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Empirical Assessment on the Impact of Leverage and Capital Adequacy on Performance of Non-Bank Financial Institutions in Bangladesh

By Liton Chandro Sarkar[*]

Non-Bank Financial Institutions (NBFIs) epitomize the most significant source of financing in our economy. NBFI is highly levered in nature. This study tries to empirically identify how capital adequacy and leverage impact NBFIs' performance in Bangladesh. A number of econometric models using panel data from 2009 to 2019 of 23 NBFIs of Bangladesh have been estimated to achieve the objective of this study. In this research, Return on Assets, Return on Equity and Tobin's Q are used as a measure of NBFIs performance of Bangladesh. According to estimated result it has been found that capital adequacy has a positive effect on profitability of NBFI's in Bangladesh. However, the research has found conflicting results when impact of leverage on NBFI performance is measured. Taking the empirical findings into consideration, the management of the NBFIs should embrace policies that are likely to help the NBFIs to maintain enough capital.

Keywords: *leverage, capital adequacy, NBFI performance, profitability, NBFI equity*

Introduction

Most of the NBFIs in Bangladesh is a profit oriented monetary and financial transitional organization which usually accepts term deposits, offers loan and finance funds among businesses, NBFIs and individuals. A sound and healthy financial system is very crucial for any economy. If an NBFI fails, it would affect its retail and institutional clients which could trigger a negative multiplier effect on the economy. To maintain customers' trust, a proper regulatory framework is required in this industry. NBFI capital which functions as buffer against losses is one of the most important parts of the regulatory framework. According to Sharp (1964), the amount that a NBFI holds apart from assets and deposits is called the NBFI capital. It is evident from the definition that higher level of capital makes a NBFI safer for its depositors. Adequate capital is the level of capital that a NBFI should keep ensuring the prudent business operations (Nwankwo 1991).

High leverage (higher level of debt) is one of the major characteristics of NBFI as the NBFI is a loan and deposit driven organization. Improper blend of debt and equity in a firm may lead to financially painful situation like shrinking profit. Finding the perfect combination of debt and equity is a challenging task for managers as the optimum use of leverage differs from industry to industry. Miller and Modigliani (1958), in one of the earlier studies presented "The Irrelevance

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Theory of Capital Structure" argued that a business's basic earning power entirely determines its value and decision regarding capital structure does not influence a business enterprise's worth in an effortlessly competitive market condition.

There were numerous studies and researches conducted in the banking industry to explore the association and relationship among leverage, capital adequacy and a firms' performance. However, those researches have showed a mixed result. Gilbert and Wheelock (2007) argue that capital adequacy requirement improves the safety and quality of the banks and has positive impact on profitability. However, alternative school of thought is also present in the literature. Cavallo and Majnoni (2001) showed that the high capital requirements lead to contraction of NBFI credit which eventually lowers the profit. In a study conducted in the context of European countries, Gleason et al. (2000) revealed that a firms' leverage has a considerable negative impact on financial firms' performance. On the other hand, James and Hadlock (2002) found that companies' performance and leverage are positively related. James and Hadlock (2002) also stated that use of higher level of debts leads to higher profitability. Likewise, Holz (2002) also suggest similar relationship. According to Smith and Watts (1992), growth potential of a business and corporate leverage has a negative relationship. In a study on bank, Schepens (2016) emphasizing on the uneven tax treatment on debt and equity of banks. He claimed that a more alike treatment of banks debt and equity leads to upsurge in the level of common equity which eventually increases bank capital ratios.

In Bangladesh, NBFS have been regulated and given license under the Financial Act-1993 and controlled by Bangladesh Bank. Under this act there also a regulation which name is the "Financial Institution Regulation-1994". According to the Financial Institution Regulation-1994, the minimum paid-up capital for NBFIs in Bangladesh is BDT. 1.0 (one) billion. Compare with banks in Bangladesh, NBFIs commercial operating line is narrow. NBFIs in Bangladesh are permitted to take periodical deposit from 2013. The first NBFI was established in 1981. According to Bangladesh Bank data, at present 34 NBFIs are operated in Bangladesh. Among them 19 NBFIs are private owned, 12 NBFIs are joint venture and rest of 3 are government-owned. Total branches of NBFI are 276. While out of 34 NBFIs only 23 NBFIs are listed Bangladesh Stock market. The structure and branches of NBFIs in Bangladesh are shown in Table 1.

Table 1. *Structure and Branches of NBFIs, Bangladesh (As on 30 June, 2020)*

Structure of NBFIs	Year							
	2013	2014	2015	2016	2017	2018	2019	2020
Government-owned	3	3	3	3	3	3	3	3
Joint Venture	10	10	10	11	12	12	12	12
Private	18	18	18	19	19	19	19	19
Total NBFIs in Bangladesh	31	31	31	33	34	34	34	34
No of Branches of NBFIs	2013	2014	2015	2016	2017	2018	2019	2020
Total Branches	175	195	210	224	254	262	273	276

Source: Department of Financial Institutions and Markets, Bangladesh Bank.

The trends in assets, liabilities and deposits of NBFIs are shown in Table 2.

Table 2. *Trends in Assets, Liabilities and Deposits of NBFIs, Bangladesh (in billion BDT) (As on 30 June, 2020)*

Particulars	2013	2014	2015	2016	2017	2018	2019	2020
Total Assets	436.3	520.1	611.0	713.9	841.1	870.3	870.3	874.3
Total Liabilities	350.4	424.2	509.0	606.4	726.0	762.1	751.8	762.2
Liabilities- Assets Ratio	80.3	81.6	83.3	84.9	86.3	87.6	82.2	87.1
Total Deposit	198.3	238.5	318.1	382.4	468.0	480.1	458.1	459.4
Deposit as % of Total Liabilities	56.6	56.2	62.5	63.1	64.5	66.1	60.9	60.3

Source: Department of Financial Institutions and Markets, Bangladesh Bank.

To the researchers' best knowledge there is a lack of academic researches related to determination of the influence of leverage and capital adequacy on NBFIs' performance in Bangladesh. Safiuddin et al. (2015) attempted to find capital structure's impact on the Bangladeshi firms using descriptive statistics. Safiuddin et al. (2015) examined the data of 10 firms for a five-year period (2008–2012) and found that leverage has negative effect on the organization's performance. Though, they did not use any econometric model to explain this relationship. The present study tries to fill this gap through econometric analysis involving variables linked to the NBFIs' financial performance, leverage and capital adequacy.

Literature Review

Numerous research and studies have been conducted on the profitability of the financial institutions. Most of most these researches had been conducted on bank. As decision regarding capital and debt is one of the major financial decisions for any firm, it has a strong presence in the financial academic literature. Miller and Modigliani (1958) suggest that optimal capital structure is nonexistent. In a fully effective capital market situation, there is no connection between companies' values and its capital structure. From then on, besides emphasizing on capital structure solely, some economists also paid attention to explore the way firm's capital structure influences performance.

This research tries to examine the impact of leverage and capital adequacy on the NBFIs' performance or profitability. In line with the objective of the study most relevant literatures on this issue will be discussed from now on.

As an extension to MM theory Myers (1984) came up with static trade-off theory which accounts for the cost of bankruptcy and agency costs of leverage into attention. It suggested that tax could be avoided through debt financing but at the expense of risk increment. If the benefit from tax avoidance surpasses the cost

associated with increased risk, a firm should consider adding leverage to its capital structure. Agency theory explains the relationship between firm's shareholders (principal) and firm's executives (agent). Agent is hired by the principal to run business. The concerns for this theory are the goal conflict between the principal and agent, and different risk tolerance level for the principal and agent. Signaling theory takes internal factors into account and suggests that asymmetry of information exists among investors and internal managers. Investors can judge value of this firm from the signal received from managers' decision on capital structure.

Examining the asset- liability ratio Ross (1977) suggested positive correlation between asset-liability ratio and company's value. Afterwards, Myers (1984) anticipated financial pecking order for an organization which start with firm's retained earnings, followed by loan financing, then issuance of equity and lastly comes to play in order to lessen the problem of uneven data and information between firms' investors and authorities.

The impact of capital on NBFI profitability is quite uncertain. In general, interest payments are reduced due to higher level of capital and that lowers the profitability by decreasing the tax shield coming from interest deductibility. But Berger (1995) argues that higher capital lowers the expected bankruptcy cost which positively impacts the profitability. On a study on U.S. commercial banks over the period from 1983–1989, he showed capital positively granger-causes the profitability. Correspondingly, from a study on a sample of NBFIs from Asian countries, Chien-Chiang and Hsieh (2013) found that capital ratios and NBFI profitability are positively correlated. There are also some other studies which found conflicting results. For instance, investigating a taster of banks from eight European countries, Goddard et al. (2013) stated a negative connection between capital and profitability ratios. Similarly, Altunbas et al. (2007) found that well-capitalized NBFIs and banks in Europe are inefficient which causes lower profitability.

Unlike capital adequacy, Leverage showed positive impact on financial firms' profitability in the previous studies. Lawal (2014) argued that leverage plays major role in amplifying the value of Nigerian NBFIs and suggested that leverage usage would be promoted to upsurge the firm's value by managers, stockholders and regulators. Abubakar (2015) examined the relation between leverage and success of the NBFIs using a selective sample of 11 out of the 23 commercial NBFIs operating in Nigeria and found a positive correlation among debt to return on equity and equity ratio. Exploring an unbalanced panel data over the period 2005–2011, Beltratti and Paladino (2015) tried to find how leverage is related to income for international banks. They have established an econometric model considering both country specific variables and bank specific. They concluded and showed a positive correlation between the capital ratio and residual income for the global banking sector.

In the context of Iran, Ebrat et al. (2013) found the evidence of both positive and negative co-relationship between performance off firm and capital. They examined evidence from 85 Iranian companies from Tehran Stock Exchange. Yadav and Salim (2012) studied the performance of 237 Malaysian businesses

organization and found a varied co-relationship between firm performance and capital structure. Leverage negatively affects the performance of firms where performance is measured through earning per share (EPS), ROE and ROA. But when growth is taken into consideration leverage seemingly has a positive effect on it. Zeitun and Tian (2007) showed a significant impact of a capital structure choice on the firms' performance. According to Manawaduge et al. (2011), use of more short-term in comparison to long-term debt to finance the operations is common for majority of the Sri Lankan companies.

Majority of the literature shows that capital adequacy and leverage have noteworthy and significant influence on the firms' performance. The scenario of Bangladeshi NBFIs is yet to be revealed.

Objectives of the Research

The board objective of this research is to evaluate and analyze the relationship among leverage, capital adequacy and firms' performance in the context of Bangladeshi NBFIs. To accomplish this principal objective, following specific objectives have been covered:

I. To quantify and identify the influence of leverage and capital adequacy on the NBFIs' performance in Bangladesh.
II. To provide some recommendations and policy guidelines based on the empirical results.

Variables Construction

Following variables identified for this research:

NBFIs' Performance (Dependent Variable)

According to Chakravarthy (1986), firms' financial performance is related to its purpose and persistence of maximizing profit for investors and shareholders while the firm's operational performance relates to expansions and growth resulting from sales and market value (Sandberg and Hofer 1987). Tobin's Q, ROA and ROE are used as proxy of financial performance in this research. The dependent variables of this study are distinct as follows:

$$Tobin's\ Q = \frac{(Market\ value\ of\ equity + Book\ value\ of\ debt)}{Book\ value\ of\ assets}$$

$$ROA = \frac{Profit\ after\ tax}{Total\ assets}$$

$$ROE = \frac{Profit\ after\ tax}{Total\ equity}$$

Leverage and Capital Adequacy (Independent Variable)

The most used indicator of NBFIs' capital adequacy is CAR (Capital Adequacy Ratio). But due to unavailability of the related data, total equity to total asset (CAP) ratio is used as substitution for capital adequacy in this study (Zheng et al. 2017). To get insight into the market perception, MBVR or the ratio of market value of the equity of the NBFI to book value of the same is also incorporated in the model. Total debt to total equity (TDTE) ratio has been used for leverage estimation. NBFI size calculated as logarithm of total asset (LogTA) is another independent variable in this model. As size is amalgamation of debt and equity, it is considered as a component of both capital adequacy and leverage.

In line with the previous researches mentioned above the researchers form expectations on the behaviour of independent variables on firm performance. Measures with expected impact of all the variables (dependent and independent) used here in this study are shown in the Table 3.

Table 3. *Variables, Notations, Measures, Expected Impacts on the Performance of NBFIs and Sources of Data*
Dependent Variables

Variables	Notations	Measures	Expected Impact	Sources of Data
Tobin's Q	TQ	$\dfrac{(Market\ value\ of\ equity + Book\ value\ of\ debt)}{Book\ value\ of\ assets}$		Annual reports and DSE website
Return on Assets	ROA	$\dfrac{Profit\ after\ tax}{Total\ assets}$		Annual reports
Return on Equity	ROE	$\dfrac{Profit\ after\ tax}{Total\ equity}$		Annual reports

Independent Variables

Variables	Notations	Measures	Expected Impact	Sources of Data
Total Debt to Total Equity	TDTE	$\dfrac{Total\ debt}{Total\ equity}$	+	Annual Reports
Total Equity to Total Assets	CAP	$\dfrac{Total\ equity}{Total\ assets}$	+/-	Annual Reports
Size	LogTA	Log (Total assets)	+/-	Annual reports
Market Value of Equity to Book Value of Equity Ratio	MBVR	$\dfrac{Market\ Value\ of\ Equity}{Book\ Value\ of\ Equity}$	+/-	Annual Reports and DSE website

Research Methodology

With regard to research methodology, this research has been examined and analyzed on pragmatic outcomes from literature and applied those models on

NBFIs in Bangladesh. The research tailed a quantitative approach. In this research, generally used secondary data collected from selected NBFIs' annual report for the development of initial model to analyze and scrutinize the impact of leverage and capital adequacy on the NBFIs' performance of Bangladesh. However, researchers have consulted with academics and NBFI professionals to derive recommendations. The researchers have selected the data of all 23 NBFIs enlisted in Dhaka Stock Exchange (DSE). Due to the unavailability of the data, the NBFIs which are not listed in the stock market are not included in the study. These NBFIs are observed over the years 2009–2019 (10 years), allowing the researchers to form a panel data set. Descriptive statistics analysis, diagnosis statistics analysis and correlation matrix analysis were used to understand the panel data.

Empirical Model

The empirical diagnostic model of the research assumes that profit or firms performance of NBFIs "i" in the period "t" depends on the leverage level and level of capital adequacy of NBFIs "i" in the period "t" with others independent variables which are expected to influence the NBFIs performance.

This study initially uses a pooled ordinary regression model as Park (2011) suggests OLS (Ordinary Least Squares) generate most consistent and efficient parameter estimates where individual effect μ_i (cross-sectional or time specific effect) does not exist ($\mu_i = 0$).

Rendering to this assumption this research will analyze and examine the impact of leverage and capital adequacy on NBFIs' performance using the following regression models:

$$TQ_{it} = \beta_0 + \beta_1 CAP_{it} + \beta_2 TDTE_{it} + \beta_3 LogTA_{it} + \beta_4 MBVR_{it} + \varepsilon_{it} \quad \ldots\ldots\ldots..(1)$$

$$ROE_{it} = \beta_0 + \beta_1 CAP_{it} + \beta_2 TDTE_{it} + \beta_3 LogTA_{it} + \beta_4 MBVR_{it} + \varepsilon_{it} \quad \ldots\ldots\ldots.(2)$$

$$ROA_{it} = \beta_0 + \beta_1 CAP_{it} + \beta_2 TDTE_{it} + \beta_3 LogTA_{it} + \beta_4 MBVR_{it} + \varepsilon_{it} \quad \ldots\ldots\ldots..(3)$$

where, Tobin's Q or TQ_{it}, Return on equity or ROE_{it} and Return on asset or ROA_{it} are financial performance indicators for NBFI *i* in year *t*. CAP$_{it}$ (Total equity to Total assets ratio), TDTE$_{it}$ (Total debt to Total equity ratio), LogTA$_{it}$ (size of the NBFIs) and MBVR$_{it}$ (market value of equity to book value of equity ratio) are explanatory variables for the NBFI *i* in year *t* i. And β_0–β_4 are regression coefficients and ε_{it} is the error term.

STATA statistical software has been used to conduct necessary statistical analysis starting from descriptive statistics to the development of the final model after cleaning the data for errors.

Pooled OLS does not provide the best result in the presence of heteroscedasticity and autocorrelation. Homoscedasticity, i.e., no heteroscedasticity suggests that each disturbance terms in model have the same variance and no autocorrelation means that disturbance terms are not correlated with each other (Greene 2012). If the individual effect μ_i exists ($\mu_i \neq 0$) in the longitudinal data assumptions of having homoscedasticity and no auto correlation may be

violated due to the heterogeneity (individual specific characteristics). This problem can be dealt in panel data model. This panel regression enables to control for the unobservable effects subject to entity. Fixed effect model assumes constant individual-specific error over time whereas random effect model assumes it random. Based on the nature of those issues either random effect or fixed effect model may be used.

Fixed Effect and Random Effect Model

The equation of "Fixed Effect Model" considering all the dependent variables of this study as PROFIT is:

$$PROFIT_{it} = (\beta_0 + \mu_i) + \beta_1 CAP_{it} + \beta_2 TDTE_{it} + \beta_3 LogTA_{it} + \beta_4 MBVR_{it} + v_{it} \ldots\ldots\ldots\ldots \quad (4)$$

where, μ_i indicates random or fixed effect to NBFI or period of time that is excluded from the regression. It can be associated with other regressors as an individual effect is time invariant and treated as a part of the intercept. v_{it} represents independent and identically distributed error. Although, "Random Effect Model" is used to analyze the differences in error variance components across period of time or individual. Here, disparity across individuals (NBFIs) is supposed to be random and not correlated with the independent variables. The equation of random effect model is:

$$PROFIT_{it} = \beta_0 + \beta_1 CAP_{it} + \beta_2 TDTE_{it} + \beta_3 LogTA_{it} + \beta_4 MBVR_{it} + (\mu_i + v_{it}) \ldots\ldots \quad (5)$$

It has been presumed that, in a random effect model, individual effect (heterogeneity) and any predictor variables are not correlated. Based on this supposition, the model estimates error variance subject to times or groups (Park 2011).

Diagnostic Tests for Model Selection

Several diagnostic tests have been used to validate the estimated regression model in this research. Those are:

Test for Serial Autocorrelation
Drukker (2003) recommends that Wooldridge test can have better estimate in a practically sized sample. Wooldridge (2002) emanates with a modest test that is known as "Wooldridge test" to perceive serial correlation in the individual error term in a panel data framework.

Test for Heteroscedasticity
Heteroscedasticity means a condition where the variance of the regress and differs across the dataset. Heteroscedasticity creates problems in analysis as most

approaches in regression analysis assume equal variance. Modified Wald test is used to identify groupwise heteroscedasticity in fixed effect model. Greene (2012, p. 324) shows the estimate for the Modified Wald test Statistic as follows:

$$w' = \sum_{i=1}^{n} \frac{(\hat{\sigma}_i^2 - \hat{\sigma}^2)}{f_{ii}}$$

Here, $\hat{\sigma}^2$ is the disturbance variance estimator of the regression and f_{ii} is estimate of Var $[\hat{\sigma}_i^2]$. The resulting test statistic is Chi-squared.

Test for Cross-Sectional Dependence

Cross-sectional dependence across errors may arise if there is existence of mutual shocks and overlooked components which eventually become chunk of the error term and error terms becomes correlated across cross- sections. This results in contemporaneous correlation which can be identified using Pesaran CD test suggested by Pesaran (2004).

Hausman Specification Test

Hausman (1978) proposes a specification test in econometrics that can be applied to hypothesis testing problems with two different estimators. To select between "Fixed Effect Model" and "Random Effect Model" Human Specification test has been applied in this research.

Results and Discussion

Same cross-sectional component has been observed over period of time in panel-data that ensures both time and space dimensions in dataset (Greene 2012). Due to this unique feature panel data can estimate better than only time series or cross-section data. With the support of STATA statistical software, regression analysis has been done to go in depth of the influence of capital structure on the selected Bangladeshi NBFIs performance.

Descriptive Analysis

The output of the descriptive statistics analysis of all the variables of the research is:

Table 4. *Summary of Descriptive Statistics*

Variable	ROE	ROA	TQ	CAP	TDTE	LogTA	MBVR
Obs.	291	291	283	291	291	291	282
Mean	16.32	1.13	1.17	0.05	10.78	10.88	2.86
Std. Dev.	19.25	2.25	0.46	0.08	28.58	0.32	6.56
Min	(193.16)	(22.93)	0.46	(0.67)	(414.66)	10.14	(37.64)
Max	184.35	13.51	5.77	0.14	230.97	11.80	63.36
Variance	370.82	5.08	0.21	0.001	817.44	0.10	43.10
Skewness	(2.89)	(4.56)	5.31	(5.36)	(9.77)	(0.14)	4.14
Kurtosis	73.30	56.10	41.92	34.36	181.22	2.53	42.23

Table 4 estimates the "Standard deviation", "Mean", "Minimum and Maximum" values of the variables, "Variance", "Skewness" and "Kurtosis" values. Thus, here the researcher provides a broad-spectrum summary of the features of the data. It can be noted that mean of all the variables (dependent and independent) is positive. However, the mean of ROA and ROE are 1.13 and 16.32 correspondingly which indicates moderate performance of the NBFIs during 2009–2019. The Tobin's Q mean value is 1.17. As Tobin's Q mean value is greater than one, it can be deduced that the market value of the NBFIs is more than their book values. This indicates that the profits made are greater than the expense of using assets of the selected NBFIs of interest and also suggests that additional investment is needed to be made by the selected NBFIs. In contrast, the mean of the CAP and TDTE are 0.05 and 10.78 respectively indicating a trifling amount of equity compared to debt of the NBFIs. MBVR is 2.86, market value of equity being almost triple of book value of equity of the DSE enlisted NBFIs. The skewness shows that majority of the data are not symmetrical. Only LogTA is quite symmetrical. All the Kurtosis values are positive, and most of the values are much higher than zero meaning that the data do not follow normal distribution.

Correlation Matrix Analysis

Table 5. *Summary of Combined Pair-Wise Correlation Matrix*

	TQ	ROE	ROA	CAP	TDTE	LogTA	MBVR
TQ	1						
ROE	-	1					
ROA	-	-	1				
CAP	0.3143	-0.0481	-0.3727	1			
TDTE	-0.016	0.6246	0.0444	0.0988	1		
LogTA	-0.1810	-0.1633	0.1845	0.3921	-0.0028	1	
MBVR	0.6676	0.3666	0.0898	0.1003	0.5821	-0.052	1

The matrix in Table 5 shows the combined pair-wise correlation calculations. Tobin's Q is positively correlated to CAP and MBVR while it is negatively

correlated to TDTE and LogTA of the NBFIs. ROE is positively correlated TDTE and MBVR, whereas it is negatively correlated to CAP and LogTA. ROA is positively correlated to all the independent variables except CAP. Most of the relationships are quite weak except for the correlation between ROE and TDTE, and Tobin's Q and MBVR.

Diagnostic Analysis

In Table 4, the outcomes of the "Modified Wald" test for groupwise heteroscedasticity in "Fixed Effect Regression Model" tests for three models are mentioned. The researcher has gone for the test of heteroscedasticity and the result is the presence of heteroskedasticity. Table 6 shows that heteroskedasticity is present in all the three models, meaning that the variances of the error terms vary from observation to observation.

Wooldridge test for auto-correlation in panel data for the three models was done in STATA statistics software and the results are shown in Table 6 representing that all the models contain autocorrelation. Therefore, there is correlation between the members of the series of observations ordered in time.

Table 6. *Heteroskedasticity, Autocorrelation and Cross-Sectional Dependence Test Results*

Tests			
	Tobin's Q	ROE	ROA
"Modified Wala" Test (For Groupwise Heteroskedasticity)			
H_0: sigma $(i)^2$ = sigma^2 for all i			
χ^2 (30)	1.5e+08	11640.25	21723.69
Prob. $> \chi^2$	0.0000	0.0000	0.0000
"Wooldridge" Test (For Autocorrelation)			
H_0: No autocorrelation			
F (1, 29)	9.063	28.727	21.291
Prob. $>$ F	0.0054	0.0000	0.0001
"Pesaran" Test (For Cross-sectional dependence)			
H_0: No Cross-Sectional dependence			
"Pesaran" Test results	6.642	31.286	20.837
Prob.	0.00	0.00	0.00

Table 6 also shows the outcomes of "Pesaran's" cross-sectional dependence test. The outcomes of the "Pesaran" test demonstration that there is cross-sectional dependence among the data of all the three models.

Here in Table 7, for all the three models, H_0: Difference in coefficients is not systematic (Random Effect)

Table 7. *Hausman Test for Tobin's Q, ROA and ROE Model*

	TQ			ROE				ROA		
	Coefficients		FE-RE	Coefficients		FE-RE		Coefficients		FE-RE
	FE	RE	Diff.	FE	RE	Diff.	FE	RE	Diff.	
CAP	-.6362803	-1.27942	.6431396	100.5402	32.39089	68.14934	-6.153746	11.41716	-17.5709	
TDTE	-.0100596	-.0098343	-.0002252	.3812007	.3976147	-.016414	-.0026394	-.0033256	.0006862	
LogTA	-.0227398	-.0626307	.0398909	-11.22993	-10.95129	-.2786415	-.40555	-.2568659	-.1486841	
MBVR	.0744114	.0748862	-.0004748	.0723525	.0095808	.0627717	.0135968	.0163734	-.0027767	
Chi^2	24.82			5.65				130.86		
Prob. Chi^2	0.0001			0.2267				0.0000		

The null hypothesis has been rejected for Tobins'Q model and ROA model. This suggests presence of fixed effect. On the other hand, presence of random effect has been suggested for ROE model as we fail to reject the null hypothesis.

Selection of Final Model

Selection of model that provides best estimate is the major concern of panel data analysis. As there is indication of first order auto-correlation and heteroscedasticity in the dataset of this study, general pooled ordinary least square model may lead to biased estimate. To handle this issue random effect and fixed effect models are assessed. According to Hausman specification test, fixed effect has been found when Tobin's Q and ROA have been used as dependent variable. In the presence of cross-sectional dependence, Driscoll and Kraay (1998) standard errors for coefficient assessed by fixed effects (within) regression will provide the best estimate. On the other hand, due to presence of the random effect and cross-sectional dependence, PCSE or Panel Corrected Standard Error method has been applied in the model where ROE is the dependent variable. Using STATA statistics software, the researchers found the result of this regression model which is presented in the Table 8.

The final model for Tobin's Q in Table 6 displays that the independent variables TDTE and MBVR are significant at 1% significance level. Among them TDTE has negative relationship with Tobin's Q whereas the relationship between Tobin's Q and MBVR is positive. It indicates that the less the debt compared to equity, the more the profit. And when NBFIs have the equities' market value more compared to the book value of the same, the performance becomes better.

Table 8. *Final Models for the Three Estimated Equations*

Variables	Coefficient of Variables		
	Tobin's Q	ROE	ROA
CAP	-0.636 (-1.45)	34.3019*** (3.00)	-6.153 (-1.65)
TDTE	-0.01006*** (-4.45)	0.4001*** (14.44)	-0.0026 (-0.72)
LogTA	-0.0227 (-0.75)	-14.6211*** (-2.34)	-0.4055 (-1.02)
MBVR	0.0744*** (5.04)	0.0584 (0.54)	0.0135 (0.78)
Cons.	1.36037*** (4.15)	168.463 (4.06)	6.030 (1.37)
Diagnostic statistic of the estimated models			
R^2	0.7535	0.5241	0.0543
F/chi^2	21.55	384.97	0.3901

Note: ***, **, and * denote Coefficients are Significant at 1%, 5% and 10% level of Significance

The final model for ROE shows that the independent variables CAP, TDTE and LogTA (NBFI size) are significant at 1% level. Among them, TDTE and CAP

have a positive relationship with ROE whereas LogTA has negative relationship with ROE. This indicates that the effect of capital adequacy on the performance of NBFIs is positive. In this research, a negative relationship also found between TDTE with NBFIs performance in the model for Tobin's Q. But in this model for ROE found a positive relationship between them. The outcome of ROE model also suggests the smaller the NBFI's size, the better the NBFI's performance.

The final model for ROA shows that no variable is truly significant. Diagnostic statistic also indicates a poor explanatory power of this model whereas models for Tobins' Q and ROE show quite satisfactory explanatory power.

Recommendations

The regulatory authority and NBFI management may take the following issues into their consideration according to the findings of this study.

1. As capital adequacy positively impacts the financial performance of NBFI, NBFI management should think of strengthening capital base through maintaining sufficient capital to monitor the use of leverage in NBFI's asset.
2. As we cannot be sure about the effect of leverage NBFI profitability, the regulatory institutions of NBFIs along with the management of NBFIs, should adopt policies that are likely to monitor the use of debt instruments with more caution.
3. Empirical result displays that MBVR has significant positive relationship with NBFIs performance. Most of the Bangladeshi NBFIs in the study are vastly levered. Equity's market value is almost triple of its book value of the NBFIs of interest. It suggests that investors' trust reflects in the NBFI performance. Further studies can be done in this regard.
4. As size of the NBFI negatively affects the NBFI performance, the NBFIs which are big in terms of total asset should try to focus on profitability rather than on expanding the size.
5. According to the Business Standard Report (2020), because of the liquidity crisis, 06 (Six) NBFIs are now in a defenseless and vulnerable state after PLFS (Peoples Leasing and Finance Services) and BIFC (Bangladesh Industrial Finance, which are stimulating and bracing for liquidation. Therefore, related authority and stake holder should concentrate on increasing and updating the credit evaluation policy and procedure, loans, advances, leases, interest income and diversification of products for improving their profitability.
6. Government and stakeholder should attempt to uphold and maintain stable development and growth to increase public sureness and confidence in NBFIs of Bangladesh.

Conclusion

The basis of this research is to empirically examine the effect of leverage and capital adequacy on NBFIs performance of Bangladesh. Taking into account that information and data were gathered from the yearly reports of 23 (Twenty-three) enrolled enlisted NBFIs of DSE for the period of last ten years from 2009 to 2019. It was found TDTE and MBVR significantly affect NBFI performance. The researchers have found CAP, TDTE and LogTA (NBFI size) as significant independent variable using ROE as dependent variable. However, there is no significant correlation among leverage, capital adequacy and performance of Bangladeshi NBFIs' when performance is measured by ROA. Evidence from empirical result suggests that capital adequacy has positive influence on the profitability of Bangladeshi NBFIs whereas size negatively affects the performance of NBFIs. Leverage has significant impact on NBFI profitability but the study is inconclusive to make comment on the direction of the significance as leverage shows both positive and negative relationship with NBFI performance. Thus, there is a mixed result regarding the influence of capital adequacy and leverage on NBFIs' performance which is reliable with the findings of existing literature.

There is scope for further study regarding the impact of leverage and capital adequacy on NBFIs' performance by considering some other ratios as proxy of capital adequacy and leverage. There has been a limitation in this study of not having access to data of capital adequacy ratio (CAR). Some of the commercial NBFIs have also been excluded from the study due to data unavailability. In spite of the limitation, the researchers have given their full effort to make the study a valuable one which might help the policy makers to bring effective decisions for the profitability and growth of the NBFIs of Bangladesh.

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