees, branch number, firm size and deposit ratio have a significant effect on efficiency at 5% level. The number of branches and employees showed a negative impact, whereas firm size and deposit ratio showed a positive effect on the firms' efficiency. The deposit ratio is negatively related because deposit interest expenses were more than offset by interest income generation through the conversion of deposits into loans.

Practical implications – The study has practical and policy implications on NBFIs' managers, employees, shareholders, depositors, clients, regulatory authorities and government as efficiency enhancement would bring financial soundness.

Originality/value – This study shed light on some firm-specific factors that can be changed to increase operational efficiency or reduce the cost-to-income ratio. The novelty of the study is that it identified some significant associations between firm-specific factors and the operational efficiency of NBFIs.

Keywords Efficiency, Deposit, Non-bank, Financial, Institutions loan, Income, Interest, Firm

Paper type Research paper

JEL Classification — G20, G21, G23

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1. Background

Development of a state rest upon the growth and flourishment of financial institutions. And the financial institution is directly or indirectly getting involved in the banking industry by their course of conduct. The banking industry mobilizes the financial sector and other economic sectors by ensuring the supply of funds from surplus units to deficit units. The process of conduct by the banking industry is known as the ultimate force for attaining the economic success of a country. The financial industry in Bangladesh comprises not only banks but also non-bank financial institutions (NBFIs) and microfinance institutes as well. NBFI is an important financial institution of any country. NBFIs have played an essential function in Bangladesh's financial system by providing extra financial offerings that are not usually available from full-fledged banks. NBFIs with their versatile products and service offering capabilities easily meet the expectation and needs of customers which eventually helps them to remain competitive in the financial market. Like a bank, NBFI is giving small-scale loans to businessmen and women as initial funds to start businesses. It can rectify the inefficiencies in fund disbursement. According to Bangladesh Bank, NBFIs are one of the main financial intermediaries that collect funds from various sources with a view to lend those funds to various sectors. But they are not allowed to accept a deposit on demand. Besides, they are not allowed to operate a current account.

NBFI is the second most important financial institution in almost all the countries in the world. The main activities conducted by NBFIs are investment and merchant banking. Besides, their services also include consultancy and advertising services, portfolio management, issue managing, underwriting, bridge financing, corporate agents in mergers and acquisitions, selling financial data, investment counselling, etc. If NBFIs are needed to enlist in the capital market, then they have to take a separate license from the Securities and Exchange Commission. Besides usual services, now NBFIs are playing crucial roles in the capital market and real estate sector of Bangladesh as well. These are controlled by the central bank of Bangladesh (Bangladesh Bank, 2019). They are regarded as the second-best loan provider to various sectors just after the banking sector. This sector's improving business success has a massive impact on the overall economy's progress. NBFI offers a cheaper source of funds to its borrower who intended to invest those funds other than businesses like construction or acquisition of residential houses for one to occupy. The need for those types of funds is becoming important for emerging economies as they continuously face social overhead-related problems. They are continuously in need of robust house financing. When the house financing system becomes strong, families easily afford to access comfortable homes and as a result their standard of living also increases. Though the financial sector is considered the banking sector of any country, now the growing emergence of NBFI is contributing a lot to the financial sector. The curiosity among the investor has increased which is indicated by the enlargement and the establishment of many NBFIs in recent times. As a result, the economic results of this industry have been a major source of concern for stakeholders nowadays. The first private NBFI in Bangladesh was established in 1981 and named IPDC. Since then the number of NBFI has been raising.

In 1999, Alan Greenspan (US Federal Reserve Chairman) proclaimed that capital investment is transformed through economic savings; as a result, it acts as a backup if the primary form of intermediation fails (Carmichael and Pomerleano, 2002). NBFIs supplement the banks by ensuring the intermediary role disbursing credit. As a result, there is competition with the bank since its commencement. Banks generally offer standardized financial services, whereas NBFI offers their work separately for each of their clients to meet their demands. Moreover, individuals NBFI for getting a competitive advantage may specialize in a particular sector. With the process of targeting, specializing and unbundling, NBFIs increase competition within the financial institutions. Though bank is considered a large portion of financial institutions in almost all the countries of the world, the contributions of NBFI is immense in the performance of financial sectors. In many countries, NBFIs works are unsupervised not only by the government but also

by credit reporting agencies because they did not hold a banking license. However, both banks and non-bank financial entities are required for the development of a robust and sustainable financial industry as a whole (Pirtea *et al.*, 2008; Raina and Bakker, 2003). By providing a diverse variety of services, NBFIs help to bridge the financial intermediation gap between banks and the rest of society (Shrestha, 2007; Sufian, 2008; Vittas, 1997).

According to Ahmed and Chowdhury (2007), the main limitation that existed in the banking sector is the accelerated development process of NBFIs. This can be interpreted in three ways. First, the banks are not able to include financial services in all business areas because of a country's central bank's rules; second, with short-term resources, banks need to fulfil the long-term financing needs of its clients so there ultimately seen a mismatch in maturity intermediation; and finally, it is not always possible for banks to extend the operational horizon through product innovations. These limitations in the banking sector can easily grab by NBFI and eventually leads them to ultimate success. They also stated that NBFIs are facing difficulties in their activities because, within the present banking system in Bangladesh, most of the private banks participate in non-banking operations. Because of their capacity to cover a wide range of financial needs for businesses, NBFIs are now considered an important sub-sector of the financial system that is fast growing and attaining prominence (Islam and Osman, 2011). Hossain and Shahiduzzaman (2002) focused on the non-banking sector's relevance as an instrument for the nation's economic success and identify the sector's fundamental difficulties. To compete with the banking sector, the NBFIs have to achieve operational efficiency and this could be obtained by lowering the cost of providing financial services per client. Commercial banks are directly or indirectly involved in activities which were solely conducted by NBFIs earlier like leasing, house financing, term lending and capital market operations. This scenario is seen in almost all the countries in the world. Currently, the major private commercial banks are intruding into the areas of NBFIs' operations. NBFIs often question about the traditional non-banking operation of banks. Rather than being rivals, their activities of conduct can be complementary to one another. According to the Bangladesh Lease and Financing Companies Association (BLFCA), private commercial banks are engaging in non-bank finance operations in violation of current banking regulations. That is why it is creating difficulties for NBFIs' operations (BLFCA, 2004). NBFIs are not allowed to take any type of deposit as is repayable on demand through cheque, draft or order of the depositor. Though NBFIs are only allowed to acquire a term deposit with a minimum maturity of 3 months or more, they are not under the coverage of the Deposit Insurance Scheme by Bangladesh Bank. Besides, they have no permission to deal with foreign exchange and gold.

The rest of the paper is organized as follows. In Section 2, the relevant literature regarding financial institutions' determinants of performance was reviewed and research gap was identified. In Section 3, the rationality of the study was discussed followed by the research objectives in Section 4. In Section 5, the research design was formulated which includes sample design, data collection design, model specification and data analysis technique. In Section 6, the present scenario of NBFIs has been discussed and in Section 7, the results were discussed through data analysis by applying different inferential techniques. In Section 8, implication of the research was discussed and finally, in, Section9, some recommended courses of action were identified along with concluding remarks.

2. Literature review and research gap

Few studies have been conducted on NBFIs in Bangladesh. Berger *et al.* (1993) in their study revealed that the size of a bank's activities has a substantial positive relationship with X-efficiency. Given that the majority of their X-efficiency disparities occur on the output side, bigger businesses may be better equipped to achieve their best combination and scale of outputs, hence enhancing output efficiency. CAMELS rating was employed by Akter *et al.* (2018)

to analyze the overall effectiveness of the NBFIs in Bangladesh. Of 33 NBFIs, their analysis indicated that only 1 was strong, 15 were adequate, 12 were fair and 4 were marginal. By analyzing ratios, Lalon and Hussain (2017) looked at the performance of Lanka Bangla Finance Ltd. They discovered that the firm's techniques for collecting receivables were weak, which is why they had issues. In their study work, Rahman and Fara (2012) investigated at the determinants of business profitability in Bangladesh's NBFIs industry. Liquidity condition and operating efficiency, among the independent factors, have a considerable impact on business revenue, as per the authors' analysis. Khandoker *et al.* (2013) in their study explored the factors that influence the NBFIs' profitability in Bangladesh. Results showed that liquidity, operating expenses, debt-equity ratio and assets have a significant effect on financial performance. Kipesha (2013) assessed the technical effectiveness of Tanzanian microcredit organizations. The study used unbalanced panel data for 2009–2011 of 29 firms. In research, the authors showed that average technical efficiency is higher under production efficiency and less in intermediation efficiency. In a research investigation, Karim *et al.* (2010) explored the link between non-performing loans and bank efficiency in Malaysia and Singapore. According to the findings, having a greater percentage of non-performing loans affects cost efficiency. Similarly, decreased cost efficiency raises the number of non-performing loans.

Ongore and Kusa (2013) conducted a study to determine the factors that influence commercial banks' financial performance in Kenya. They concluded that the financial performance of banking firms is affected largely by board and management decisions, but macroeconomic factors have an insignificant impact. Jelodar (2016) conducted research to identify the important factors that affect bank efficiency in Iran with the help of Data Envelopment Analysis and hierarchical analysis. Findings revealed that leadership style, recruitment, resource allocation, the employees' satisfaction, dignity and self-actualization were important factors that affect the efficiency of banks. Imtiaz *et al.* (2019) undertook research to identify profitability determinants of NBFIs in Bangladesh. The study period was from 2013 to 2017. ROE was used as a proxy of profitability. The size of the firm, the proportion of loan, net interest and non-interest income ratio all have a positive link with profitability, whereas CAR, DR, NPLR and CIR all have a negative association. Islam and Ahmed (2018) published a paper on "macroeconomic factors affecting performance of NBFIs." They have found that there is a relationship that exists between NBFIs performance with the selected macroeconomic variables. Banerjee and Mamun (2003) in their work basically focused on the study of the status of the lease financing in Bangladesh. They find that the average cost of fundraising for NBFI is higher than that of the bank. Faisal (2014) studied the technical, allocative and economic efficiencies of leasing firms in Bangladesh in his PhD dissertation by applying Data Envelopment Analysis (DEA) for the period of 2006–2011. The study found that during the period efficiency score of the most efficient firm ranges between 0.667 and 1.

Staikouras and Wood (2004) in their study aimed to identify the profitability determinants of European banks in 1994–1998. The findings demonstrate that alterations in the external macroeconomic environment, as well as factors connected to management actions, have an impact on the profitability of European banks. Hossain and Ahamed (2015) explored the effect of firm-specific variables on banks' profitability in Bangladesh from 2012 to 2016. The study found that the earnings indicators, capital strength and industry impact have a positive relationship with ROE. Kamande *et al.* (2016) investigated the influence of bank-specific variables on commercial banks' financial performance in Kenya from 2011 to 2015. The study showed that the quality of a bank's asset has the greatest impact on its return on investment (ROI). Faisal and Rahman (2020) in their study measured the 17 leasing companies' efficiency in the constant return to scale (CRS) approach through DEA. Results showed that except for one firm, the average technical efficiency score for all firms is below 0.8. Rahman (2020) used DEA in a CRS method to measure and deconstruct total factor productivity efficiency (TFPE) into technical, size and mix efficiency in order to investigate the poor efficiency dimension of 22 leasing

businesses (2013–2017). The average TFPE of all leasing companies was found to be 31.86%, whereas the average output technical efficiency was 64.28%. Firms may raise their production by 47.1% while utilizing identical input. Mongid (2016) investigated the factors of cost inefficiency in banks operating in eight ASEAN member nations. For the years 2008–2012, data from 504 institutions were utilized. The mean cost-inefficiency ratio was found to be around 59%. Inflation, loan loss provision, human expenditures, capital adequacy, asset size and solvency position are all demonstrated to have a beneficial impact on cost inefficiencies. In their study, Rahman *et al.* (2017) examined a panel dataset of 1,190 banks from BRICS (Brazil, Russia, India, China and South Africa) countries between 2007 and 2015 and found strong evidence that more productive banks have more capital and lower financial intermediation costs. The effect of income diversity on bank efficiency was studied by Nisar *et al.* (2018). The panel Tobit model regression results demonstrated a positive and substantial association between income diversification and all three types of efficiencies; scale, pure technical and total technical.

Several studies have been conducted on financial institutions. The majority of this research, nevertheless, has been centered on commercial banks. It may be because the banking activities have a widespread operation. However, a limited number of studies have focused on NBFIs' determinants of performance and this provided a new frontier for studying in the financial sector. This study tends to concentrate on NBFIs' efficiency determinants in Bangladesh since it is an area that has been largely unexplored by researchers. None of the above-mentioned studies get an insight into the efficiency of the non-banking sector of Bangladesh and this opens up the possibility of dealing with it through an inquiry. This study is an attempt to fulfil this gap. This work can never be considered a conclusion rather than the beginning of a new topic.

3. Rationale of the study

In a highly challenging and unstable economic atmosphere, financial institutions are becoming increasingly important. These essentially inject idle cash into the economy's numerous productive uses. As a result, having effective financial institutions are critical for any country's long-term success. NBFIs fill up the gaps in financial intermediation left by commercial banks by offering a variety of financial services. They also contend with banks, driving them to become more sensitive and effective to the requirements of their consumers. The status of the development of NBFIs is typically a reliable indication of the state of development of a nation's financial mechanism as a whole (Sufian, 2008). Nevertheless, there are two primary causes why NBFIs are important: one is economic progress, and the other is financial sustainability. NBFIs, in general, perform a variety of functions that banks do not, such as providing finances, fungibility, informational efficiency and risk aggregation offerings, which widen the range of risks exposed to venture capitalists. They stimulate and increase investment and savings efficiency in this way. Second, banks will unavoidably be obliged to accept risks that would else be carried by the stock market, collective investment schemes or insurance firms in a financial industry where NBFIs are comparably underdeveloped. This has been generally acknowledged by regulators in their examination of the lessons learned from the Asian currency crisis, for example (Sufian, 2006).

NBFIs are playing a very vital role in the financial market development and economic growth of Bangladesh. Leasing companies are providing lease financial services to the manufacturer which assist them to continue a smooth production run. Insurance companies are providing risk protection services to different business enterprises through which they can get reimbursement in case of loss or damage of any valuable property. Finance companies are providing funds to the venture capitalist with a view to procure assets to start a business venture. NBFIs are a source of long-term financing for many corporations.

4. Objectives

The prime objective of the study was to identify the significant determinants of NBFIs' efficiency in Bangladesh. The specific objectives are:

(1) To discuss the present situation of NBFIs in Bangladesh.

(2) To describe the firm-specific factors through descriptive statistics and identify the strength of the relationship between each pair of factors

(3) To determine the intensity and direction of impact of several firm-specific attributes on NBFIs' efficiency

5. Research methodology

5.1 Data and sample

The study is solely based on secondary data from 5 years (2016–2020) which were collected from the annual report of respective NBFIs listed in Dhaka Stock Exchange (DSE) of Bangladesh. The motivation behind choosing Bangladesh is that it is a third-world country which is in a transition stage to move toward "middle income country" status from "LDC" status, and in this country, NBFIs are expanding rapidly through enriching their service menus to compete with mainstream financial institution-commercial banks. During the study period, 34 listed NBFIs were operational which comprises the entire population. On the basis of market share and operating soundness, 15 NBFIs were selected as samples by applying judgmental sampling method. So, the total number of observations was $15 \times 5 = 75$. As the sample size of 15 NBFIs adequately represents the population size of 34 listed NBFIs, so the result from sample observations could be generalized over the entire population observations.

5.2 Model specification and variable description

One dependent and eight explanatory or independent variables were chosen to conduct regression analysis. Due to large numerical figures, so all the variables were converted into natural logarithms. In the study, the non-structural approach is used for determining efficiency. And here Cost to income ratio (CIR) is used as a proxy for conducting efficiency. In the study of Rahman *et al.* (2021), CIR was used as a measure of bank efficiency to revealing the relationship among competition, efficiency and stability. Besides, Huljak *et al.* (2019) in their working paper evaluated cost efficiency and total factor productivity growth of European banks and used CIR as an indicator of efficiency. Moreover in the study of Antwi (2019) and Tripe (1998), CIR was used as a proxy for bank efficiency. CIR indicates company's costs with respect to its income which is calculated by dividing the firm's operating expenses by the operating revenue. It mainly indicates how efficiently the company is able to control expenses with respect to revenue. Mongid (2016) and Moormann and Burger (2008) have used CIR for determining the efficiency of a firm. According to popular belief, a high CIR equates to low production and efficiency and vice versa. The CIR allows for quick and easy comparisons between financial institutions, with the outcome appearing to be sensible. A panel regression model was used to measure the effect of changes in the efficiency of financial institutions of NBFIs of Bangladesh by taking only one dependent variable as opposed to seven explanatory variables. The regression used for this study based on the variable is given in the following equation:

$$\mathrm{CIR}_{it} = \beta_0 + \beta_1 \mathrm{FS}_{it} + \beta_2 \mathrm{CAR}_{it} + \beta_3 \mathrm{LR}_{it} + \beta_4 \mathrm{NPLR}_{it} + \beta_5 \mathrm{DR}_{it} + \beta_6 \mathrm{BR}_{it} + \beta_7 \mathrm{DIR}_{it} + \beta_8 \mathrm{EM}_{it} + \varepsilon_{it}$$

where CIR = Cost to Income Ratio; FS = Firm size (natural logarithm of total assets); CAR = Capital Adequacy Ratio (Total capital/Risk weighted asset); LR = Loan Ratio (Total loan/Total asset); NPLR = Non-performing Loan Ratio (Non-performing Loan/Total loan); DR = Deposit Ratio (Total deposit/Total asset); DIR = Deposit Investment Ratio (Total deposit/Total investment); BR = Number of branches; EM = Number of employees.

$\beta_0, \beta_1, \beta_2, \ldots \beta_8$ Coefficients of the respective variables; and ε_{it} = Random error term

A firm's efficiency depends on its size due to the effect of economies and diseconomies of scale. Higher CAR suggests a reduced requirement for external funding and, as a result, a smaller chance of bankruptcy, lowering the firm's cost of capital. Generally, the presence of more loans on the asset side or higher LR indicates more income probability for the firms. The higher the NPLR, the riskier the loan is becoming bad debt. Deposit needs to be efficiently managed in such a way that it does not become a bad loss for the institutions. Besides, failure in transforming deposits into loans may impact profitability as well. Higher DIR indicates more deposits are converted to investment which would eventually enhance earnings.

5.3 Tools and techniques

EViews was applied for analyzing panel data. To analyze the panel data, first pooled OLS regression method has been run. But the pool regression does not distinguish the individual's effects. So, the fixed model and random models are run on pool regression. And finally, based on the Hausman test, whether a fixed model or random model of panel regression is suitable for the study has been selected and used. The FE model is valid, while the RE model is incoherent if the individual effects are associated with the other regressors in the model. Because the regressors are linked with the individual effects and hence become endogenous, the RE estimator becomes incoherent. Both descriptive and inferential statistical tools were used in the study. Mean, standard deviation, maximum and minimum were used to describe the variables. Ordinary least square regression and Pearson correlation have been used to measure the significance and direction of the relationship between efficiency and firm-specific variables.

5.4 Model diagnostic tests

5.4.1 Goodness of fit of the model. Analysis of variance (ANOVA) tests such as *F*-test was used to appraise the overall goodness of fit of the model. Besides, R^2 and adjusted R^2 value were used to judge the percentage of change in the explained variable by the change of explanatory variables. A larger value of R^2 indicates that the model is good to estimate the effect.

5.4.2 Hausman test. The Hausman test was conducted in order to know whether the fixed effect model or random effect model is perfect for the study.

5.4.3 Normality test. Normality was used to know whether a variable is normally distributed or not. For the normality test, one of the most popular methods of the Jarque–Bera method was implemented.

5.4.4 Wald Test. Wald test was conducted for getting the idea about heteroscedasticity presence or not in the final chosen model.

5.4.5 Pesaran test. Pesaran test was used to detect whether there is any serial correlation presence among the variables. A cross-section dependence test was conducted to get the result of the Pesaran test.

6. Present scenario of non-bank financial institutions of Bangladesh

During the past five years, the activities of NBFIs have witnessed massive growth. And the leasing sector is developing quite dramatically. As a result, commercial banks also started different activities which were earlier only conducted by NBFIs. The introduction of banks into the leasing sector is expected to support growth by filling a vacuum in institutional

finance allocation and servicing the demands of the manufacturing industry in the procurement of long-term productive assets. Now, 34 NBFIs are conducting their business operation in our country. In the case of ownership perspective, the majority of the NBFIs are owned by private-owned companies; they hold 19 companies, 12 are owned by joint ventures with foreign participation and the rest 3 are owned by the government.

According to Bangladesh Bank (BB) report in June, 2019, there is not a single NBFI that has been evaluated as having a "1 or strong" position in the CAMEL rating. There are 14 NBFIs whose ranks were "2 or satisfactory"; 10 NBFIs were in "3 or fair"; 7 NBFIs were in "4 or marginal"; and 1 was in "5 or unsatisfactory" position in the CAMEL rating. And rest 2 are not in CAMEL rating consideration because of being in the liquidation process. This downgrading situation happens because of most of the liquidity crises in recent years. And this liquidity crisis is seen in the whole financial sector as well. As a result, the cost of acquiring funds has increased. According to the Bangladesh Bank report in June 2019, the cost of funds in NBFIs increased to 9.7% from 9.2%. It is one of the most significant threats to the long-term viability of both individual NBFIs and the overall sector. As a result, they are getting involved in investing in high returns segments and which eventually exposes them to commensurately higher risks. Besides, the bank is gradually getting involved in traditional NBFIs work, which is also creating a negative impact. Moreover, only 22 institutions are enlisted in the share market and most of the condition is not quite satisfactory. Because the non-performing loan proportion is increasing day by day. Some proper needs to be taken to solve these problems.

7. Results and discussion

7.1 Descriptive statistics of firm-specific factors

Table 1 exhibits the performance of NBFIs in Bangladesh with regard to efficiency and other firm-specific attributes over five years (2016–2020). The mean value of CIR is 3.37 units, and it has a standard deviation of 0.47 units and the minimum and maximum value range from 2.19 to 4.50 units. The average capital adequacy ratio is 2.79 units and it goes as high as 3.89. Branch and employment have an average value of 1.95 and 5.21, respectively. LR and NPLR show that on average 4.10 units of total assets are loan, while 1.81 units of total loans are NPL. And there is a huge difference between minimum and maximum values of these two ratios. The deposit ratio and deposit investment ratio means are 4.26 and 4.05, respectively. And their minimum and maximum are quite similar to one another. A number of branch and employees' average values are 1.95 and 5.21 and they go as high as 3.46 and 7.56, respectively (see Table 2).

7.2 Analysis of relationship between factors

This section examines the correlations between the variables. The correlation analysis used a Pearson correlation formula to determine the strength of the relationship.

Variables	Observations	Mean	Std. Deviation	Minimum	Maximum
CIR	75	3.37	0.47	2.19	4.50
CAR	75	2.79	0.29	1.76	3.89
BR	75	1.95	0.93	0.00	3.46
FS	75	23.72	0.72	22.37	25.37
DIR	75	4.26	0.24	3.61	4.86
DR	75	4.05	0.22	3.44	4.34
EM	75	5.21	0.98	3.40	7.56
LR	75	4.10	0.96	0.96	4.51
NPLR	75	1.81	0.66	0.23	3.52

Source(s): EViews output by analyzing the data

Table 1. Mean, standard deviation, minimum and maximum values

Variables	CIR	BR	CAR	FS	DIR	EM	DR	LR	NPL
CIR	1								
BR	0.0326	1							
CAR	−0.269	0.0025	1						
FS	−0.254	0.0027	0.007	1					
DIR	−0.145	−0.007	−0.004	0.0009	1				
EM	0.0855	−0.008	−0.003	−0.006	0.003	1			
DR	−0.268	−0.009	0.008	−0.000	−0.151	0.005	1		
LR	−0.002	−0.000	−0.001	−0.001	0.004	−0.680	−0.001	1	
NPL	−0.207	−0.002	0.007	0.004	0.001	0.001	0.015	0.060	1

Table 2.
Correlation matrix

Source(s): EViews output by analyzing the data

The correlation matrix reveals that independent variables have both positive and negative correlations. Deposit ratio, NPL ratio, branches and firm size are positively correlated to capital adequacy ratio, whereas employee, loan ratio, deposit to investment ratio are negatively associated. Firm size is inversely correlated with all the variables except the NPL ratio and deposit-to-investment ratio. FS and CAR are directly correlated with branches while all others are inversely correlated with them. All the variables are positively correlated with the NPL ratio except the branch variable. The capital adequacy ratio and loan ratio have a favorable relationship with the net interest margin. To see if there is an issue with multicollinearity, the degree of correlation among the variables was measured. Any two independent variables have a correlation of less than 0.8, as seen in the table. As a result, it is safe to say that this model does not have a problem of multicollinearity.

The matrix also reveals that branches and employees are directly correlated to CIR whereas CAR, LR, DR, DIR, NPL ratio and firm size are negatively correlated. The degree of correlation suggests that a number of employees have the strongest correlation with CIR on the other hand deposit ratio has the weakest correlation.

7.3 Effect of firm-specific factors on efficiency

The following table shows the coefficients and other statistics of pooled OLS, fixed effect and random effect models through panel regression analysis (see Table 3).

According to the Hausman test, the fixed effect model is appropriate among the above three models which are shown in Table 4. The fixed effect model is as follows:

$$\begin{aligned}\text{CIR} = {} & 10.48 - 0.15 * \text{CAR} + 0.06 * \text{BR} - 0.32 * \text{FS} - 0.64 * \text{DR} + 0.63 * \text{DIR} \\ & + 0.31 * \text{EM} - 0.11 * \text{LR} - 0.14 * \text{NPL}\end{aligned}$$

Here, the intercept of the model is positive meaning that if all the exogenous variables are zero, then CIR equals 10.48. And the *t*-statistics is 3.53 and *p*-value is 0.00 which is statistically significant at a 1% level of significance. The independent variable capital adequacy ratio has a reverse connection with CIR. The co-efficient is −0.15 which is insignificant at a 5% level. So, it can be concluded that an insignificant association exists between CAR and the efficiency of NBFIs. The explanatory variable number of branches has a significant (at 5% level) positive impact on CIR. If all other things remain constant, a unit change in the branch can increase the CIR by 0.06 unit. Firm size has a significant (at 1% level) negative impact on CIR. It means that efficiency could be enhanced by increasing firm size as unit cost of providing financial services could be reduced by spreading the fixed cost over a large number of service recipients and by the effect of the learning curve. Deposit ratio has a significant (at a 5% level) negative effect on CIR. The co-efficient is −0.64

Table 3. Coefficient table of panel regression analysis

Variable	Pooled OLS model Coefficient Std. Error	*t*-statistic	Prob.	Fixed effect model Coefficient Std. Error	*t*-statistic	Prob.	Random effect model Coefficient Std. Error	*t*-statistic	Prob.
CAR	−0.190055 (0.15731)	−1.208	0.2313	−0.155135 (0.13334)	−1.16337	0.2500	−0.175190 (0.12454)	−1.40663	0.1642
BR	0.479575 (0.10431)	4.597	0.0000	0.067586 (0.15933)	2.42417	0.0432	0.204550 (0.11966)	1.70931	0.0921
FS	−0.292763 (0.10297)	−2.843	0.0059	−0.329642 (0.12830)	−2.56918	0.0131	−0.341865 (0.10981)	−3.11305	0.0027
DR	−0.222078 (0.46164)	−0.481	0.6321	−0.648005 (0.52674)	−1.23019	0.0242	−0.495908 (0.42716)	−1.16090	0.2499
DIR	−0.133490 (0.41330)	−0.322	0.7477	0.638910 (0.47590)	1.34252	0.1853	0.507105 (0.39957)	1.26911	0.2089
EM	0.034846 (0.10489)	4.332	0.0408	0.317202 (0.11999)	2.64351	0.0108	0.246030 (0.10816)	2.27453	0.0262
LR	−0.074323 (0.04149)	−1.791	0.0778	−0.117472 (0.12360)	−0.95036	0.3463	−0.097631 (0.07411)	−1.31722	0.1923
NPLR	−0.104200 (0.09406)	−1.107	0.2720	−0.143847 (0.13241)	−1.08635	0.2824	−0.094682 (0.10756)	−0.88027	0.3819
C	11.68885 (2.89259)	4.040	0.0001	10.47705 (2.96877)	3.52908	0.0009	10.70239 (2.57372)	4.15832	0.0001
Effect specification									
Cross-section ran.							SD = 0.31356; Rho 0.7387		
Idiosyncratic ran							SD = 0.18647; Rho 0.2613		
R-squared		0.634548		0.890180			0.420222		
Adjusted *R*-squared		0.590251		0.843718			0.349945		
S.E. of regression		0.301939		0.186472			0.182083		
Sum squared resid		6.017021		1.808142			2.188183		
Log likelihood		−11.8118		33.27416					
F-statistic		14.32479		19.15919			5.979576		
Prob (*F*-statistic)		0.000000		0.000000			0.000009		
Mean dependent var		3.371545		3.371545			0.866541		
S.D. dependent var		0.471693		0.471693			0.225837		
Akaike info criterion		0.554981		−0.273978					
Schwarz criterion		0.833080		0.436719					
Hannan–Quinn criter.		0.666023		0.009796					
Durbin–Watson stat		0.802981		2.162141			1.864857		

Source(s): EViews output

which means that if all other variables remain constant a unit increase in deposit will decrease the CIR by 0.64 unit. It happens because deposit interest expenses were more offset by interest income generation through the conversion of deposits into loans. Deposit–to-investment ratio has an insignificant positive impact on CIR. Number of employees has a significant (at 1% level) positive influence on CIR. The co-efficient value suggests that 1 unit increase in an employee will increase the CIR by 0.31 units. The positive association between CIR and number of employees and branches implied that expanding the existing facilities or into new geographic areas failed to generate enough revenue to cover rising costs. Non-performing loan and loan ratios have an insignificant negative impact on CIR.

In this model, *R*-Square is 89% meaning that the exogenous variables are strong enough to explain the endogenous variable and also adjusted *R*-square is 84% which is a good sign for the model estimation means that model explains the endogenous variable strongly by observing the standard error. Here, *F*-statistics value is quite high 19.15 as well as its *p*-value of 0.00 is less than 0.05 meaning that independent variables simultaneously have an impact to explain the variable, and the model is statistically highly significant.

7.4 Model diagnostic tests

7.4.1 Hausman test. Hausman test is one type of robustness test to choose whether the fixed effect method or random effect model is appropriate. Basically, it tests whether unique errors are correlated with the regression and detects the endogenous variables in a regression model. The test is as follows:

$$\mathrm{H} = (\beta\mathrm{RE} - \beta\mathrm{FE})\left(\sum \mathrm{FE} - \sum \mathrm{RE}\right)^{-1} (\beta\mathrm{RE} - \beta\mathrm{FE})$$

where RE = random effect and FE = fixed effect.

In this test, the null hypothesis is in favor of random effects model.

The observed chi-square value is 14.929494 and has a *p* value of 0.0075, suggesting that the *p*-value is less than 5%. Therefore, null hypothesis is rejected and the alternative hypothesis is accepted. To put it differently, the fixed effect model is our appropriate model for the study.

7.4.2 Jarque–Bera normality test. Jarque–Bera normality test expresses whether the variables used in the study are normally distributed or not. This test is based on skewness and kurtosis. In this test, null hypothesis is in favor of the normal distribution of data (Figure 1).

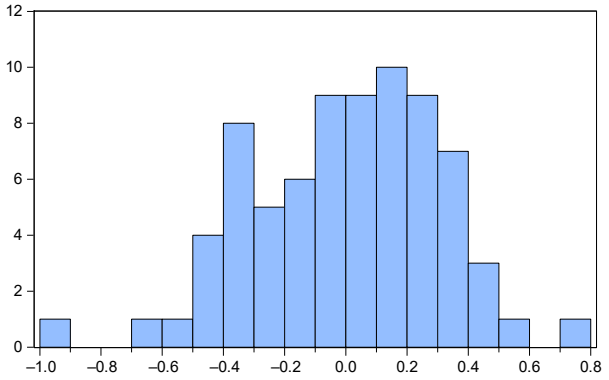
The Jarque–Bera value is 1.88 and has a probability of 0.390, which is more than a 0.05 significance level. Therefore, we cannot reject the null hypothesis. So, it can be concluded that the data is normally distributed in the study.

7.4.3 Wald Test. Wald test (Modified Wald test): The Wald test (Wald, 1943) is a multivariate generalization that allows one to evaluate a collection of parameters at the same time to see if they are insignificant enough to be removed. The distribution is chi-square. This allows us to check for heteroscedasticity in the fixed effect model (see Table 5).

Table 4. Correlated random effects – Hausman test

Test summary	Chi-Sq. statistic	Chi-Sq. d.f.	Prob.
Cross-section random	14.929494	8	0.0076

Source(s): EViews output by analyzing secondary data



Source(s): EViews output by analysing secondary data

Figure 1.
Jarque–Bera test

Test statistic	Value	df	Probability
t-statistic	0.547968	52	0.5861
F-statistic	0.300269	(1, 52)	0.5861
Chi-square	0.300269	1	0.5837

Source(s): EViews by analyzing the data

Table 5.
Wald test

H0. Homoscedasticity

H1. Heteroscedasticity

The interpretation indicates that the probability of the Wald test is 0.5861, which is greater than the 5% significance level, which suggests that it is not possible to reject the null hypothesis. So, it can be concluded that there is no presence of heteroscedasticity.

7.4.4 Pesaran CD test. Pesaran test indicates whether there is any cross-sectional correlation presence in the study. This test is based on the average of pair-wise correlation coefficients. The test is exactly centered at zero under the null and does not need bias correlation. This test cannot be directly conducted in EViews, but the result of the Pesaran test can be found while conducting a cross-section dependence test in EViews. The null hypothesis states that there is no serial correlation in the fixed effect model (see Table 6).

The result suggests that the probability of chi-square is 0.9678 which is greater than the 0.05 significance level meaning that we cannot reject the null hypothesis. So, it can be inferred that there is no serial correlation in the fixed effect model. Besides, the value of the Durbin–Watson test is 2.16, which is very much near 2. This result also suggests that there is no such autocorrelation in the model.

Test	Statistic	df	Prob.
Bias-corrected scaled LM	1.902493	105	0.0571
Pesaran CD	0.040332		0.9678

Source(s): EViews output by analyzing the data

Table 6.
Cross sectional dependence test

8. Practical and policy implications

The findings of the study will be beneficial for various sectors like non-bank stakeholders, researchers, academicians and scholars, finance students, finance professionals, government agencies and policymakers. The study will be a guideline to the managers of NBFIs as they will get an insight into the determinants of efficiency and take appropriate measures. Besides, potential investors can also know the operational performance of NBFIs before investing in there. This study reveals a new insight as efficiency determinants of NBFIs were an unexplored area in Bangladesh. The study will bring curiosity among stakeholders and entice them to do further research and go deeper into this sector. To finance students and finance professionals, this study will be beneficial for them in choosing to pursue their carrier in these fields. Government bodies like BB and policymakers may find this paper useful. The findings of this paper can assist the government and BB in formulating various decisions and policies. Moreover, they also can know the present situation of NBFIs.

9. Conclusion and recommendations

NBFI is one of the promising and potential sectors of Bangladesh. In the NBFI business, competition is fierce due to the growing number of commercial banks and fierce competition can enhance the operational efficiency of the financial industry. The variables impacting the operating efficiency of non-bank financial organizations in Bangladesh are investigated in this study. Among the independent variables, number of branches, number of employees, firm size and deposit ratio expressively influence the operational efficiency of NBFIs. The first two factors affect efficiency negatively, whereas the last two variables affect it positively. The findings of this study are consistent with the findings of Berger *et al.* (1993), Imtiaz *et al.* (2019), Khandoker *et al.* (2013) and Mongid (2016). The study contributes to the existing body of knowledge regarding efficiency determinants of non-bank financial services industry by identifying the firm-specific significant factors that affect NBFIs' efficiency from the context of Bangladesh. Nowadays, banking institute offer a a range of services as non-bank institute. So, the potential customer of NBFIs is getting those services from banking institutes. To sustain competition with the bank, NBFI should decrease the number of branches along with employees which would lead to increased operational efficiency.

The firms should increase their size in order to achieve the advantages of economies of scale and hence boost efficiency. Besides it, they should take appropriate measures to increase their deposit volume by offering long-term deposit schemes tailored to the risk appetite and return requirement of institutional and individual clients. Income from the loan could be enhanced by overcoming some drawbacks in extending loans such as faulty project appraisal, lack of expertise, weak supervision system, collection efforts, etc. NBFIs should extend loans by analyzing project feasibility as the amount of money recovered from a mortgaged property is small. Even though there is no appropriate security, if the project is sustainable and has sufficient cash flow, the loan is usually not at risk of default. The policymaker should create an awareness of the role played by NBFIs in the economy of Bangladesh. Besides, the government should ensure a level playing field for NBFIs so that they can compete with commercial banks which are intruding into the service areas of NBFIs.

This study is based on data from 5 years. So, further studies can be undertaken by expanding the time period as well as by adding new factors in order to extract accurate results. The study focuses only on operational efficiency rather than overall efficiency. In doing further study on overall efficiency, the new researcher may find different results of efficiency. Further research can be done on efficiency determinants of non-financial sectors.

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Appendix

SL	Name of NBFIs	SL	Name of NBFIs
1	Uttara Finance and Investments Ltd.	9	Lanka Bangla Finance Ltd.
2	Delta Brac Housing Finance Corporation Ltd. (DBH)	10	Phoenix Finance and Investments Ltd.
3	GSP Finance Company (Bangladesh) Ltd. (GSPB)	11	Bangladesh Finance and Investment Co. Ltd.
4	IDLC Finance Ltd.	12	Bay Leasing and Investment Ltd.
5	United Finance Ltd.	13	MIDAS Financing Ltd. (MFL)
6	IPDC Finance Ltd.	14	Premier Leasing and Finance Ltd.
7	National Housing Finance and Investments Ltd.	15	Union Capital Ltd.
8	Islamic Finance and Investment Ltd.		

Table A1. List of top 15 NBFIs of listed in DSE and taken in our study

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