

ORIGINAL ARTICLE**THE SIGNIFICANT CONTRIBUTION OF BANGLADESHI COMMERCIAL BANKS' LIQUIDITY POSITION, BANK SIZE, AND INTERNAL CAPITAL GENERATING ABILITY TO INCREASE PROFITABILITY**

Rana Al Mosharrafa

Abstract

The banking system is the lifeblood of an economy. This study aims to inspect the extent of the impact of banks' managerial issues in terms of liquidity position, bank size and internal capital-generating capacity on the profit-making ability of commercial banks in Bangladesh during the period of 2007 to 2018. To examine data, a static panel model is constructed by considering 57 commercial banks. Indicators of a bank's profitability include return on assets, return on equity, and net interest margin. The Fixed Effect model and the Random Effect models are considered as the baseline estimations and the Ordinary Least Square estimation was performed to inspect the robustness of the data. The study suggests that the liquidity position and internal capital generation rate have a highly positive and significant impact on bank profitability. But bank size is significantly negatively correlated with banking profit. The rivalry, as assessed by the Herfindahl-Hirschman Index, has a strong beneficial impact on the profitability of banks, supporting the impact of industry-specific variables. Inflation and spread are two macroeconomic factors that have a detrimental but minor effect on bank profitability. The findings might increase management's awareness of the banking sector in Bangladesh as well as provide a proposition to policymakers.

Keywords

Profitability, Liquidity, Internal Capital Generation Rate, Bank size, and Inflation

JEL Classification

G21, C23, H12.

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1. INTRODUCTION

The progressive banking system contributes significantly to the transformation of the economy as an important institutional and functional vehicle. Modern economics' primary propeller and pillar for boosting economic expansion is this industry. However, in contrast to advanced economies, the banking sector is less stable in developing nations (Tran et al .2022). Due to worries about financial stability in the banking sector, panic withdrawals of money have risen (Mosharrafa, 2023). Bangladesh has a unique context for analyzing how operational challenges affect bank profitability due to a number of institutional and economic factors.

A company's ability to make a profit is referred to as profitability. It is the main objective of all commercial endeavors. Determining current and historical profitability as well as predicting future profitability is crucial in the banking industry. A robust banking industry serves as a foundation for the financial system's stabilization, enabling revenues for emerging economies. While some commercial banks are very well-known for their profitability, others are less known. This raises questions about certain factors that bank management will use to assess the financial health of a bank. Concurrently, it must be aware of how widespread the factors that affect bank profitability are in Bangladesh. A reliable and capable banking system can generate significant profit, offer clients good service, and amass sufficient funds to issue loans to borrowers. Bank profitability is a crucial factor for the growth of an economy, both at the micro and macro levels. A bank provides agricultural credit to accelerate agricultural output, which in turn speed up economic growth of a country (Patwary et al., 2023). Banks strive to create enough money on a micro level to survive in an era of escalating financial market competition. At the macro level, there must be enough profit to resist any unfavorable shocks and preserve the stability of the currency. The Basel Committee on Bank Supervision (BCBS, 2006) states that any bank's risk associated with operations can result in system vulnerability to external events, internal process failure, and human error. The criteria for gaining a competitive advantage in today's firms, however, are skillful behavior and sustained performance. The important managerial challenges and macroeconomic factors that have the biggest impact on bank profitability must be identified in order to preserve financial stability and protect against any negative shocks. Bank profitability in Bangladesh's banking industry may be impacted by a number of variables, including ineffective cost management, liquidity position, bank size, controlling of overhead costs, capital adequacy, the status of non-performing loans, the function of banks as intermediaries, market concentration and macroeconomic indicators such as, inflation, and growth in the economy. The primary goals of this study are to illustrate the significance of liquidity management, bank size and inner capital generating capability to promote banks' profitability in Bangladesh. Therefore, the goal of this study effort is to assess the influence of some specific managerial variables on banking profit by considering the existing competition in the banking industry in Bangladesh. The majority of earlier studies in this area looked into the impact of a variety of bank-specific variables on a specific profit-driven entity. But in this study, the researcher attempted to determine how three profitability indicators are affected by same selected bank-specific variables using the Fixed effect and Random effect model. The robustness of the data is checked by the Ordinary Lease Square method for the same variables. This study makes an effort to pinpoint the disparities in managerial considerations of bank size, inward capital generating competencies, and liquidity condition, as well as their effects on banks' profitability, using some empirical data from the banking sector of Bangladesh.

2. REVIEW OF LITERATURE

Banks are attempting to increase customer fulfillment, much like other service organizations, by offering improved service quality, delivering better endorsements, and fostering client loyalty. The

banking sector has seen significant change as a result of the financial market's quick liberalization, the introduction of new technology, fierce rivalry, globalization, and fluctuating consumer demand. Although implementing financial sector reform initiatives brought about some positive changes, the corporate health and performance of privately and publicly governed commercial banks have significantly suffered.

Profitability serves as a benchmark for assessing the health of a nation's banking industry, financial system, and overall economy. Numerous researchers from various countries have looked into how internal and external banking issues affect bank profitability.

Numerous studies shed light on factors influencing bank performance across different regions. In Pakistan, Alim et al. (2021) found that liquidity positively affects ROA but not ROE. In Turkey, Caliskan & Lecuna (2020) highlighted that bank size, deposit conversion ratio, liquidity, efficiency, and inflation enhance profitability, while interest rates have a negative impact. In Saudi Arabia, Alshebmi et al. (2020) reported a negative correlation between nonperforming loans and ROA, but a positive relationship with GDP growth, bank liquidity, credit risk, and capital adequacy rate. In Indonesia, Purwasih & Wibowo (2021) observed short-term effects on ROA, with factors like exchange rates, operational costs, and income not affecting the long run. Parvin et al. (2019) in Bangladesh found a positive link between bank size and loan-to-asset ratio with ROA but a negative effect from the deposit-to-asset ratio. In Nigeria, Fanen et al. (2020) identified capital and operational efficiency, credit risk, and bank size as significant determinants of bank performance (ROA). In Bangladesh, Rahman et al. (2017) noted that deposits and bank size negatively impacted ROA, while equity had a favorable effect. Jigeer & Koroleva (2023) in China found that bank size, capital adequacy, credit quality, and operating efficiency influenced profitability, with liquidity having no significant effect. Additionally, Othmani (2022) in Tunisia discovered a positive relationship between foreign ownership and bank performance. Isik & Ersoy (2022) in China highlighted a positive link between bank age and profitability for listed banks, while unlisted banks exhibited a quadratic relationship. Hunjra et al. (2022) studied South Asian banks and found significant impacts of credit risk, liquidity risk, and operational risk. Siddique et al. (2021) noted negative associations between nonperforming loans, cost-efficiency ratio, and liquidity ratio with ROA and ROE but positive connections for capital adequacy ratio and average lending rate. In Gulf Cooperation Council (GCC) countries, Alfadli & Rjoub (2020) reported negative impacts of efficiency, credit risk, diversification, and concentration ratio on bank performance, with a positive effect from the capital adequacy ratio and macroeconomic indicators. Szegedi et al. (2020) in Pakistan emphasized the positive impact of disclosing Corporate Social Responsibility activities on financial performance. Isik (2017) in Turkey observed positive influences of income diversification, deposit level, bank scale, and bank stability on ROA, alongside negative impacts from credit risk, lending level, operating expenses, and capital adequacy. Djalilov & Piesse (2016) found varying effects of credit risk on bank profitability in Central and Eastern Europe and the former USSR, with government spending and monetary freedom having negative effects and better-capitalized banks performing well in early transition countries. Fungacova et al. (2009) highlighted variations in market structure, credit risk, liquidity risk, and bank size among state-controlled, domestic-private, and foreign-owned banks in the Russian banking sector, while operational costs and bank risk aversion remained consistent across ownership types. Following a thorough analysis of the available literature, it becomes clear that the banks' operational profits are constituted by Return on Equity (ROE), Return on Asset (ROA), and Net Interest Margin (NIM). The literature review of a few recent empirical investigations is summarized in Table 1.

Table 1
Review of Some Recent Literature on Bank Profitability

Studies	Country	Time period	Dependent variable	Independent variables	Estimation technique	Empirical findings
Alim et al. (2021)	Pakistan	2006 to 2019	ROA and ROE	NPL to total advances, liquid assets, and liquid assets to total deposit ratio.	Ordinary Least Square	Liquidity is advantageous for ROA, but not for ROE.
Caliskan & Lecuna (2020)	Turkey	Yearly data 1980 to 2017	ROA and ROE	Bank size, deposit conversion ratio, liquidity, Efficiency, inflation, Interest rate, exchange rate	Multivariate regression model	Bank sizes, deposit conversion ratio, liquidity, Efficiency, inflation rate, exchange rate have positive impact and Interest rate has negative impact on profitability.
Alshebmi et al. 2020.	Kingdom of Saudi Arabia	2009 to 2018	Non-performing Loans to Total Loans and Advances. (NPL)	Ratio of Return on Assets, GDP growth rate, liquid assets to total assets ratio, loans and advances to deposits, bank size, and inflation.	Multiple regression analysis.	A negative correlation exists between the nonperforming loan and the return on assets, but positive relation with GDP growth, bank liquidity, credit risk and capital adequacy rate.
Purwasih & Wibowo (2021)	Indonesia	2006-2019	ROA	Industrial production index, inflation, interest rate, capital adequacy ratio, nonperforming loan.	ARDL	In the short run Exchange Rates, Operational Costs, and Operational Income and Non-Performing Financing affect ROA but not in the long run.
Parvin et al. (2019)	Bangladesh	2011-2015	ROA	Loan to asset ratio and bank size and Liquidity	Regression and Correlation analysis	Bank size and the loan-to-asset ratio had a favorable relationship with ROA. The deposit-to-asset ratio has a detrimental effect on ROA.
Fanen et al. (2020).	Nigeria	2012 to 2018	Return on Assets (ROA)	Credit risk, Bank capital efficiency, Bank Size, Liquidity Risk, Operational Efficiency, GDP and Inflation.	Fixed effect and Random effect Model	capital efficiency, operational efficiency, credit risk, and bank size significantly determine the financial Performance of banks.

Rahman et al. (2017)	Bangladesh	2009-2013	ROA	Profitability, Size, Equity, Deposit, Loan, Operating Expenses.	linear multiple regression	Deposits and bank size significantly lower the return on assets (ROA). Equity is found to have a favorable, considerable impact. The handling of loans and expenses is determined to have little impact on the banks' profitability.
Jigeer & Koroleva (2023)	China	2008-2020	ROE, ROA	Log of assets, Deposit to assets, Capital adequacy, Non-performing loan, operating expenses to operating income, liquidity ratio. GDP and Inflation.	Pooled OLS model	Bank size, capital adequacy, credit quality, and operating efficiency have a significant impact on bank profitability. But liquidity has no significant effect on the bank's profitability
Othmani, (2022)	Tunisia	2005 - 2020	Tobin's Q and ROE	Foreign Ownership,	GMM technique. Fixed effect and Random effect Model	Positive relationship between foreign ownership and bank performance. By transferring technology and development of products and services bank with higher level of foreign ownership tend to perform better.
Isik & Ersoy (2022)	China	2006 - 2019	ROA, ROE and NIM	Bank age, Size, Efficiency, credit risk, bank stability, capitalization, growth, financial inclusion, stock market, banking sector development, concentration ratio, CRISIS	Panel Corrected Standard Errors (PCSE) technique is used	For listed banks, there is a positive and linear relationship between bank age and profitability indicators, specifically ROA and ROE. For unlisted banks, there is a quadratic (inverted U-shaped) impact of bank age on financial performance across all profitability models
Hunjra et al. (2022)	Pakistan, India, Bangladesh and Sri Lanka	2009 to 2018	ROA & ROE	Credit risk Non-Performing Loan ratio, Liquidity risk	Generalized Method of Moments (GMM)	Credit risk, liquidity risk, and operational risk have a significant impact on the financial performance of

				Current Ratio, Loan to Deposit ratio. Operational risk, Firm age, Firm growth		commercial banks in South Asia. Nonperforming loans ratio and loan-to-deposit (LTD) ratio have a negative impact on the financial performance of banks. Current ratio and Operational risk has a positive effect on financial performance of commercial banks in South Asia.
Siddique et al. (2021)	Pakistan and India	2009 to 2018	ROE and ROA	Non-performing loan, Capital adequacy ratio, Cost efficiency ratio, Average lending rate, Liquidity ratio, Bank size Inflation Age	Generalized Method of Moments (GMM) technique. Fixed effect model	Nonperforming Loans, Cost-Efficiency Ratio, and Liquidity Ratio are significantly negatively related to ROA and ROE of South Asian commercial banks. Capital Adequacy Ratio and Average Lending Rate are significantly positively related to the ROA and ROE .
Alfadli & Rjoub (2020)	Gulf Cooperation Council (GCC) countries i.e. include Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates.	2011 to 2017	Return on Average Assets, Return on Average Equity, Net Interest Margin and Profit	Bank size, Efficiency, Capital adequacy, Liquidity ratio, Credit risk, diversification, concentration ratio, inflation and oil price.	PCSE (Panel-Corrected Standard Errors) Technique and Regression Analysis.	Efficiency, credit risk, diversification, and concentration ratio have a significant negative impact on all the performance measures of the commercial banks. The capital adequacy ratio positively affects all the bank performance measures. macroeconomic indicators influence the financial performance measures of the banks
Szegedi et al. (2020)	Pakistan	2008 to 2018	Return on Asset (ROA) and Return on Equity (ROE) and Tobin's Q	Corporate Social Responsibility Discloser, Size, Age, Capital ratio, overhead expenses	Dichotomous and unweighted disclosure index method was	Banks have been more transparent in disclosing their CSR activities over the study period. Proper disclosure of these

			Tobin's Q	expenses	method was used to construct CSR disclosure index. Regression analysis.	disclosure of these activities has a positive impact on their financial performance, as measured by ROE and ROA.
Isik, (2017)	Turkey	2009 to 2016	ROA and ROE	Income diversification, Deposit level, Bank scale, Bank stability, Credit risk, Lending level, Operating expenses, Capital adequacy	Fixed and random effects panel data estimation technique.	ROA is positively influenced by income diversification, deposit level, bank scale, and bank stability. Bank profitability is negatively affected by credit risk, lending level, operating expenses, and capital adequacy. The impact of internal determinants on bank profitability may vary depending on the ownership structure of the banks in Turkey.
Djalilov & Piesse (2016)	Central and Eastern Europe and the former USSR	2000 to 2013	Return On Assets (ROA)	Capital, Credit risk, cost, size, HHI, GDP growth Inflation, Government spending, Fiscal freedom, monetary freedom.	Generalized Method of Moments (GMM) technique in panel data model.	Credit risk has a positive impact on bank profitability in early transition countries but a negative impact in late transition countries. Government spending and monetary freedom negatively influence bank profitability. Better-capitalized banks are more profitable in early transition countries
Fungacova et al. (2009)	Russia	1999 to 2007	Net Interest Margin	Herfindal Index, Personal cost, Capitalization, Non-performing loan, size, liquidity ratio.	Fixed effects panel data estimation technique.	Market structure, credit risk, liquidity risk, and the size of operations, differ among state-controlled, domestic-private, and foreign-owned banks in the Russian banking sector.

						Operational costs and bank risk aversion are consistent and homogeneous across the different ownerships of the banks.
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The table clearly shows that the results of earlier research on the influence of management elements and company to set on bank profitability were mixed and ambiguous. The nations selected, the models utilized, the data sample, the data formats (panel vs. time series), the frequency of the data (annual, quarterly, monthly), the estimation techniques, etc. are some of the factors that contribute to these inconsistent outcomes. Additionally, studies have used a number of proxies to investigate the impact of managerial concerns on bank profitability.

Deposits are seen as liabilities in the banking industry, while issuing debt securities is regarded as an asset. The banking industry is undergoing advancements in both technology and the way services are delivered. With the revolution of technological advancement and strict regulation, traditional banking operations have changed completely. Even though empirical research yields conflicting findings, the management concern pass-through effect has a stronger impact on bank profitability. Only a little amount of research is accessible, as shown in the table, for South Asian nations. Consequently, there is plenty of room for investigation into these concerns.

3. METHODOLOGY OF THE STUDY

Most of the data used in this research work is secondary because of the nature of the investigation. For the analysis of panel data, the models of Pooled Ordinary Least Square (POLS), Fixed Effect (FE), and Random Effect (RE) are frequently used. According to Gangl (2010), the researcher chose to employ the Fixed-effect (FE) model and the Random-effect (RE) model to estimate the causal inference in this work. The model 1 has also been identified using the Hausman test. The test's results validate that the FE model is appropriate for the research variables¹.

3.1. Empirical Approach and Analytical Framework

For the analysis of the study, the annual bank-level unbalanced data set from 57 commercial banks that functioned in Bangladesh from 2007 to 2018 was used. In this study, a panel regression has been performed using the measures of profitability by ROE, ROA, and NIM and workout the competitive power of the degree of concentration. As a result, ROE, ROA, and NIM are considered as the dependent variables, and collections of data particular to banks, industries, and the macroeconomic environment are included as independent variables.

3.1.1. Model Specification

The following linear form will be used as the econometric approach to estimate the model:

$$\pi_{it} = a_0 + \sum_{j=0}^j \beta_j X^j_{it} + \sum_{l=0}^l \beta_l X^l_{it} + \sum_{m=0}^m \beta_m X^m_{it} + \varepsilon_{it} \text{ -----Equation -1}$$

$$\text{Where, } \varepsilon_{it} = v_i + \mu_{it}$$

¹ The chi-square statistics of the pertinent Hausman test is $\chi^2(3) = 40.01$ with a p-value of 0.0000.

Here, π_{it} is the profitability of bank i at time t ; where $i = 1, 2, 3 \dots N$; $t=1, 2, 3 \dots T$ and α is a constant. In contrast, the descriptive variables for bank-specific, industry-specific, and macroeconomic factors are represented by j_{it} , l_{it} , and m_{it} of X_{it} , respectively. The disturbance is represented by ε_{it} with the unobserved bank-specific effect by v_i and the idiosyncratic error by μ_{it} .

3.2. Data Sources and Sample Description

In the research of impact analysis of managerial factors like liquidity management, the size of the bank and the internal capital generating capability as well as supply side issues such as inflation and bank spread on commercial banks' profitability in Bangladesh. Data were collected from different sources. Data for the dependent variables and bank-specific explanatory factors were gathered from the annual reports of the various banks operating in Bangladesh as well as the Bangladesh Bureau of Statistics were used to compile macroeconomic variables. The description of the variables employed in the study and their expected effect on bank profitability are represented in Table 2.

Table 2

Description of the Variables and Their Expected Impact on Banking Profit

Variables	Notation	Explanation	Anticipated Effect
Dependent variables to estimate profitability:			
Return on Asset	ROA	Net Profit to Total Assets ratio	
Return on Equity	ROE	Net Profit to Shareholders Equity ratio	
Net Interest Margin	NIM	net Interest Income to Interest earning assets ratio	
Independent Variables			
a) Bank-Specific Managerial Variables			
i. Cost Efficiency	TE/TR	Total expense to total revenue ratio	-
ii. Liquidity position	LA/TA	Liquid asset to total asset ratio	+
iii. Bank Size	In (TA)	Natural logarithm of total asset of a bank	+/-
iv. Internal capital generation rate	ICGR	(1/Capital ratio) x ROA x earnings retention ratio	+
v. Non-performing loan to total loan ratio	NPL/TL	Non-performing loan over total loan (%)	-
b) Industry- Specific Variables			
vi. Herfindahl-Hirschman Index (HHI)	HHI	Sum of square of market share is a proxy to measure market concentration	+/-
c) Supply side macroeconomic variables			
vii. Inflation rate	(% Inf)	Annual Rate of Inflation (%)	-
viii. Bank Spread	SR	Difference between banks' average lending rates and deposit rates	+

Table 3 provides a summary of the dependent and independent variable statistics for Bangladeshi commercial banks from 2007 to 2018.

Table 3*Descriptive Statistics of the Variables of Banks Operating in Bangladesh from 2007-2018*

Variables	No. of Observation	Mean	Std. Dev	Min	Max
Dependent Variable					
Return on Asset (ROA)	579	0.0087	0.0196	-0.1400	0.1260
Return on Equity (ROE)	535	0.3280	0.7560	-8.8140	7.5850
Net Interest Margin (NIM)	581	0.0224	0.0205	-0.0478	0.3400
Independent Variables					
a) Bank-Specific Managerial Variables					
i. Cost Efficiency (TE/TR)	581	1.11e-07	3.19e-07	0	5.93e-06
ii. Liquidity position (LA/TA)	531	0.1870	0.3300	0.0013	5.1860
iii. Bank Size (In TA)	581	25.2100	1.1690	20.9300	27.9000
iv. Internal capital generation rate (ICGR)	508	0.3820	1.1090	-6.8300	15.3000
v. Non-performing loan to total loan ratio (NPL/TL)	543	0.1410	0.4040	0.0000	7.5000
b) Industry- Specific Variables					
vi. Herfindahl-Hirschman Index (HHI)	684	0.0430	0.0064	0.0372	0.0592
c) Supply side macroeconomic variables					
vii. Inflation rate (% Inf)	684	7.3470	1.5710	5.3500	10.6200
viii. Bank Spread (SR)	570	5.1530	0.4020	4.4400	5.9400

According to Table 3, Bangladeshi banks generated average ROA, ROE, and NIM of 0.87%, 32.80%, and 2.24%, respectively, during the period of 2007 to 2018. The corresponding standard deviations of ROA, ROE, and NIM are 0.0196, 0.7560, and 0.0205. These demonstrate significant fluctuations in the profit growth of Bangladeshi banks, which have minimum values of -0.1400, -8.8140, -0.0478 and maximum values of 0.126, 7.5850, and 0.340 for ROA, ROE, and NIM, respectively. This indicates that Bangladeshi banks' profitability has significantly deviated throughout this period. Conversely, among bank-specific variables, the average bank size is 25.21 and standard deviation is 1.1690 with a minimum value of 20.93 and maximum value of 27.90 which indicate poor capacity to survive. Average values for bank-specific factors for the ratios of TE/TR, LA/TA, ICGR, and NPL/TL are 0%, 24.9%, 3.82%, and 14.10%, respectively, with standard deviations of 0%, 147.20%, 116.9%, 110.9%, and 40.40%. The minimal inflation rate and bank spread, in a supply-side macroeconomic framework, are 5.35 and 4.44, respectively, while the highest rates are 10.62 and 5.94, respectively, with a mean of 7.35 and 5.15. For industry-specific factors, HHI has an average value of 4.30% and a standard deviation of 0.64%. (Min. = 3.72%, Max. = 5.92%).

Table 4 demonstrates the correlation matrix and the degree of correlation between the predicted variable and the explanatory variables employed in the regression analysis. The matrix shows that there is a minor relationship between the independent variables. These STATA pair-wise correlation matrixes are abbreviated versions of Table 2.

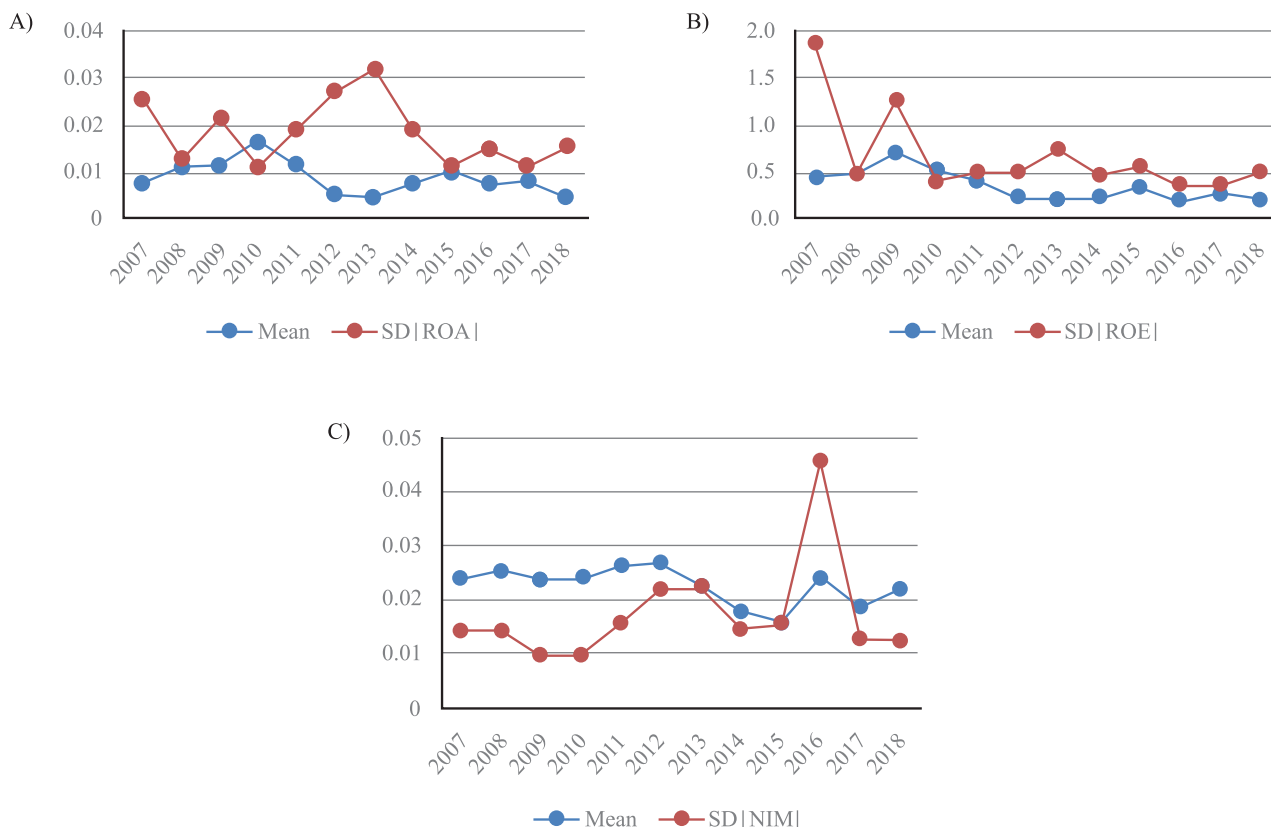
Table 4
Pair Wise Correlation Matrix

Variables	(roa)	(cost efficiency)	(liquidity)	(log_ta)	(NPL_TL)	(icgr)	(hhi)	(inflation)	(spread)
roa	1.000								
cost_efficiency	-0.032	1.000							
liquidity	0.967***	0.027	1.000						
log_ta	-0.135***	-0.492***	-0.170***	1.000					
NPL_TL	0.004	0.055	0.041	0.034	1.000				
icgr	0.040	-0.114**	-0.021	0.124***	-0.087*	1.000			
hhi	0.008	0.020	-0.007	-0.252***	-0.050	0.123***	1.000		
inflation	-0.047	-0.016	-0.060	-0.137***	-0.067	-0.023	0.278***	1.000	
spread	0.085*	-0.035	0.114**	-0.051	0.053	0.063	0.640***	0.314***	1.000

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Figure 1 demonstrates that, across the study period (2007–2018), ROA and ROE both significantly deviated from the mean in 2013, whereas NIM greatly deviated from the mean in 2016. The three profitability numbers show varied degrees of variation from the mean over the period of the study.

Figure 1
The Movement of Average and Standard Deviation of the ROA, ROE, and NIM of Bangladesh’s Commercial Banks from 2007 to 2018



3.3. Diagnostic Test

To identify any issues with multicollinearity among the explanatory variables in the investigation, the VIF test is provided in Table 5. The test’s findings indicate that the average is less than 2 and that each independent variable’s VIF is less than 10 (the VIF cutoff value). Each variable must have a value that is less than 10. As a result, the study’s model avoids the multicollinearity issue.

Table 5
Test of Multicollinearity

Variables	VIF	1/VIF
i. Cost Efficiency (TE/TR)	1.87	0.5350
ii. Liquidity position (LA/TA)	1.17	0.8577
Internal capital generation rate (ICGR)	1.10	0.9121
v. Bank Size (In TA)	1.96	0.5097
vii. Non-performing loan to total loan ratio (NPL/TL)	1.08	0.9240
HHI	2.06	0.4850
Spread	2.67	0.3745
inflation	1.62	0.6182
Mean VIF	1.69	

4. ANALYSIS AND EMPIRICAL RESULT

In this research, panel data from 57 commercial banks in Bangladesh for a period of 2007 to 2018 was taken into consideration. To understand the effects of specific features of each group on bank profitability as measured by ROA, ROE, and NIM, fixed effect and random effect models are executed. The output results of the equation-1 consistent regression from the study's empirical model were first displayed. The model's ordinary least squares estimation result was then shown to test the data's robustness. In every context, the researcher approved individual heterogeneity and employed a robust standard error.²

In order to support the adoption of fixed effect estimator, Hausman test is performed. Table 6 shows the baseline estimation results for the fixed effect model and an alternative estimation for the random effect model of ROA, which is a proxy variable used to assess the profitability of Bangladesh's commercial banks. The sample data in the study gives significant evidence for the model's best fit because the p-values for the F-test and Wald χ^2 tests are less than the significance level at 1%, 5%, and 10%, respectively.

² Confirmed by LM Heteroskedasticity test, along with the corresponding test results (P-Value), are provided in the relevant tables.

Table 6

Outcome of the Fixed-Effect (FE) Model and Random Effect (RE) Model Estimation to Assess the Significance of Some Bank Specific Management Variables that Accelerate Bank Profitability proxied by ROA in the Commercial Banks of Bangladesh during 2007 to 2018

Variables	Fixed Effect (FE) Estimation	Random Effect (RE) Estimation
Dependent Variable: Return on Asset (ROA)	Coefficient (β)	Coefficient (β)
Independent Variables :		
Bank Specific Variables :		
Cost Efficiency	-15221.7 (9504.9)	-23088.1 (16259.2)
Liquidity position	0.080*** (0.0022)	0.081*** (0.0025)
Bank Size	-0.026*** (0.0051)	-0.015** (0.0049)
Non-performing loan to total loan ratio	0.0059 (0.0045)	0.0012 (0.0036)
Internal capital generation rate	0.0073*** (0.0021)	0.0080*** (0.0021)
Industry Specific Variable :		
.Herfindahl-Hirschman Index	-2.70** (0.86)	-1.19 (0.75)
Supply Side Economic variable:		
Inflation rate	-0.0015* (0.0010)	-0.00044 (0.0010)
Bank Spread	0.0037 (0.0067)	-0.0021 (0.0069)
Constant	0.75*** (0.16)	0.44** (0.16)
<i>Number of observations</i>	388	388
<i>F-State (P-Value), Wald χ^2,</i>	F(8,325) = 24.96 (0.0000)	
<i>R²</i>	0.9440	
Hausman Test, χ^2 (3) (P-value)	41.01 (0.0000)	
LM Heteroskedasticity Test, χ^2 (55) (p-value)	3.6e+32 (0.0000)	

Note: The above table depicts the regression output for the baseline estimate of ROA determinants from the fixed effect model and the alternative estimator of ROA determinants from the random effect model. At the 0.01, 0.05, and 0.10 level, coefficients that are significantly different from zero are shown with ***, **, and *, respectively. The Wald test was used to evaluate the model's goodness of fit, and the Hausman test supported the use of a fixed effect estimator. The LM heteroskedasticity test validates the model's use of robust standard error.

Table 6 shows the baseline estimation results of the fixed effect model and the alternative estimation results of the random effect model for ROA, a proxy variable used to assess the profitability of Bangladeshi commercial banks. The p-value of the F-test and Wald χ^2 test in the model is less than the significance level at 1%, 5% and 10% which means that the sample data in this study gives significant evidence regarding the best fit of the model. According to the study expectations and Quoc et al. (2022), the empirical study suggests the profitability of the bank is significantly influenced by its

liquidity status, as indicated by the ratio of liquid assets to total assets. This finding signifies that 1% increase in liquid assets enhances profitability by 8.1%. Banks that hold more liquid assets require less capital to mitigate risk during instability and can generate more profit by providing the availability of loanable funds.

Because of the strong and unfavorable correlation between bank size and ROA, profitability will decline as assets grow. This result is similar to the research work performed by Mosharrafa and Islam (2021). This is due to the fact that smaller banks are easier to manage than larger ones, resulting in larger banks having lower efficiency and higher administrative costs. This result is consistent with research that has been done by Rahman et al. (2017), Zheng et al. (2017), Alim et al. (2021), Iaik (2017) and Caliskan & Lecuna, (2020). It is observed that the internal capital generation rate (ICGR) is significantly positive with ROA. It says that every 1% increase in internal capital generation rate would increase the profitability of the bank by 0.73%. This finding agrees with the findings of Grzeta et al. (2023), Thanh & Thu (2020) and Islam and Mosharrafa (2021). It suggests that higher ICGR will have an impact on the expansion of the bank's asset base, which would result in higher profitability. This strong correlation proves that a larger capital requirement is necessary to increase internally generated profit rather than borrowing money from outside sources. The Basel III agreement recommends using ICGR as a beneficial instrument to maintain an acceptable level of buffer capital. It emphasizes the value of capital when determining management's profit rates, growth rates, and dividend policies (Gup & Kolary, 2005).

HHI on bank profitability employed to determine the deterministic power of the market structure, and it became clear that there had been a negative and significant impact on banking profit. This indicates that competition in Bangladesh's banking industry has a detrimental influence on profitability which is consistent with the studies of Fungacova et al. (2009) and Alim et al. (2021). In terms of macroeconomic variables, inflation and ROA are inversely related, meaning that as inflation rises, profitability will fall. This implies that if inflation rises, fund costs will also rise, ultimately lowering bank profitability. According to Mosharrafa (2015), credit rate of commercial bank has a significant positive impact on the performance of banks. So, bank spreads promote favorable bank profitability. In order to increase bank spread, which eventually boosts bank profitability, banks must demand higher interest rates on loans while paying lower rates on deposits. According to the loanable fund hypothesis, if demand for loanable funds exceeds supply, the bank spread will be high, which means that banks will have higher lending rates as a result of the excess demand for loanable funds. This indicates that banks will seek to increase net interest margins by raising interest income in order to generate more profit (Rahman et al., 2023).

Table 7 shows the baseline estimation results for the fixed effect model and the alternative estimation results for the random effect model of ROE, which is a proxy variable used to measure the profitability of Bangladeshi commercial banks. The sample data used in the study serve as sufficient proof that the model provides the best fit because the p-values for the Wald χ^2 test and F-tests in the model are less than the significance level at 1%, 5%, and 10%, respectively.

Table 7

Outcome of the Fixed-Effect (FE) Model and Random Effect (RE) Model Estimation to Assess the Significance of Some Bank Specific Management Variables which Accelerate Bank Profitability Proxied by ROE in Bangladeshi Commercial Banks from 2007 to 2018.

Variables	Fixed Effect (FE) Estimation Coefficient (β)	Random Effect (RE) Estimation Coefficient (β)
Dependent Variable: Return on Equity (ROE)		
Independent Variables:		
Bank Specific Variables:		
Cost Efficiency	93755.5 (593622.7)	-221809.8 (403728.0)
Liquidity position	0.0010 (0.012)	0.0044 (0.012)
Bank Size	-0.026 (0.088)	0.0036 (0.076)
Non-performing loan to total loan ratio	0.12 (0.11)	0.096 (0.092)
Internal capital generation rate	0.39* (0.19)	0.39* (0.18)
Industry Specific Variable :		
Herfindahl-Hirschman Index	29.0 (17.6)	36.8** (14.1)
Supply Side Economic variable:		
Inflation rate	0.0020 (0.027)	0.0042 (0.022)
Bank Spread	-0.099 (0.10)	-0.13+ (0.079)
Constant	0.17 (2.65)	-0.71 (2.21)
<i>Number of observations</i>	389	389
<i>F-State (P-Value), Wald χ^2,</i>	F(8,326) = 19.77 (0.0000)	
<i>R²</i>	0.3104	
<i>Hausman Test, χ^2 (3) (P-value)</i>	41.01 (0.0000)	
<i>LM Heteroskedasticity Test, χ^2(55) (p-value)</i>	4.4e+06 (0.0000)	

Note: The aforementioned table revealed the regression output from the fixed effect model as the baseline estimator and random effect model as an alternate estimator of the determinants of ROE. Coefficients which are significantly different from zero at 0.01, 0.05 and 0.10 level are marked with ***, **, * respectively. To test the goodness of fit of the model, Wald test was performed while Hausman test confirms the justification of employing fixed effect estimator. LM heteroskedasticity test confirms the use of robust standard error in the model.

Even though ROE is used as a proxy for measuring bank profitability, both in fixed effect and random effect models, the internal capital generation rate beta coefficient showed the anticipated positive sign. Based on the results of the regression, a 1% increase in the internal capital generation rate would boost bank profitability by 39 basis points.

According to HHI's assessment, the market structure has a deterministic impact on bank profitability that is beneficial and statistically significant with ROE. It implies that competition in Bangladesh's banking industry has a big impact on raising its profitability.

In Table 8, fixed effect and random effect models are executed by considering NIM for measuring the profitability of banks. The cost of financial intermediation is revealed by NIM. The majority of the findings line up with those listed in Table 6 in most cases. To be more precise, liquidity position is found to be highly significant and positively correlated with NIM which is similar to the findings of Alim et al., (2021) and Caliskan & Lecuna, (2020). This ratio reflects the efficiency of the bank. Efficiency in liquidity management will lead to enhanced profitability.

Table 8

Outcome of the Fixed-Effect (FE) Model and Random Effect (RE) Model Estimation to Assess the Significance of Some Bank Specific Management Variables that Accelerate Bank Profitability Proxied by NIM in Commercial Banks of Bangladesh from 2007 to 2018.

Variables	Fixed Effect (FE) Estimation Coefficient (β)	Random Effect (RE) Estimation Coefficient (β)
Dependent Variable: Net Interest Margin (NIM)		
Independent Variables :		
Bank Specific Variables :		
Cost Efficiency	-133827.8* (71804.0)	-130820.1* (66380.4)
Liquidity position	0.22*** (0.0067)	0.22*** (0.0079)
Bank Size	-0.056** (0.016)	-0.040* (0.018)
Non-performing loan to total loan ratio	0.019* (0.0077)	0.017* (0.0075)
Internal capital generation rate	-0.00034 (0.0022)	-0.00025 (0.0022)
Industry Specific Variable :		
.Herfindahl-Hirschman Index	-6.08* (2.45)	-3.70* (2.09)
Supply Side Economic variable:		
Inflation rate	-0.0038* (0.0018)	-0.0025 (0.0017)
Bank Spread	0.020 (0.013)	0.012 (0.011)
Constant	1.58** (0.49)	1.09* (0.52)
<i>Number of observations</i>	390	390
<i>F-State (P-Value), Wald χ^2,</i>	F(8,327) = 12.21 (0.0000)	
<i>R²</i>	0.9431	
<i>Hausman Test, χ^2 (3) (P-value)</i>	41.01 (0.0000)	
<i>LM Heteroskedasticity Test, χ^2(55) (p-value)</i>	4.6e+31 (0.0000)	

Note: The above table discloses the regression output from the fixed effect model as the baseline estimator and random effect model as the alternative estimator of the determinants of NIM. Coefficients which are substantially different from zero at 0.01, 0.05 and 0.10 level are marked with ***, **, *

respectively. To test the goodness of fit of the model, Wald test was performed while Hausman test confirms the justification of employing fixed effect estimator. LM heteroskedasticity test confirms the use of robust standard error in the model.

Robustness Check: Robustness checks can be performed in a variety of ways, such as changing the dependent variable's measure, changing the regression analysis's methodology, changing the control variable, etc. To test the reliability of estimation outputs, the regression of equation 1 was carried out in this study utilizing the Ordinary Least Square (OLS) estimation method (Table 9). The basic results of the study's findings are identical. The estimation results are consistent with the earlier findings, namely that liquidity position, bank size and internal capital generation rate, all significantly affect bank profitability as shown in Tables 6, 7, and 8. It is absolutely the case that the baseline estimation output is reliable.

Table 9

Outcome of the Ordinary Least Square (OLS) Model Estimation to Assess the Significance of Some Bank Specific Management Variables that Accelerate Bank Profitability Proxied by ROA, ROE and NIM in Bangladeshi Commercial Banks from 2007 to 2018 (Robustness Check)

Variables	Return On Assets (ROA)	Return On Equity (ROE)	Net Interest Margin (NIM)
	Coefficient (β) (Robust Standard Error, σ)	Coefficient (β) (Robust Standard Error, σ)	Coefficient (β) (Robust Standard Error, σ)
Independent Variables :			
Bank Specific Variables :			
Cost Efficiency	-23088.1 (16259.2)	-221809.8 (403728.0)	-130820.1* (66380.4)
Liquidity position	0.0808*** (0.00245)	0.00435 (0.0123)	0.224*** (0.00794)
Bank Size	-0.0154** (0.00487)	0.00358 (0.0761)	-0.0396* (0.0177)
Non-performing loan to total loan ratio	0.00124 (0.00363)	0.0956 (0.0917)	0.0167* (0.00747)
Internal capital generation rate	0.00799*** (0.00214)	0.389* (0.179)	-0.000246 (0.00217)
Industry Specific Variable :			
Herfindahl- Hirschman Index	-1.194 (0.753)	36.78** (14.05)	-3.702+ (2.085)
Supply Side Economic variable:			
Inflation rate	-0.000440 (0.00103)	0.00416 (0.0223)	-0.00253 (0.00173)
Bank Spread	-0.00211 (0.00690)	-0.133+ (0.0793)	0.0116 (0.0105)
Constant	0.442** (0.157)	-0.708 (2.210)	1.088* (0.525)
<i>Number of observations</i>	388	389	390
<i>F-State (P-Value), Wald χ^2, R²</i>	F(54, 325) = 7.50 Prob > F = 0.0000 0.9220	F(54, 326) = 2.65 Prob > F = 0.0000 0.3104	F(54, 327) = 9.18 Prob > F = 0.0000 0.9431

5. CONCLUSION

This research study provides an in-depth, alternative viewpoint on some managerial issues that are responsible for increasing the earning potential of Bangladeshi banks. The research study provides empirical findings from 388 observations for 12 years period from 2017 to 2018. It demonstrates the impact of some definite bank management variables such as, liquidity management, bank size and in-

ternal capital generating ability on the profit generating capacity of commercial banks in Bangladesh.

With a few exceptions, this research study's conclusions and the direction of the correlation of predictor variable with the response variable are consistent with those of other studies. The findings of the study showed that the effects of the factors varied while using various profitability proxies. The study's conclusions showed that each component of the investigation was pertinent. The panel data analysis results of the study can be summarized as follows: (i) encourage banks to maintain a healthy liquidity position to manage risks and support lending during economic instability. (ii) monitor bank growth to ensure efficiency, as larger banks can face lower efficiency and higher costs. (iii) promote strategies to increase the internal capital generation rate (icgr), which positively affects profitability. (iv) align regulations with international standards like Basel iii to maintain buffer capital levels. (v) encourage banks to manage capital strategically in line with profit, growth, and dividend objectives. These measures can enhance banking sector stability and profitability, benefiting the broader economy.

This study exclusively centers on the Bangladeshi commercial banking sector. Nonetheless, it's worth exploring if our findings apply to other emerging economies. Comparative analysis across countries could offer insights into internal capital generation and performance. Additionally, studying the influence of bank size and liquidity in different financial systems could yield compelling findings. The findings of the study revealed that prolonged time adjustments are recommended in the variables to raise bank profitability and that the study is highly pertinent to legislation. Coordination between the management, relevant stakeholders, and policymakers can boost the effectiveness and profitability of the banks, ensuring Bangladesh's sustained growth.

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How to cite this article: Mosharrafa R.A. (2023). The significant contribution of bangladeshi commercial banks' liquidity position, bank size, and internal capital generating ability to increase profitability. *International Journal of Insurance and Finance* 3(2), 11-31. <https://doi.org/10.52898/ijif.2023.7>