Influence of Liquidity on Profitability of Commercial Bank's in Bangladesh

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Abstract
This paper aims to drill down the impact of liquidity on commercial bank's profitability in the banking sector of Bangladesh. To attain a sound outcome this paper used a sample of 10 commercial banks that are enlisted in Dhaka Stock Exchange. The duration of collecting data was from 2012 to 2019. For attaining the objective properly the paper used four measures of liquidity such as loan to deposit ratio, deposits to assets ratio, loan to asset ratio, and cash deposit ratio. Return on equity (ROE) and return on asset (ROA) is another measure to analyze the impact on profitability. The outcome of this paper states that the impact of liquidity on commercial bank's profitability in Bangladesh is not statistically significant.
Keywords: Profitability, ROE, ROA, Liquidity, loan to deposit ratio, deposits to assets ratio, loan to asset ratio, and cash deposit ratio.

1. INTRODUCTION
Banks are considered as the financial backbone of any economic system. For mobilizing the fund from the surplus to deficit unit it plays the most significant roles (Mishkin, 2019). Currently in Bangladesh, there are basically two types of bank such as scheduled banks and nonscheduled banks. Currently the number of scheduled bank in Bangladesh is 60 which are also classified in to several categories such as public limited banks, specialized banks, private commercial banks, and foreign banks (Bangladesh Bank, 2019).

Experience says that bank's stability are effected by several factors. Profitability and liquidity are considered as the most significant factors for that. For a successful operation liquidity is considered as the vital issues. For providing an uninterrupted banking service maintaining the adequate liquidity is must. Liquidity refers to the ability to meet the financial obligations on time. The others situation is called illiquid (Madura, 2018).

In banking industry liquidity management is considered as the most important task which is being considered as the survival factor for a bank. A bank will be considered as a problem bank when it face an unescapable liquidity crisis on a regular basis. Ultimately it will lead the bank to come up with a lower profitability (Mishkin, 2019).

Apart from this bank has another objective to maximize its value. Investors are more focused to get the return in the form of dividend and price appreciation of their stocks. From their point of view profitability ratio is the benchmark of bank's performance. So they are less willing to invest on such banks that faces lower profitability. To attract the investor's bank also tries to maintain a balance between liquidity and profitability. Because they believe that a weak liquidity position if threat for the bank's profitability (Rose, 2016).

2. OBJECTIVES OF THE STUDY
The aim of this paper is to find the impact of liquidity on commercial bank's profitability in Bangladesh.

3. LITERATURE REVIEW
Several researches were conducted based on the impact of liquidity over the profitability of the commercial banks where the researchers showed the impact of liquidity over the profitability on commercial banks.

Olagunju, David and Samuel (2011) conducted a research based on the liquidity management and Nigerian commercial banks' profitability. On that research they came up with an outcome that a significant relationship exists between management of liquidity and profitability. Vein, Ibe (2013) researched in the same field and observed the impact of the management of liquidity on Nigerian commercial banks' profitability. They also came up with an outcome that in the banking sector liquidity management considered one of the most vital issue.

Raheman et al. (2010) carried out a study on the similar types of topics. He found that for two reasons liquidity management and profitability are significant. (a) To achieve the goal of profit maximization for the shareholders profitability is important. (b) To continue the operation smoothly liquidity plays a vital role.

Lartey, Antwil and Boadi (2013) researched in the same area. They worked to find out the association between liquidity management and commercial bank's profitability that are enlisted under Stock Exchange of Ghana. They found a very weak positive relationship exists between liquidity management and profitability of

their listed banks.

Ahmed (2016) made a study and came up with an outcome that a weak positive relationship exists between liquidity and profitability. He said that as the liquidity management is positively associated with the company's profitability so the companies must need to pay its attention on proper liquidity management.

Almazari (2014) worked to identify the influential factors that have an impact on profitability of the commercial banks in Saudi and Jordan. He came up with an outcome that some liquidity indicators are positively associated with the profitability measured by ROA while some liquidity indicators are negatively associated with the profitability measured by ROA. He measured the bank's performance based on four parameters such as profitability, liquidity, capital and efficiency.

Bordeleau and Graham (2010) carried out a study and found the effect of liquid assets on profitability. According to them to maximize profits and continue its operation banks need to hold more liquid assets if a bank is more reliant on short-term funding, keeping all other things constant.

Although the pattern of research is same but the relationship between liquidity and profitability of commercial banks differs from place to place. Akter and Mahmud (2014) revealed the relationship between liquidity management and profitability of the commercial banks. They didn't found any significant relationship between liquidity and profitability in banks in Bangladesh.

4. PROBLEM STATEMENT

This paper mainly focuses to find the impact of liquidity on commercial bank's profitability in Bangladesh. Based on the above literature reviews, it is being observed that a positive relationship exists between liquidity and profitability for various situation such as short term to long term. Results also differs from industry to industry or country to country. In fact different authors found different relationship between liquidity and profitability in different countries. However the impact of liquidity on the commercial bank's profitability leftovers a less drilled area. So this paper aims to have a practical research for drilling down the impact of liquidity on commercial bank's profitability in Bangladesh and tries to fulfill the research gap in this area.

5. THE CONCEPTS OF BANKS'S PROFITABILITY

Bank's effectiveness of fund management is measured by profitability. Profitability of a bank is measured through return on asset (ROA) and return on equity (ROE). It means the capacity of a bank to earn from their investment. It gives an indication about the efficiency of a fund manager. Shareholders are more concerned about their return in the form of profitability (Rose, 2016).

5.1 ASSESSMENT OF BANK'S PROFITABILITY

To get bank's profitability usually researchers use two types of ratios such as return on asset (ROA) and return on equity (ROE) both from the depositor's and owner's perspective.

(a) RETURN ON ASSETS

It refers to the firm's ability to generate return for every dollar investment on its asset. Return on asset refers to the efficiency of the fund manager for all the parties. It is basically a ratio that measures (Whitehead, 2001) the firm's capacity to utilize its assets to generate profits.

Return on assets (%) = Net income/ (Total assets) × 100

(b) RETUEN ON EQUITY

It refers the efficiency of the management for using the bank's fund for generating profit. It process of calculating the return on equity is to divide the net income by amount of capital. ROE is a ratio of the profit amount available to the owner's average stake in the business for a specified time period (Maheshwari & Maheshwari, 2009).

6. THE PERCEPTIONS OF BANK'S LIQUIDITY

Bank usually maintain enough liquidity to decrease the chance to be insolvent. The most important task for any depository institutions is liquidity management. Banks consider cash in vault, item in the process of collection, balance available in the central bank etc. as liquid asset. Based on GARP (2013) liquidity can also be referred as the bank's ability to finance and gear up its asset to meet expected and unexpected cash flows and collateral commitments at a rational cost without suffering undesirable losses.

6.1 SCHEMING OF BANK'S LIQUIDITY

Liquidity of a bank defines the bank's ability to finance its businesses efficiently (Greuning & Bratanovic, 2004). To get liquidity position of a bank an analyst uses four financial ratios. These ratios are a) loan to deposit ratio, b) deposit to asset ratio c) cash deposit ratio, and d) loan to asset ratio.

Loan to deposit ratio represents the ratio of total loans and advances to the deposit of funds. It gives an indication about the appropriateness of investing fund raised from deposit. Deposit to asset ratio represents the ratio of total deposit to total asset. Cash deposit ratio represents the proportion of the amount landed by a

commercial bank from its deposit. Loan to asset ratio represents the ratio of the total of loans and advances to its assets (Rose, 2016).

7. HYPOTHESES OF THE RESEARCH

To get a sound outcome the following research hypotheses has formulated.

H_{01}: Liquidity doesn't have any significant impact on the bank's profitability measured by return on asset.

H_{02}: Liquidity has significant impact on the bank's profitability measured by return on equity.

8. METHDOLOGY

8.1 SAMPLING DESIGN AND SAMPLE SIZE

This paper aims to find the impact of liquidity on the profitability of Bangladeshi commercial banks. To get a sound outcome sample of ten commercial banks are used. To select the banks conventional and judgmental techniques are used. The reasons for using judgmental technique is to get the information conveniently and to get valid information. As it is known that judgmental sampling, also called purposive sampling or authoritative sampling, is a non-probability sampling technique in which the sample members are chosen only on the basis of the researcher's knowledge and judgment. As the researcher's knowledge is instrumental in creating a sample in this sampling technique, there are chances that the results obtained will be highly accurate with a minimum margin of error. This paper mostly worked on secondary data collected from the bank's annual report. The data was collected within the duration from 2012 to 2019.

8.2 SOURCES OF THE COLLECTED DATA

All the banks that will be used in the sample are listed in Dhaka Stock Exchange (DSE). This study will mostly worked on secondary data that will be collected from the bank's annual report and Bangladesh Bank websites.

8.3 DATA PROCESSING AND ANALYSIS

In nature this is a quantitative study. To find the impact of liquidity on profitability a multivariate regression model has developed. Regression analysis, correlation analysis and multicollinearity test are used to test the sample observations. For the analysis SPSS version 20 has used.

Here the profitability of the commercial banks are considered as the dependent variable. Profitability has represented through return on asset and return on equity. On the other side liquidity has considered as the independent variable. Liquidity has represented through Loans to deposit ratio, deposit to assets, loan to assets ratio, and cash deposit ratio.

Table 1: description of variables

Variables	Measurement Unit	Symbol	Description
Dependent Variables	Return on Asset	ROA	Net Income / Total Assets
	Return on Equity	ROE	Net Income / Total equity
Independent Variables	Loan to Deposit ratio	LDR	Loans and Advances / Total Deposits
	Deposit to Asset ratio	DAR	Total Deposits / Total assets
	Cash Deposit ratio	CDR	Cash & Cash Equivalent / Total Deposit
	Loan to Assets ratio	LAR	Advances & Loans / Total Assets

8.4 MODEL CONSTRUCTION AND ESTIMATION APPROACH OR RESEARCH DESIGN:

The regression model is specified as follows:

Model 1: $Y_1 = \alpha_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4$

Model 2: $Y_2 = \alpha_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4$

Where,

Y_1 = Bank's profitability represented by ROA

Y_2 = Bank's profitability represented by ROE

X_1 = Loan to Deposit ratio (LDR)

B_1 = Coefficient of LDR

X_2 = Deposit to Assets ratio (DAR)

B_2 = Coefficient of DAR

X_3 = Loan to Asset Ratio (LAR)

B_3 = Coefficient of LAR

X_4 = Cash to Deposit ratio (CDR)

B_4 = Coefficient of CDR

α_0 = Constant

Here the regression model 1 measures the impact of liquidity over the profitability of the commercial banks in Bangladesh where the proxy for profitability is ROE. Regression model 2 does this same thing but here the

proxy for profitability is ROA

9. ANALYSIS AND FINDINGS

To get a sound outcome on the impact of liquidity on the profitability of the commercial banks in Bangladesh, correlation and regression statistics has applied. By using the SPSS a multivariate regression model has also applied to a get a comprehensive result.

9.1 DESCRIPTIVE STATISTICS

Table 2 represents the scenario of the descriptive statistics both for the dependent and independent variables for seven years duration from 2012-2019. The table has generated through using SPSS version 20. According to Table 2 based on ROA the average performance of bank is 0.0139 and the standard deviation is 0.0025 and based on ROE the average performance of the bank is 0.1648 and the standard deviation is 0.0236. Here the variation of the data is very low.

Table 2: Descriptive Statistics

Variables	Minimum	Maximum	Mean	Std. Deviation
ROA	0.0094	0.0196	0.0139	0.0025
ROE	0.1515	0.2455	0.1648	0.0236
LAR	0.6110	0.7213	0.6645	0.0251
LDR	0.7625	1.0212	0.8356	0.0671
DAR	0.6785	0.8548	0.7861	0.0476
CDR	0.0743	0.1211	0.0923	0.0156

According to Table 2, the mean value of LAR is 0.6645 and the standard deviation is 0.0251. The mean value of LDR is 0.8356 and the standard deviation is 0.0671. The mean value of DAR is 0.7861 and the standard deviation is 0.0476. The mean value of CDR is 0.0923 and the standard deviation is 0.0156. The result shows a lower variation in the existing data set.

9.2 CORRELATION ANALYSIS

Table 3: Correlation Matrix

		ROA	LDR	DAR	LAR	CDR
Pearson Correlation (2-tailed)	ROA	1.000	0.711	-0.766	0.266	0.254
	LDR	0.711	1.000	-0.866	0.545	-0.229
	DAR	-0.766	-0.866	1.000	-0.119	-0.091
	LAR	0.266	0.545	-0.119	1.000	-0.612
	CDR	0.254	-0.229	-0.091	-0.612	1.000

Correlation between return on asset and LDR is positive; that is 0.711. Correlation between return on asset and DAR is negative and it is -0.766. Correlation between return on asset and LAR is weak positive and it is 0.266. Correlation between return on asset and CDR is weak positive and it is 0.254. The overall correlation between return on asset and other independent variables is not statistically significant.

Table 4: Correlation Matrix

		ROE	LDR	DTA	LAR	CDR
Pearson Correlation (2- tailed)	ROE	1.000	-0.211	-0.156	-0.612	0.831
	LDR	-0.211	1.000	-0.860	0.545	-0.229
	DAR	-0.156	-0.866	1.000	-0.119	-0.910
	LAR	-0.612	0.545	-0.119	1.000	-0.612
	CDR	0.831	-0.229	-0.091	-0.612	1.000

Correlation between return on equity and LDR is negative; that is -0.211. Correlation between return on equity and DAR is negative and it is -0.156 Correlation between return on equity and LAR is negative and it is -0.612. Correlation between return on equity and CDR is positive and it is 0.831. The overall correlation between return on asset and other independent variables is not statistically significant.

According to Hair et al. (2006) a multicollinearity test is necessary to use before running multiple regression. It is the magnitude to which one idea can be clarified by the other ideas. Another rule of thumb according to Kleinbaum, Kupper, & Muller (1998) is that a variable is considered to be high collinearity if its variance inflation factor (VIF) exceeds 10.

Table 5: Collinearity Statistics

Variables	Tolerance	VIF
LDR	0.128	7.798
DAR	0.135	6.123
LAR	0.667	1.412
CDR	0.209	4.556

According to table-5 the outcome of tolerance and variance inflation factor, here the VIF is less than 10 and the tolerance level is not tend to zero. The result says about the absence of multicollinearity which allows to run the regression analysis.

9.3 REGRESSION ANALYSIS

Table 6: Regression Output of Model 1

Model	R	R Square	Adjusted R Square	F-Statistic	Sig. F-Statistic
1	0.876	0.775	0.609	4.479	0.064
Coefficient					
	Unstandardized Coefficient		Standardized Coefficient	t	P-value
	B	Std. Error	Beta		
(Constant)	0.580	0.388		0.567	0.644
LDR	-0.311	0.318	-0.877	-0.546	0.601
DAR	-0.417	0.378	-0.861	-1.468	0.185
LAR	0.156	0.449	0.166	1.476	0.167
CDR	0.966	0.389	0.648	1.811	0.109
Dependent Variable: ROA					

$Y_1 = 0.580 - 0.311X_1 - 0.417X_2 + 0.156X_3 + 0.966X_4$

Where

Y_1 = Bank's profitability represented by ROA

X_1 = Loan to Deposit ratio (LDR)

X_2 = Deposits to Asset ratio (DAR)

X_3 = Loan to Assets ratio (LAR)

X_4 = Cash Deposit Ratio (CDR)

LOGICAL ARGUMENTS ABOUT THE REGRESSION EQUATION

Loan to Deposit Ratio: From the equation it has been observed that if loan to deposit ratio increases by 1% then ROA decreases by 0.311%. So there is a negative relationship between ROA and LTD.

Deposit to Asset Ratio: From the equation it has been observed that if deposit to asset ratio increases by 1% then ROA decreases by 0.417%. So there is a negative relationship between ROA and DAR.

Loan to Asset Ratio: From the equation it has been observed that if loan to asset ratio increases by 1% then ROA increases by 0.156%. So there is a positive relationship between ROA and LAR.

Cash to Deposit Ratio: From the equation it has been observed that if cash to deposit ratio increases by 1% then ROA increases by 0.966%. So there is a positive relationship between ROA and CDR.

9.4 HYPOTHESIS ANALYSIS

According to table-6 for model 1 the value of R-square is 0.775 which is greater than 0.5. This result says that the independent variables (CDR, DAR, LAR, and LDR) can explain the dependent variable (ROA) by 77.5%. R-Square value greater than 0.5 has greater explanatory power. The value of adjusted R-square is 0.609. It shows the true estimate of the explanatory power of this model. Here the P-value of the liquidity ratios is 0.644 which is greater than 0.5. So for model 1 null *hypothesis is accepted*. So it can be said that liquidity (predictors) doesn't have any significant impact on the bank's profitability measured by return on asset.

Table 7: Regression Output of Model 2

Model	R	R Square	Adjusted R Square	F-Statistic	Sig. F-Statistic
2	0.902	0.807	0.651	5.514	0.057
Coefficients					
	Unstandardized Coefficients		Standardized Coefficients	t	P-value
	B	Std. Error	Beta		
(Constant)	0.013	0.045		0.547	0.634
LDR	-0.022	0.036	-0.045	-0.543	0.611
DAR	-0.067	0.042	-0.826	-1.341	0.188
LAR	0.083	0.053	0.712	1.194	0.187
CDR	0.086	0.045	0.471	1.812	0.121
Dependent Variable: ROE					

$Y_2 = 0.013 - 0.022X_1 - 0.067X_2 + 0.083X_3 + 0.086X_4$

Where

Y_1 = Bank's profitability represented by ROA

X_1 = Loan to Deposit ratio (LDR)

X_2 = Deposits to Asset ratio (DAR)

X_3 = Loan to Assets ratio (LAR)

X_4 = Cash Deposit Ratio (CDR)

LOGICAL ARGUMENTS ABOUT THE REGRESSION EQUATION

Loan to Deposit Ratio: From the equation it has been observed that if loan to deposit ratio increases by 1% then ROE decreases by 0.022%. So there is a negative relationship between ROE and LDR.

Deposit to Asset Ratio: From the equation it has been observed that if deposit to asset ratio increases by 1% then ROE decreases by 0.067%. So there is a negative relationship between ROE and DAR.

Loan to Asset Ratio: From the equation it has been observed that if loan to asset ratio increases by 1% then ROE increases by 0.083%. So there is a positive relationship between ROE and LAR.

Cash to Deposit Ratio: From the equation it has been observed that if cash to deposit ratio increases by 1% then ROE increases by 0.086%. So there is a positive relationship between ROE and CDR.

9.5 HYPOTHESIS ANALYSIS

According to table-7 for model 1 the value of R-square is 0.807 which is greater than 0.5. This result says that the independent variables (CDR, DAR, LAR, and LDR) can explain the dependent variable (ROE) by 80.7%. R-Square value greater than 0.5 has greater explanatory power. The value of adjusted R-square is 0.651. It shows the true estimate of the explanatory power of this model. Here the P-value of the liquidity ratios is 0.634 which is greater than 0.5. So for model 2 *null hypothesis is accepted*. So it can be said that liquidity (predictors) doesn't have any significant impact on the bank's profitability measured by return on equity.

10. CONCLUSION

This paper mostly focus on the impact of liquidity on profitability in commercial banks of Bangladesh. For this the data was analyzed within the time period of 2012-2019. Usually commercial banks maintain a certain level of liquidity and then they invest the remaining amount for business purpose. The outcome says that apart from CDR there is a negative correlation between ROE other independent variables. A strong positive correlation exists between ROE and CDR and a weak positive correlation exists between ROA and LAR and CDR. On the other side there is a strong positive relation between ROA and LDR. A strong negative relation exists between ROA and DAR. Based on the findings this paper accepts the null hypothesis. That means the impact of liquidity on commercial bank's profitability in Bangladesh is not statistically significant. Although the relation is not statistically significant still maintaining the liquidity is one of the most key issues for commercial banks. At the same time profitability measures the financial strength of any institution. Over a period of time liquidity measures the gift in term of operations and profitability measures the efficacy in value intensification for a commercial banks.

11. Recommendation

This paper is dreadfully policy-relevant. To get more accurate result in future other categories of variables can also be consider. So an adjustment in the variables is required. At the same time this study recommends to carry out a cross border study including other countries to find the impact other economic issues on the connection between this two variables. Finally, this paper supports the banking literature through concentrating to their stakeholders and the bankers and stakeholders for improved decision making for their organizations.

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