

Liability Management and Profitability in Banks

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Published in January, 2022 (Online)

Published by Bangladesh Institute of Bank Management (BIBM)

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Foreword

As part of the ongoing dissemination of BIBM research outputs, the present research monograph contains the findings of the research project: “Liability Management and Profitability in Banks”. Profitability is of utmost concern of a bank. Banks primarily make profit by the spread between the rates they offer to the accumulated pool of savers (deposit rate), and the rates they offer to potential borrowers (lending rate). Appropriate liability management along with the quality of bank’s asset ultimately leads the bank toward success. Commercial banks, that earn income from their loans and advances, incur major costs against their liabilities. Therefore, profitability of banks is directly affected by the management of their assets and liabilities. This publication examines the impact of liability management on the profitability of commercial banks in Bangladesh.

It gives me immense pleasure, on behalf of BIBM, to offer this important resource of academic inputs to the practitioners of the banks and financial institutions, regulatory agencies as well as to the academics and common readers. I hope, this monograph will be a valuable resource for professionals especially for the banking community for understanding the importance of liability management in enhancing profitability of the banks, which in turn will help in successfully running their businesses.

We do encourage feedback from our esteemed readers on this issue which certainly would help us to improve our research activities in the years to ahead.

Md. Akhtaruzzaman, *Ph.D.*
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Acknowledgement

This research project has been completed with the great support from many persons and organizations.

We would like to especially thank Dr. Md. Akhtaruzzaman, honorable Director General, BIBM for his valuable advice, inspiration, comments and thoughts to progress our research work. The team sincerely acknowledges the contribution of Dr. Ashraf Al Mamun, Associate Professor and Director (R.D.&C.), BIBM.

With a greater appreciation, we are truly indebted to Mr. Ahmed Jamal, Chairman, BIBM Executive Committee and Deputy Governor, Bangladesh Bank; Dr. Barkat-e-Khuda, Dr. Muzaffer Ahmad Chair Professor, BIBM; Md. Ali Hossain Prodhania, the then Managing Director, Bangladesh Krishi Bank and Supernumerary Professor, BIBM; Dr. A. K. Enamul Haque, Professor, Department of Economics, East West University; Faruq Mainuddin Ahmed, Managing Director and CEO, Trust Bank Limited; Mohammed Monirul Moula, the then Managing Director & CEO, Islami Bank Bangladesh Limited; and Md. Arfan Ali, President and Managing Director, Bank Asia Limited for their opinion and suggestions for preparing the report.

The research team recognizes the contributions of some higher officials (participated in the research interview) working in the relevant department of different commercial banks namely Muhammad Nadim, Mohammad Abu Yousuf Sobhan, Md. Ibrahim Khalil, Mohammed Shahid Ullah, Md. Farid Uddin, Badal Kumar Nath, Atiqur Rahman and Md. Ali Reza.

We are also very grateful to all of our faculty colleagues for their comments and positive suggestions to carry out our research.

Our honest indebtedness goes to research assistant, who have facilitated us to get very much useful information and data formulation. Our sincere appreciation goes to Papon Tabassum, Research Officer, BIBM; Sk. Md. Azizur Rahman, Research Assistant/Enumerator, BIBM and Md. Awalad Hossain, Computer Operator, BIBM for their support.

Finally, we would like to thank all of those who, directly and indirectly, extended their cooperation in our research work.

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List of Acronyms

ADR	Advance to Deposit Ratio
AIC	Akaike Information Criterion
AIDR	Advance to Investment Deposit Ratio
ALCO	Asset Liability Management committee
ALM	Asset Liability Management
CAGR	Compound Annual Growth Rate
CASA	Current Account and Savings Account
CASAFD	Current Account and Savings Account vs. Fixed Deposit
CRR	Cash Reserve Requirement
FCB	Foreign Commercial Bank
FCY	Foreign Currency
FD	Fixed Deposit
FE	Fixed Effect
FMOLS	Fully- Modified Ordinary Least Squares
HC	Household vs. Corporate Deposit
IB	Islami Bank
LCR	Liquidity Coverage Ratio
LCY	Local Currency
MCO	Maximum Cumulative Out Flow
MLE	Maximum Likelihood Estimation
MTFR	Medium Term Funding Ratio
NPL	Non-Performing Loan
NSFR	Net Stable Funding Ratio
PBT	Profit Before Tax
PCB	Private Commercial Bank
PT	Public vs. Total Deposit
RE	Random Effect
REM	Random Effect Model
RLIs	Regulatory Liquidity Indicators
ROA	Return on Assets
ROE	Return on Equity
SB	Specialized Bank
SC	Schwarz Criterion
SND	Short Notice Deposit
SOCB	State Owned Commercial Bank
STD	Short Term Deposits
SLR	Statutory Liquidity Ratio
TA	Total Assets
UR	Urban vs. Rural Deposit
VECM	Vector Error Correction Model
WB	Wholesale Borrowing

Executive Summary

Banks's finance is the key for a country's economic growth. Banks mainly make profit by the spread between the rates they offer to the accumulated pool of savers, and the rates they offer to potential borrowers. Appropriate liability management along with the quality of bank's asset ultimately leads the bank toward success. Proper asset and liability management can control the risks arise in the business due to mismatches between assets and liabilities. Banks are in a business to receive deposits as liability on the one hand and create or invest in assets on the other hand. Commercial banks incur major costs against their liabilities and earn income from their loans and advances. Therefore, profitability of banks is directly affected by the management of their assets and liabilities.

The study intends to focus the impact of liability management on the profitability of commercial banks in Bangladesh. The study is conducted mainly based on the secondary data. However, to finalize the research, some information has been collected through unstructured interviews. Data has been collected from statistics department of Bangladesh Bank, Scheduled Bank Statistics, Bangladesh Bank Quarterly and concern banks. Extensive literature has been reviewed. Concerned regulations, both internal and external, have been studied. In examining existing structure of liabilities and their management, data have been collected ranging between 2015 and 2019. However, for empirical analysis under Panel Co-integration, Vector Error Correction Model (VECM) and Random Effect Model (REM), quarterly data ranging from the first quarter of 2009 to the second quarter of 2020 for five groups of banks (SOCBs, PCBs including IBs, SBs and FCBs) are considered. Therefore, the study used $\{N \times T (5 \times 46)\}$ 230 observations for data analysis.

In this research, Return on Assets (ROA) is considered as the dependent variable and different forms of deposits as independent variables. Liability composition has been used as independent variables. Aiming to assess the impact of GDP and Non-performing Loan (NPL) on the relationship between profitability and liability management in banks, the model is further augmented by taking GDP and NPL as independent variables. However, as GDP and NPL data are yearly, we convert both data sets into quarterly by following the linear method.

From the study we found SOCBs have been experiencing the lower ROA with more involvement in the rural segments of deposits and advances whereas FCBs have been experiencing the highest Return on Assets (ROA). As usual, they are not focusing on rural deposits and advances. The overall fund management efficacy and predominance of cheaper sources of fund possibly contributes toward the higher ROA of FCBs. The rural and urban composition of banks' advances and deposits presents the sheer dominance of urban concentration. This is evident from the gap of deposits in urban and rural area for private commercial banks which is over around 70percent. Regarding division wise per head deposits Dhaka has the highest rate and Rangpur has the lowest rate. In case of public sector deposits, SOCBs have been holding the highest share of deposits followed by SBs. With respect to composition of different types of deposits, the fixed deposit has higher share indicating that the depositors prefer to invest more on time deposits.

In terms of CAGR, resident foreign currency deposits record the highest growth rate indicating the growing preference of NRBs to deposit money in foreign currency in Bangladeshi banks. The deposit turnover ratio is highest in case of current deposits followed by convertible taka account. The Foreign Commercial Banks have the highest percentage of current & savings deposit whereas the Islamic Banks have the lowest percentage of current & savings deposit during 2015 to 2019. The Division-Wise Advance-Deposit ratio has increased over the years for all the divisions. Rangpur has the highest ADR followed by Dhaka division. In the context of neighboring country analysis, the spread for Bangladeshi banking sector is relatively higher than that of other countries, but the rate of return on assets is the lowest. This phenomenon is due to a high level of NPL ratio. The share of deposit to GDP is also lower in Bangladesh as compared to other countries.

Positive impacts of urban vs. and Rural Deposits (UR) as well as public vs. total deposits on profitability of banks are documented in both VECM and REM, although short term effect of UR is not statistically significant as per VECM. Impact of public deposits is significantly positive in both short and long-term. REM clearly recommends significant positive impact of household vs. corporate deposit although VECM records assorted interactive short-term feedback effects. The coefficient of Current Account and Savings Account (CASA) vs. Fixed Deposits (FD) is negative and insignificant in both analyses. NPL significantly shows negative impact on profitability of banks. The adjusted R^2 shows moderate capacity to explain.

The result of the research suggested that as part of liability management particularly deposit management in banks drives nearly 30 percent of banks' profitability (adjusted R^2 in VECM and REM = 0.311217 and 0.262117, respectively), it is expected that regulators, policymakers and bankers will come forward with great strategies to manage deposits in banks. As evidence suggests sheer dominance of urban deposit in total deposits and its positive impact on profitability, emphasis is required to be given to source more urban deposits along with rural deposits. Significant positive impact of public deposits with around 20 per cent share of total deposits is also clearly documented. In this context, proper Governments' policy for allocation of their deposits among individual banks is important.

Significant long-term positive behavior of household vs. corporate deposit with short-term assorted behavior postulates that banks' planning in collecting and using household deposit in short term is poor. Appropriate deposit products for household depositors, offering acceptable financial benefits as well as few non-financial benefits to them and proper planning to use this fund can bring discipline in household deposit management. Insignificant negative impact of Current Account and Savings Account (CASA) vs. Fixed Deposits (FD) deserves further research. However, we posit that banks cannot use current and saving deposits in profitable venture as it has high turnover. Significant negative impact of NPL on profitability of banks reiterates the most deserving expectation to reduce soaring bad loans of banks to enhance their performance.

Additionally, enhancing trust on banks, ensuring financial literacy, launching strong software for collecting deposits in online, initiating a separate department for liability management in banks, issuing bond for collecting long-term deposits, bringing at least one person from each family

under bank services, encouraging people to keep deposit in banks in place of pillow cover, motivating diaspora community to send their saved money to Bangladesh, informing vital features of deposits to probable customers and doing proper asset-liability management in banks can improve the quality of liability management which will, in turn, enhance the profitability of banks. Besides, increasing branch network through launching new branches, agent banking, mobile banking, internet banking, and strong websites with appropriate marketing can also be useful.

Liability Management and Profitability in Banks

1. Introduction and Background

1.1 Introduction

Commercial banks' role in economic growth is well documented. Banks make profit mainly by the net interest income generated from the interest rate they offer to the depositors and their borrowers. The recent expansion of technology, development of economy, broadening of financial institutions, and intense competition have made the banking business more sophisticated (Tahir et al., 2018). Appropriate liability management along with the quality of bank's asset ultimately leads the bank toward the success. Besides, proper asset and liability management can control the risks arising from assets and liabilities mismatches (Rosen & Zenios, 2008). These deal with the efficient management of sources and uses of bank funds concentrating on profitability, liquidity, capital adequacy, and risk factors. Asset-liability management is an important dimension of risk management, where the exposure to various risks is minimized while maintaining the appropriate combination of asset portfolio and liability composition in order to satisfy the goals of the financial institution. Therefore, asset and liability management include a formalization of this understanding as well as a technique to measure and manage these risks in order to lead for satisfactory profitability (Tee, 2017).

Banks' profitability is of utmost concern of a bank. Banks are in a business to receive deposits as liability on the one hand and create or invest in assets on the other hand. Commercial banks incur major costs against their liabilities and earn income from their loans and advances. Therefore, profitability of banks is directly affected by management of their assets and liabilities. Kosmidou et al. (2004) and Shubiri (2010) acknowledge that important possible factors that create impact on banks' profitability are the asset and liability management. Sayeed and Hoque (2010) and Asiri (2007) also emphasize on asset and liability management for greater profitability of banks. In addition, different market and macroeconomic factors also influence the ability of the banks to make profits (Athanasoglou et al., 2008). Wealth and profit maximization are the fundamental objectives of all firms. To this end, which areas of a financial strategy are working and which ones need improvement are required to be examined from time to time.

A key ratio of banks' profitability is the Return on Assets (ROA) calculated as the Profit before Tax (PBT) divided by Total Assets (TA). In general, the higher the net interest margin, the higher will be the profit margins and therefore, banking sector would be more stable. However, a higher net interest margin could reflect riskier lending practices associated with substantial loan loss provisions and could be an indication of inefficiency

in the banking sector. Therefore, banks should effectively and efficiently manage its liability and the overall assets to ensure profitability and to survive in the long run.

Liability management was purposeless till 1960s. The banking sector contemplated liabilities as exogenous factors creating limitations in asset management. Truly, for a long period the greater part of capital resources came from savings and fixed deposits. The financial system has now radically changed. Competition among banks for collecting deposits has become intense. Consequently, liability management has become the main part of banks' strategy in order to ensure the cheapest possible funds. At the same time, the importance of decisions regarding the amount of capital adequacy is enforced. Certainly, the adequacy of the bank as far as equity contributes to the removal of bankruptcy risk.

Along with deposits in different maturities, commercial banks are also depending on the borrowing especially from the money market. Besides, banks may also issue bonds into capital market to raise funds for their investments. The profit margin largely depends on the weighted average cost of funds for various sources. It is a common phenomenon that if a bank can reduce the funding cost, its profit margin will increase. However, reduction of funding cost largely depends on the funds availability and the management's control over its liabilities.

Loan pricing is the greater part of a bank's assets management. Since, interest rate risk is at the core of banking business, managing it successfully is crucial to whether or not banks remain profitable. Due to changes in the market environment, the banking industry in Bangladesh has become competitive and this competition compels banks to reduce their spread.

Although there are many studies on determinants of profitability, the literature is scant in the consideration of liability management and its impact on the profitability of commercial banks. These shortcomings may be due to an over-emphasis on the impact of asset-liability management together on the profitability. However, very few studies were found in different context that considered asset-liability management and the profitability of banks and those are mostly in the context of developing countries. Therefore, the study intends to focus the impact of liability management on the profitability of commercial banks in Bangladesh.

1.2 Objectives

The main purpose of the study is to examine the impact of liability management on the profitability of banks. Some other specific objectives are as follows:

- i. to review macro prudential and bank specific policies relating to liability management of commercial banks;

- ii. to examine the existing structure of liabilities and their management of different groups of banks; and
- iii. to assess the impact of liability management on the profitability of banks.

1.3 Chapter Plan

The first section covers introduction, objectives, and chapter plan. The second section shows literature review followed by description of data and methodology including empirical procedures in section three. Section four reviews regulations and policy relating to liability management in banks. Structure of different types of deposits is analyzed in section five. The section six shows the discussion on empirical analysis on liability management and profitability of banks. The section seven ends the paper by stating findings and policy recommendations.

2. Literature Review

Charumathi (2008) viewed Asset Liability Management (ALM) as a vibrant process of planning, organizing, harmonizing, and governing the assets and liabilities to achieve a definite net interest income through the mechanism of its mixes, volume, maturities and costs. Singh (2013) endorsed Charumathi's view and stated that ALM deals with the asset and liability mix to reduce the risk. Overall ALM position also matters in increasing or decreasing of asset and liability of bank's balance sheet. Obari (2015) established that a unit increase in ALM position caused by decline in deposits results a reduction of bank's overall financial performance. Anjichi (2014) also specified that banks can identify financial prospects and uncertainty to improve their financial resources through creating an encouraging environment by comprehensive asset liability management.

The profitability of banks is one of the important factors for vibrant financial system of a country (Tektaş et al., 2005). Therefore, to ensure sustainable growth, banks have to earn profit at rationale level. As opined by Mishikin (2004), within the regulatory environment, banks should fix their own liabilities and assets composition that help them to determine explicit operating objective and to maximize the shareholders' equity (profit). Several researchers opined that ALM is one of the important factors that have large effect on commercial bank's profitability, (Kosmidou, 2004; Shubiri, 2010; Sayeed and Hoque, 2010; Asiri, 2007). Sheela and Bastray (2014) studied on the effect of ALM on the commercial banks profitability in Indian financial market and found that good asset and liability management strategy of banks ensure more profitability. Besides banks, the study of Darush (2013) established the positive association between ALM and financial performance of micro firms in Sweden and Harvey (2013) showed the positive association between ALM and financial performance of service firms in United States.

Commercial banks generally raise funds, by issuing different checkable or demand deposits, saving deposits, and time/fixed deposits (Mishikin, 2004). To assess the impact of ALM on the profitability of listed banks in Ghana, Tee (2017) found that the component of liabilities mostly saving and fixed deposits account, other liabilities account and credit balances had substantial and negative impact but interest rate had no such impact on commercial banks profitability. Belete (2013) and Tee (2017) also endorsed this finding. Among liabilities in bank's balance sheet, the key component is deposit which has significant influence on bank's overall profitability as well. In examining the impact of ALM on banks' profitability in Nepal, Shrestha (2015) also found that deposits and other liabilities have negative effect on profitability of commercial banks.

In fixing the determining factors of banks profitability, Alper and Anbar (2011) and Ramlall (2009) found that commercial bank's profitability can be described by both inside and outside factors where internal factors are connected to bank's administration which includes the ALM culture of bank. The external factors are the economic and regulatory atmosphere that has impact on the performance of banks. The general macroeconomic factors like GDP, market interest rates, inflation rate, and ownership were considered as the explanatory factors of the profitability of banks.

For Kuwaiti banks, Asiri (2007) observed that assets management had positive and liabilities management had negative impact on the profitability. Tamiru (2013) and Stierwald (2010) studied the effect of ALM on profitability and found a positive association between them. Similar study done by Gikonya (2011) on the affiliation between ALM and commercial banks profitability in Kenya and also established that ALM positively related to profitability. On the other hand, literature has proven that poor level of ALM leads the banks into financial risks which can generate negative effect on the firms' profitability (Obari, 2015). A study on banks' profitability from Bangladesh context was done by Sayeed et al. (2012) by applying Statistical Cost Accounting (SCA) method revealed that, banks with high earning can generate higher returns from the portfolio of assets and receive lower earnings from the portfolio of liabilities compared to the low earning banks. In case of private and public banks' returns their results were inconclusive. They also concluded that assets management strategy of large banks was superior than small banks, but not in case of liability management.

In selecting the variables for assessing the effect of ALM on the profitability of listed banks in Ghana, Tee (2017) considered Return on Asset (ROA) as the dependent variable and Total liability as one of the independent variables in his model. Belete (2013) also considered ROA as a function of balance sheet in investigating the effect of ALM on banks profitability in the Ethiopian financial market. In case of reinvestment, bank's profit can contribute a mentionable part in its equity formation. Bank's profit provides a

significant source of equity particularly if reinvested into the business. This generally helps to save the banks and high profits can stimulate the financial stability (Flamini et al., 2009).

Tee (2017) in his study mentioned that banks must emphasize on public consciousness to attract more savings and fixed deposits which boost their loans and advances to ensure banks' performance. Belete (2013) and Shrestha (2015) also endorsed the finding of Tee (2017). The study of Obari (2015) suggested that managers of banks should develop such mechanisms to attract deposits and gain low cost funding for managing any probable liquidity mismatches that may help banks to avoid expensive debt capital. Although several studies have been done in the field of ALM and the profitability of commercial banks, study on the area of liability management solely and the profitability of banks is very rare. Effects of liability management on the profitability of banks will provide some new thoughts to the policy makers and researchers for rethinking for the proper liability management to ensure better profitability of their banks.

3. Data & Methodology

3.1 Data Coverage

The current study is conducted mainly based on the secondary data. Additionally, some primary information has also been collected to know the implications of regulations of Bangladesh Bank relating to the liability management of bank. Secondary data have been collected from different publications of Bangladesh Bank and concern banks. Extensive literature has been reviewed. Concerned regulations, both internal and external, have gone through as well. In examining existing structure of liabilities and their management, data have been collected ranging between 2015 and 2019. However, for empirical analysis, quarterly data ranging from the first quarter, 2009 to the second quarter, 2020 for five groups of banks (SOCBs, PCBs including IBs, SBs and FCBs) are considered. Finally, a total number of $\{N \times T(5 \times 46)\}$ 230 observations are employed for the analysis. Data have been collected from statistics department of Bangladesh Bank, Scheduled Bank Statistics and Bangladesh Bank Quarterly.

3.2 Empirical Methodology

3.2.1 To reiterate, the paper examines the liability management and profitability of banks in Bangladesh. To this end, Return on Assets (ROA) is taken as the dependent variable and different forms of deposits as independent variables. The most commonly used profitability ratios are namely ROA (Return on Assets) and ROE (Return on Equity), Net Profit Margin, etc. However, ROA reflects the ability of bank's management to generate profits from the bank's assets, although it may be biased due to off balance sheet activities. The ROE is a good measure of accounting profitability from the shareholders perspective. Therefore, ROA is considered as the key ratio for the evaluation of bank

profitability, given that the ROA is not distorted by high equity multipliers. The ROA is measured as Profit before Tax (PBT) divided by Total Assets (TA). Liability composition has been used as independent variables by following the classification of (Mishikin, 2004 and Belete, 2013). These are namely urban vs. rural deposit, household vs. corporate deposit, public deposit in total deposit, current and savings deposit vs. fixed deposit. As share of borrowing in total liabilities in banks is very tiny, borrowing has not been considered in the estimation process. Moreover, all banks do not borrow from the market.

3.2.2 For this purpose, a panel data set consisting of cross-sectional and time series observations is utilized in the research. This offers an appropriate way to do research in a situation where an adequate number of cross-sectional and time series observations are not found. Otherwise, it would not be possible to use only one of these two dimensions for meaningful analyses (Gujarati, 2003). This data estimation includes the constant coefficient, fixed and random effects regression models. To find out the association among variables in a heterogeneous panel, the following model is formed:

$$ROA_{it} = \beta_0 + \beta_1 UR_{it} + \beta_2 HC_{it} + \beta_3 PT_{it} + \beta_4 CSFD_{it} + e_{it} \text{ -----(1)}$$

Where, ROA = Return on Asset, UR = Urban vs. Rural Deposit, HC = Household vs. Corporate Deposit, PT = Public Deposit in Total Deposit and CSFD = Current and Savings Deposit vs. Fixed Deposit. The expected signs of the parameters are: $\alpha > 0$, $\beta_1 > 0$, $\beta_2 > 0$, $\beta_3 > 0$ and $\beta_4 > 0$.

As the logarithm of the ratio variable performs slightly better than the ratio variable (Lien et al. 2017), all variables are taken as ratios and then, changed into logarithm form. Additionally, this change reduces the inconsistency of the variables and assist to neutralize the size impact.

3.2.3 Model (1) is estimated by the Pedroni (2000, 2001) panel Fully- Modified Ordinary Least Squares (FMOLS) co-integration technique. This method adjusts for the presence of endogeneity and serial correlation in the panel data. This is considered as a suitable technique, particularly, if there are endogenous factors that can cause co-movements in the variables. Five groups of banks namely State-owned Commercial Banks (SCBs), Private Commercial Banks (PCBs), Specialized Banks (SBs), Islamic Banks (IBs) and Foreign Commercial Banks (FCBs) are taken as the cross section. These groups of banks are heterogeneous in terms of sizes, branches, level of efficiency, types of services, etc. Before estimating cointegration for model (1), the order of integration of the variables has been determined by using panel unit root tests. In case of all variables are found to be I (1), then co-integration is investigated by using the pedroni panel co-integration tests (1999, 2000, 2001). These tests and techniques are applied to make sure that no spurious regression phenomenon exists in the estimation of β_i (1...5). In order to test for the

presence of a unit root in the panel data series, panel unit root tests proposed Levin, Lin and Chu (2002) and Im, Pesaran and Shin W Stat (2003) are employed. Both tests are applicable to heterogenous panels. The null hypothesis is nonstationary in these tests.

Pedroni's panel co-integration tests are residual-based tests for the null of co-integration in heterogeneous panels. Two types of statistics are considered here. The first-one is on pooling the residuals of the regression along the within-dimension and test statistics used for this type are the panel v -statistic, the panel ρ -statistic, the panel PP-statistic, and the panel ADF-statistic. On the other hand, second-one is on pooling the residuals of regression along the between dimension of the panel. The test statistics used for the second-type includes the group ρ -statistic, PP-statistics, and ADF-statistic. These are only the group mean statistics of the individual time series statistics. All statistics are standardized with the means and variances so that they are asymptotically distributed $N(0, 1)$ under the null hypothesis of no co-integration. As one-sided tests, large positive values of the panel ρ -statistic reject the null hypothesis of no cointegration. For the remaining statics, large negative values reject the null hypothesis.

3.2.4 Afterwards, the following panel vector error-correction model in the spirit of (Engle and Granger, 1987) is estimated.

$$\Delta ROA_{it} = \beta_0 + \sum_{q=1}^p \beta_1 \Delta ROA_{it-q} + \sum_{q=0}^p \beta_2 \Delta UR_{it-q} + \sum_{q=0}^p \beta_3 \Delta HC_{it-q} + \sum_{q=0}^p \beta_4 \Delta PT_{it-q} + \sum_{q=0}^p \beta_5 \Delta CSFD_{it-q} + \varphi ECM_{it-1} + \epsilon_t \text{ ----- (2)}$$

The estimated coefficient (φ) of the error-correction term is expected to be negative for long-run convergence and causal relationship. The estimated coefficients of β_1 to β_5 reveal short-run interactive feedback relationships among the variables. The Akaike (1969) Information Criterion (AIC) and Schwarz Criterion (SC) are used to determine the appropriate lag-lengths.

3.2.5 After conducting panel cointegration and vector error-correction, we have moved to reexamine the aforesaid findings by estimating either Fixed-Effects (FE) or Random Effects (RE) model. Hausman (1978) specification test is conducted to ascertain the appropriateness of Fixed-Effects (FE) or Random Effects (RE) model. This takes the form of a comparison between the parameters of the FE and the RE models e.g., Greene (2012); Wooldridge (2002)]. This is done via a Chi-square test of the difference between the vector of coefficient estimates of FE and that of RE. The Hausman test is regularly deployed as a test for whether RE can be used, or whether FE estimation should be used, instead (Greene, 2012).

A simple standard unbalanced RE model is specified first here contemplating of our baseline model delineated in Model-1. Further, aiming to assess the impact of GDP and Non-performing Loan (NPL) on the relationship between profitability and liability

management in banks, the following RE model is further estimated. However, as GDP and NPL data are yearly, we convert both data set into quarterly by following the linear method.

$$ROA_{it} = \beta_0 + \beta_1 UR_{it} + \beta_2 HC_{it} + \beta_3 PT_{it} + \beta_4 CSFD_{it} + \beta_4 GDP + \beta_4 NPL_{it} + e_{it} \text{ ---(3)}$$

We decide to use RE model as it performs well, even when the normality assumptions are violated. As a result, they are preferred to ‘complete pooling’ methods, which assume no differences between higher-level entities. In contrast, FE does not allow for the estimation of higher level, time-invariant parameters or residuals. Both RE and FE are estimated using the Maximum Likelihood Estimation (MLE).

4. Prudential Regulation and Bank Specific Policies Relating to Liability Management in Banks

4.1 Regulatory and Policy Issues

Bangladesh Bank has taken different initiatives to manage banks’ liability properly. In addition, banks also have own policy to manage their liabilities. Major initiatives in these regards are discussed in this section.

4.1.1 Asset-Liability Management Guidelines of Bangladesh Bank (2016)¹

Bangladesh Bank issued revised Asset-Liability Management (ALM) Guidelines in 2016. As per ALM guideline, monthly estimates of loans and deposits for the whole year or for the next 3-6 months are presented to Asset-Liability Committee (ALCO). The projection is done on the basis of reviewing the past projection precision to comprehend the level of amendments that can apply qualitatively to the current projections both for FCY and LCY.

4.1.2 Wholesale Borrowing (WB)

The limit for borrowed fund is generally set in amount based on eligible capital of the bank. The wholesale borrowing limit should be plugged at 80 percent for non-PD banks’, and 100 percent for PD banks’ qualified capital. However, on fortnightly maximum two deviations are permissible.

4.1.3 Interest Rate/ Profit

Interest/profit is required to maintain maximum 9 percent for loan except loan against credit card. The rate will be maximum 7 percent in case of pre-shipment financing². Notably, BB has brought a number of changes in interest rate structure under stimulus package. Intermediation spread will be maximum 4 percent for all types of credit facilities including SME, except consumer financing and financing against credit card,

¹ <https://www.bb.org.bd/aboutus/regulationguideline/guidelist.php>

² BDPR Circular no.3, February 24, 2020

earlier which was 5 percent ³. The ALCO should work out on various limits which must be approved by the board.

4.1.4 Advance to Deposit Ratio (ADR)

Advance to Deposit Ratio (ADR) is determined on such a basis where in the market there will be no excessive liquidity pressure. Based on the regulatory requirements for liquidity, ADR shall be derived in the maximum level. For the purpose of measuring liquidity position, total demand and time liabilities are calculated according to the DOS Circular No.01/2014. Banks those have both conventional and Islamic banking business must calculate and conserve advance to deposit ratio individually for both of their banking operation. In that case, for Islamic banking ADR should be maintained in line with the Islamic Shariah based banks. The management of the bank should inform the BoD regarding their ADR in all meeting to support for quick decision.

4.1.5 Raising Funds from the Capital Market

Like other corporate, banks may also place public offer for its securities. In this regard, banks need to comply with the provisions of BSEC Public Issue Rules, 2015. For the purpose of listing, an issuer should be eligible for direct listing according to the Regulation No. 9 of the DSE (Listing) Regulations, 2015.

4.2 Bankers' Responses to Regulatory Issues Relating to Liabilities

To have more practical and field level experience, the research team attempted to have interview of a number of bankers regarding the aforementioned areas through a questionnaire (Appendix-1) sent to a number of interviewees selected purposively. Finally, the research ended up with the feedback from 32 interviewees (Appendix-2).

4.2.1 Loan Pricing

As per the response of respondents, pricing should be a risk-based pricing by considering base rate, risk premium and the tenor premium. The cost of funds is calculated considering of weighted average interest/profit-bearing liabilities. All non-equity funded liabilities have been considered in this computation and only shareholder's equity has been considered as equity funded liabilities. However, banks start to charge 9 percent interest rate on loans since 1st April, 2020.

4.2.2 Basel-III, and Deposit, Borrowing and Spread

As per Basel-III recommendations, banking industry follows liquidity standards (e.g., LCR; NSFR). In context of Pillar-2 of Basel-III, risk-based capital adequacy, liquidity indicators such CRR, SLR, Medium Term Funding Ratio (MTFR), ADR and Maximum Cumulative Out Flow (MCO), etc.

³ BDPR Circular Letter No.11, June 12, 2018

4.2.3 Bank Borrowing from the Capital Market

To have market practices regarding bank borrowing from the capital market, respondents mention that banks have no limit for borrowing from this market. However, bank sets its borrowing limit as per the internal policy approved by respective board.

4.2.4 Borrowing from the Money Market

For non-PD, its limit is 80 percent of regulatory capital whereas for PD it is 100 percent of the same. Again, some other respondents opine that there is no limit for borrowing from the Money market. ALCO takes decision regarding the borrowing amount.

4.2.5 Distribution of Saving Deposits into Demand and Time Deposits

Respondent banks including Islamic bank stated that they considered 9 percent as demand and remaining 91 percent as time deposit of all savings Deposit. It is mentionable that some other banks allow it for 10 percent and 90 percent respectively as per the Bangladesh Bank instruction⁴.

4.2.6 Leverage Ratio

Banks are highly leveraged entities. Generally, regulators use Tier-1 leverage ratio to ensure the capital adequacy. According to the reply of the respondents, leverage ratio in their banks ranges between 4.1 to 4.91 percent. It is noted that a minimum Tier-1 leverage ratio of 3 percent is being prescribed by Bangladesh Bank both at single and combined level (Bangladesh Bank, 2014).

5. Structure of Liabilities of Different Groups of Banks in Bangladesh

This section covers the analysis of structure of liabilities particularly focusing on deposits of different groups of banks. Moreover, a comparative analysis among the neighboring countries regarding the share of deposits to GDP (%), bank's cost to income ratio (%), bank's return on assets (%), bank's net interest margin (%), and bank-lending deposit spread (%) are also illustrated.

5.1 Return on Assets of Banks

In Bangladesh, the Foreign Commercial Banks (FCBs) have always been maintaining the highest Return on Asset (ROA) on an average. The FCBs are constantly maintaining the ROA twice as much as the other banks are maintaining. Possibly, overall fund management efficacy and predominance of cheaper sources of fund contribute to this performance. The specialized banks are always having a negative ROA which can be explained by the objective with which these banks have been established. Specialized banks were established to boost and support special sectors by mitigating the financial needs of those particular sectors. This objective, in most of the times, leads them to

⁴ BDPD Circular No.6, June 24, 2007

disburse fund with the intent to stimulate these sectors, rather than with the intent of profit maximization. Consequently, these banks are making subsidized lending. As, in most of the cases, these banks are backed by the Government, the negative ROA does not matter much; since it is working for the overall economic growth for which the subsidy can be rationalized as well. SOCBs are also doing the banking business by giving the highest priority on social consideration which kept them behind of other banks in earning profit. PCBs' earning performance looks good although it is showing a decreasing trend.

Table 5.1: Return on Assets (ROA) of Banks (%)

Year	SOCBs*	SBs*	PCBs**	FCBs	IBs	Total
2015	0.17	-0.83	1.00	1.96	1.10	1.00
2016	0.07	-2.12	1.02	1.68	1.20	0.91
2017	0.31	-0.84	0.80	1.83	1.10	0.86
2018	-0.86	-1.13	0.50	1.98	1.40	0.53
2019	-1.40	-3.70	0.80	2.70	1.00	0.30

Source: Bangladesh Bank

Notes: *SOCBs and SBs as categorized by BB in the concerned year; **PCBs including IBs

At a glance, in 2015 the State-Owned Commercial Banks had an ROA of 0.17percent whereas ROA had decreased to -1.40percent in 2019. In case of Specialized Banks, the return on the asset was -0.83 percent in 2015 which decreased to -3.70 percent in 2019. On the other hand, the Private Commercial Banks had an ROA of 1.00 percent in 2015, which decreased to 0.80percent in 2019. The Foreign Commercial Banks had an ROA of 1.96 percent in 2015. This dropped to 1.00 percent in 2019. Finally, the table shows that the Islamic Banks in Bangladesh had an ROA of 1.00percent in 2015, which went down to 0.30 percent in 2019.

5.2 Urban-Rural Composition of Deposits and Advances of Banks in Bangladesh

The urban-rural composition of banks' advances and deposits presents the sheer dominance of urban area in deposit mobilization and loan disbursement. On top of that, it shows the clear distinctions among the objectives of different groups of banks (Table-5.2).

Table 5.2: Urban-Rural Composition of Deposits and Advances of Banks (%)

		SOCBs			SBs			PCBs			FCBs			IBs			Total		
		Urban	Rural	Gap	Urban	Rural	Gap	Urban	Rural	Gap	Urban	Rural*	Gap	Urban	Rural	Gap	Urban	Rural	Gap
2015	Deposits	67	33	35	52	48	3	86	14	71	100			85	15	70	80	20	60
	Advances	82	18	64	39	61	-21	95	5	89	100			94	6	88	90	10	80
	Gap	-15	15		12	-12		-9	9					-9	9		-10	10	
2016	Deposits	66	34	32	51	49	2	85	15	71	100			84	16	68	79	21	59
	Advances	81	19	63	37	63	-25	94	6	88	100			94	6	87	90	10	80
	Gap	-15	15		14	-14		-9	9					-10	10		-10	10	

		SOCBs			SBs			PCBs			FCBs			IBs			Total		
		Urban	Rural	Gap	Urban	Rural	Gap	Urban	Rural	Gap	Urban	Rural*	Gap	Urban	Rural	Gap	Urban	Rural	Gap
2017	Deposits	66	34	31	51	49	2	85	15	70	100			84	16	67	79	21	59
	Advances	80	20	61	34	66	-33	93	7	87	100			93	7	87	89	11	79
	Gap	-15	15		17	-17		-8	8					-10	10		-10	10	
2018	Deposits	66	34	32	51	49	1	84	16	69	100			83	17	65	79	21	59
	Advances	78	22	56	34	66	-33	94	6	88	100			94	6	88	90	10	79
	Gap	-12	12		17	-17		-10	10					-11	11		-10	10	
2019	Deposits	65	35	30	50	50	0	84	16	68	100			82	18	64	79	21	58
	Advances	79	21	58	33	67	-34	94	6	88	100			94	6	88	90	10	79
	Gap	-14	14		17	-17		-10	10					-12	12		-11	11	
Deposits	CV (%)	11	14		11	13		17	23		20			17	25		16	18	
	CAGR (%)	6	8		6	7		10	13		9			9	14		9	10	
Advances	CV (%)**	18	28		6	13		23	25		18			23	22		22	23	
	CAGR (%)**	10	14		1	7		12	14		8			13	13		11	13	

Source: Scheduled Banks Statistics, Bangladesh Bank

Notes: * FCBs do not have any exposure of deposits and advances in the rural area.

** CV and CAGR are calculated on absolute figure of deposits and advances.

Over the last five years (from 2015-2019), the structural distribution of deposit and advances between urban and rural area was almost unchanged. The urban depositors provide 80 percent of the total deposit of Bangladesh whereas 90 percent advances are taken by urban borrowers. The massive unchanged gap in regional composition is a cause of concern. In fact, the growth of deposits and advances in both areas are almost at a similar level. The Compounded Average Growth Rate (CAGR) of deposits in the urban area is 9 percent while it is 10 percent in rural area. The advances grew by 11 percent in urban areas in last five years while the growth rate for advances in rural areas is slightly higher i.e., 13 percent. In recent years, it has been seen that banks increased focus on SME financing to mark their footprint in rural areas. Apparently, it is not operationally efficient for the commercial banks to extend their business to small ticket loans and deposits in the rural area. However, recently the spur of agent banking is addressing the issue. A change may be seen in the aforesaid structure in upcoming years.

The regional structure of deposit and advances of specialized banks is quite different from that of other conventional and Islamic commercial banks. Around 50 percent deposits of the specialized banks belong to rural people and around 65 percent of the total advances of the specialized banks are given in the rural businesses. The foreign commercial banks show the extreme opposite picture having no operation in the rural area. Islamic commercial banks' regional gap is also significant. The private commercial banks are in no exception. The gaps of deposits in urban and rural area for private commercial banks are over 70 percent and the gap for loans and advances is around 88 percent over the five years. The above-mentioned gap for state-owned commercial banks

is less than that of foreign, Islamic, and private commercial banks. Around 65 percent of their deposit comes from urban area while approximately 80 percent of the loans are sanctioned in favor of the urban business. The compounded annual growth rate for deposits in rural area has been highest in Islamic banks (14% in from 2015-2019) and surprisingly lowest in specialized banks (only 6% from 2015-2019). The picture is almost same in advances growth for.

5.3 Division Wise Per Head Deposits and Advances

The Division Wise Per Head Deposits and Advances has increased over years. It was BDT 0.501 lac deposits and BDT 0.366 lac advances in 2015 where it had increased to BDT 0.736 lac deposits and BDT 0.608 lac advances in 2019 (Table 5.3.). The overall gap between deposits and advances had decreased from BDT 0.135 lac to BDT 0.128 lac during years. Dhaka division had the highest Division Wise Per Head Deposits and Advances. The deposits were BDT 1.228 lac in 2015 which had increased to BDT 1.782 lac in 2019 and the Advances were BDT 0.961 lac in 2015 which increased to BDT 1.625 lac in 2019. On the other hand, Rangpur Division had the lowest Deposits which were BDT 0.087 lac in 2015 and BDT 0.130 lac in 2019. However, this division is performing well in terms of lending. Advances of Rangpur were BDT 0.08 lac in 2015 which increased to 0.127 lac in 2019. Over the years, CV and CAGR of deposit is less than CV and CAGR ratio advances.

Table 5.3: Division Wise Per Head Deposits and Advances (Taka in Lac)

Year	Item	Divisions								Total
		Dhaka	Chattogram	Rajshahi	Khulna	Barishal	Sylhet	Rangpur	Mymensingh	
2015	Deposits	1.228	0.513	0.153	0.198	0.159	0.321	0.087	0.092	0.501
	Advances	0.961	0.354	0.112	0.141	0.071	0.073	0.08	0.07	0.366
	Gap	0.267	0.159	0.041	0.057	0.088	0.248	0.007	0.022	0.135
2016	Deposits	1.347	0.599	0.177	0.225	0.183	0.342	0.106	0.106	0.56
	Advances	1.09	0.401	0.131	0.16	0.082	0.082	0.096	0.083	0.416
	Gap	0.257	0.198	0.046	0.065	0.101	0.26	0.01	0.023	0.144
2017	Deposits	1.477	0.673	0.189	0.242	0.197	0.354	0.107	0.112	0.606
	Advances	1.291	0.47	0.153	0.186	0.107	0.113	0.107	0.104	0.487
	Gap	0.186	0.203	0.036	0.056	0.09	0.241	0	0.008	0.119
2018	Deposits	1.587	0.714	0.199	0.253	0.213	0.375	0.113	0.122	0.655
	Advances	1.462	0.516	0.162	0.198	0.101	0.095	0.117	0.101	0.547
	Gap	0.124	0.198	0.037	0.055	0.112	0.281	-0.003	0.021	0.108
2019	Deposits	1.782	0.795	0.227	0.288	0.238	0.405	0.130	0.140	0.736
	Advances	1.625	0.577	0.177	0.218	0.114	0.100	0.127	0.108	0.608
	Gap	0.157	0.218	0.050	0.070	0.123	0.305	0.003	0.032	0.128
Deposits	CV* (%)	14.43	16.40	14.50	13.89	15.05	8.94	14.25	15.74	14.67
	CAGR* (%)	7.73	9.16	8.24	7.80	8.38	4.75	8.38	8.77	7.99

Year	Item	Divisions								Total
		Dhaka	Chattogram	Rajshahi	Khulna	Barishal	Sylhet	Rangpur	Mymensingh	
Advances	CV (%)	20.94	19.19	17.48	16.91	18.96	16.88	17.24	17.27	20.07
	CAGR (%)	11.08	10.28	9.60	9.10	10.02	6.58	9.64	9.01	10.68

Source: Scheduled Banks Statistics, Bangladesh Bank.

Notes: *CV and CAGR are calculated on absolute figure of deposits and advances.

5.4 Public Sector – Private Sector Composition of Deposits and Advances

The private sector has more shares of Deposits and Advances compared to the public sector. However, the percentage for the public sector had increased over the years. The private sector contributed 82 percent of total deposits and took 99 percent of advances in 2015 which had decreased in 2019 to 80 percent of total deposits and 98 percent of advances. On the other hand, the public sector had 18 percent deposits and 1 percent advances in 2015 which had increased to 20 percent deposits and 2 percent advances (Table-5.4) in 2019. The Foreign Commercial Banks had secured the highest share of deposits in the private sector over the years which were 94 percent in 2015 and 90 percent in 2019. On the other hand, the State-Owned Commercial Banks had secured the highest share of deposits from the public sector over the years which were 40 percent in 2015 and 47 percent in 2019.

Table 5.4.: Public Sector-Private Sector Composition of Deposits and Advances (%)

Year	Item	SOCBs		SBs		PCBs		FCBs		IBs		Total	
		Public	Private	Public	Private	Public	Private	Public	Private	Public	Private	Public	Private
2015	Deposits	40	60	26	74	9	91	6	94	7	93	18	82
	Advances											1	99
2016	Deposits	39	61	28	72	10	90	8	92	7	93	18	82
	Advances											1	99
2017	Deposits	40	60	28	72	11	89	7	93	7	93	19	81
	Advances											1	99
2018	Deposits	43	57	25	75	10	90	8	92	7	93	19	81
	Advances											2	98
2019	Deposits	47	53	19	81	10	90	10	90	7	93	20	80
	Advances											2	98
Deposits	CV* (%)	19	8	12	16	21	18	35	19	19	18	19	16
	CAGR (%)	10	4	0	9	12	10	19	8	10	10	10	9
Advances	CV (%)											43	21
	CAGR* (%)											24	11

Source: Scheduled Banks Statistics, Bangladesh Bank.

Notes: *CV and CAGR are calculated on absolute figure of deposits and advances.

5.5 Composition of Different Types of Deposits of Banks in Bangladesh

The deposit portfolio of the scheduled banks in Bangladesh is dominated by the fixed deposits. In 2019, 47.52 percent of the total deposit in the banking sector was in the fixed deposit accounts. The higher percentage of such deposit makes the cost of deposit relatively higher for banks since the interest rate on fixed deposits is higher than CASA (Current Account and Savings Accounts). In 2019, around 8.3 percent of the deposits were in current accounts and 18.18 percent of the deposits in savings accounts. However, the growth rate of fixed deposits is lower than the growth rate of deposits in CASA. The compounded annual growth rate for fixed deposits was only 7.37 percent (from 2015-2019) while the rate was 10.46 percent for the current account and 10.43 percent for savings account.

Table 5.5: Composition of Different Types of Deposits of Banks (%)

Year	Current Deposits	Deposits withdrawable on sight	Savings Deposits	Convertible Taka Account	Foreign Currency Accounts	Wage Earners' Deposits	Resident Foreign Currency Deposits	Special Notice Deposits	Fixed Deposits	Deposits Pension Scheme	Negotiable Certificates of Deposits	Restricted (Blocked) Deposits
2015	7.72	1.22	18.59	0.23	0.36	0.23	0.75	8.27	50.93	7.85	0.22	0.00
2016	7.86	1.88	20.02	0.20	0.43	0.29	0.92	9.28	47.39	8.01	0.20	0.00
2017	8.33	1.48	20.24	0.35	0.61	0.18	0.92	9.72	46.27	7.90	0.16	0.00
2018	8.18	1.35	19.93	0.13	0.68	0.32	1.06	10.12	46.35	7.87	0.14	0.00
2019	8.30	1.46	19.96	0.10	0.39	0.31	1.34	9.33	47.52	7.98	0.12	0.00
CV (%)	19.02	21.21	18.18	45.83	35.66	34.14	38.65	20.92	14.49	16.58	9.70	25.05
CAGR (%)	10.46	12.81	10.43	-7.86	10.66	15.99	22.30	11.55	7.37	9.21	-4.25	15.19

Source: Scheduled Banks Statistics, Bangladesh Bank.

Notes: *CV and CAGR are calculated on absolute figure of deposits.

5.6 Deposits Turnover of Banks in Bangladesh (x)

The deposit turnover of banks in Bangladesh has changed over the years. The current deposits had decreased from 17.39 times to 15.52 times over the period from 2015 to 2019 and savings deposits had decreased from 1.55 times to 1.32 times over the same period (Table-5.6). On the other hand, the turnover of the convertible Taka account has increased from 5.75 times to 13.78 times over 2015 to 2019. The resident foreign

currency deposits had decreased from 1.93 times to 0.95 times, the special notice deposits had decreased from 5.4 times to 3.92 times and the recurring deposits had decreased from 0.15 times to 0.08 times. However, the fixed deposits had increased slightly from 0.28 times to 0.29 times.

Table 5.6: Deposits Turnover of Banks (x)

Year	Current Deposits	Savings on Deposits	Convertible Taka Account	Foreign Currency Accounts	Wage Earners' Deposits	Resident Foreign Currency Deposits	Special Notice Deposits	Fixed Deposits	Recurring Deposits	Others*
2015	17.39	1.55	5.75	6.11	2.29	1.93	5.4	0.28	0.15	17.99
2016	14.99	1.36	6.79	3.79	2.47	1.66	4.32	0.27	0.15	13.62
2017	16.09	1.34	3.66	3.78	3.39	1.83	3.78	0.44	0.12	15.87
2018	15.43	1.55	4.87	3.48	2.10	6.56	3.47	0.31	0.11	13.73
2019	15.52	1.32	13.78	4.59	2.34	0.95	3.92	0.29	0.08	19.37

Source: Scheduled Banks Statistics, Bangladesh Bank.

Notes: *Other deposits include Deposits Withdrawable on Sight, Special Purpose Deposits, Margin Deposits, Restricted (Blocked) Deposits & Negotiable Certificates of Deposits.

5.7 Composition of Demand and Time Deposits of Banks in Bangladesh (%)

The demand and time deposits had increased over the years. The Foreign Commercial Banks have the highest percentage of demand deposit which was 60.60 percent in 2015 and 69.93 percent in 2019; whereas the Islamic Banks have the lowest percentage of demand deposit which was 27.73 percent in 2015 and 28.77 percent in 2019. On the other hand, Islamic Banks have the highest time deposit which was 72.27 percent in 2015 and 71.23 percent in 2019 whereas the Foreign Commercial Banks have the lowest time deposit which was 39.40 percent in 2015 and 30.07 percent in 2019. The overall composition of the deposit remains more or less stable for all of the bank categories.

Table 5.7: Composition of Demand and Time Deposits* of Banks (%)

Year	SOCBs		SBs		PCBs		FCBs		IBs		Total	
	Demand	Time	Demand	Time	Demand	Time	Demand	Time	Demand	Time	Demand	Time
2015	43.73	56.27	38.13	61.87	32.98	67.02	60.60	39.40	27.73	72.27	37.37	62.63
2016	47.72	52.28	36.33	63.67	36.46	63.54	66.41	33.59	29.37	70.63	40.88	59.12
2017	50.34	49.66	31.64	68.36	37.07	62.93	69.19	30.81	30.20	69.80	41.84	58.16
2018	52.84	47.16	36.49	63.51	35.21	64.79	72.31	27.69	29.11	70.89	41.78	58.22
2019	54.01	45.99	36.55	63.45	34.76	65.24	69.93	30.07	28.77	71.23	41.20	58.80

Source: Bangladesh Bank

Notes: *Demand= Current +Savings deposit; Time = Fixed deposit

5.8 Division –Wise Advance/ Deposit Ratio (%)

The Division-Wise advance-deposit ratio has increased over the year. The Dhaka division had 78 percent in 2015 which had increased to 91 percent in 2019, The Chattogram division had 69 percent in 2015 which had increased to 73 percent in 2019, The Rajshahi division had 73 percent in 2015 which had increased to 78 percent in 2019; the Khulna division had 71 percent in 2015 which had increased to 76 percent in 2019; the Barishal division had 44 percent which had increased to 48 percent in 2019; and the Mymensingh division had 76 percent which was increased to 77 percent in 2019 (Table-5.8). The Rangpur Division has the highest ratio of Division-Wise Advance. The percentage was 92 percent in 2015 and 97 percent in 2019. On the other hand, the Sylhet Division has the lowest percentage of Division- Wise Advance. The percentage was 23 percent in 2015 and 25 percent in 2019.

Table 5.8: Division –Wise Advance/ Deposit Ratio (%)

Year	Dhaka	Chattogram	Rajshahi	Khulna	Barishal	Sylhet	Rangpur	Mymensingh
2015	78	69	73	71	44	23	92	76
2016	81	67	74	71	45	24	91	78
2017	87	70	81	77	54	32	100	93
2018	92	72	81	78	47	25	103	83
2019	91	73	78	76	48	25	97	77

Source: Scheduled Banks Statistics, Bangladesh Bank

5.9 Weighted Average Rates of Interest (WARI) on Deposits and Advances

The foreign commercial banks have always maintained around 7 percent spread during the years. The spread for the other groups of banks was more or less volatile. Overall spread of the banking sector has been 4 percent on an average. The costs of deposits of PCBs and IBs are 6.42 percent and 6.76 percent respectively in 2019 which are higher as compared to other groups of banks. On the other hand, costs of deposit for FCBs are always lowest among all groups of banks. This is always around 2.00 per cent during 2015-2019.

Table 5.9: Weighted Average Rates of Interest (WARI) on Deposits and Advances

Year		SOCBs	SBs	PCBs	FCBs	IBs	Total
2015	Deposits	6.28	7.18	6.44	2.63	6.66	6.25
	Advances	9.82	9.81	11.74	9.82	11.31	11.21
	Spread	3.54	2.63	5.3	7.19	4.65	4.96
2016	Deposits	4.83	6.46	5.24	1.78	5.61	5.01
	Advances	8.57	8.86	10.31	8.32	10.05	9.86
	Spread	3.74	2.4	5.07	6.54	4.44	4.85
2017	Deposits	4.2	5.23	5.27	1.67	5.65	4.83
	Advances	7.75	8.18	9.66	8.1	9.3	9.21
	Spread	3.55	2.95	4.39	6.43	3.65	4.38
2018	Deposits	4.33	5.66	5.76	2.3	5.94	5.21
	Advances	6.57	7.62	10.5	8.89	10.13	9.62
	Spread	2.24	1.96	4.74	6.59	4.19	4.41

Year		SOCBs	SBs	PCBs	FCBs	IBs	Total
2019	Deposits	4.54	5.6	6.42	2.31	6.76	5.75
	Advances	6.76	7.67	10.64	9.79	10.2	9.8
	Spread	2.22	2.07	4.22	7.48	3.44	4.05

Source: Scheduled Banks Statistics, Bangladesh Bank

5.10 Position of Bangladesh among Neighboring Countries: Deposit to GDP, Cost to Income Ratio, Return on Assets, Net Interest Margin & Spread

The table shows that in 2013, the share of deposits to GDP was 43.78 percent in Bangladesh, 63.65 percent in India, 44.74 percent in China, 30.26 percent in Pakistan, 30.64 percent in Sri Lanka, and 65.55 percent in Nepal. In 2017, the share of deposits to GDP of Bangladesh had decreased to 43.63 percent from 43.78 percent in 2013. But the other countries had increased their share of deposits to GDP during 2013-2017. In 2017, the share of deposits to GDP was 64.93 percent in India, 54.68 percent in China, 32.60 percent in Pakistan, 51.02 percent in Sri-Lanka and 83.41 percent in Nepal. In brief, Nepal had the highest share of deposits to GDP where Pakistan had a lower share of deposits to GDP. Comparing with most of the other countries, the share to deposit ratio of Bangladesh is still below 50 percent, since a huge portion of the overall population is not financially included yet. Financial inclusion at a large scale might be needed to address the lower rate of deposit to GDP ratio.

Table 5.10: Position of Bangladesh among Neighboring Countries: Share of Deposit to GDP, Cost to Income Ratio, Return on Assets, Net Interest Margin & Spread

Year	Aspects	Bangladesh	India	China	Pakistan	Sri Lanka	Nepal
2013	Share of Deposits to GDP (%)	43.78	63.65	44.74	30.26	30.64	65.55
	Bank's cost to income ratio (%)	47.91	45.80	33.52	55.57	45.95	45.31
	Bank's return on assets (%)	1.30	0.99	1.12	1.10	1.42	1.65
	Bank's net interest margin (%)	3.99	3.01	2.98	3.87	4.86	4.39
	Bank-lending deposit spread (%)	1.87		3.00	4.81	2.22	
2014	Share of Deposits to GDP (%)	44.91	64.26	43.89	30.52	32.12	67.37
	Bank's cost to income ratio (%)	48.44	47.38	31.20	52.13	47.01	47.22
	Bank's return on assets (%)	1.13	0.75	1.09	1.51	1.43	1.65
	Bank's net interest margin (%)	3.92	2.85	2.84	4.51	4.20	4.24
	Bank-lending deposit spread (%)	3.15		2.85	4.47	0.34	
2015	Share of Deposits to GDP (%)	44.90	64.41	44.80	30.34	34.77	72.88
	Bank's cost to income ratio (%)	46.83	47.24	36.33	46.00	55.00	47.36
	Bank's return on assets (%)	0.94	0.31	1.54	1.51	1.33	1.96
	Bank's net interest margin (%)	2.02	2.90	4.07	4.28	4.03	4.39
	Bank-lending deposit spread (%)	3.47		2.85	4.18	0.97	
2016	Share of Deposits to GDP (%)	44.38	66.06	50.85	32.15	42.80	84.24

Year	Aspects	Bangladesh	India	China	Pakistan	Sri Lanka	Nepal
	Bank's cost to income ratio (%)	49.97	45.25	33.27	51.21	54.68	43.84
	Bank's return on assets (%)	0.59	0.47	0.96	1.33	1.47	1.89
	Bank's net interest margin (%)	2.43	2.84	2.29	3.72	4.08	3.93
	Bank-lending deposit spread (%)	4.21		2.85	3.92	3.40	
2017	Share of Deposits to GDP (%)	43.63	64.93	54.68	32.60	51.02	83.41
	Bank's cost to income ratio (%)	50.30	50.79	32.20	56.44	54.49	41.11
	Bank's return on assets (%)	0.84	-0.16	0.99	0.89	1.44	2.17
	Bank's net interest margin (%)	2.43	3.01	2.30	3.28	4.49	4.40
	Bank-lending deposit spread (%)	3.93		2.85	3.73	2.57	

Source: World Bank, Federal Reserve Bank of St. Louis (Data up to 2017 is available)

Additionally, Pakistan had the highest bank's cost to income ratio which was 55.57 in 2013 and 56.44 percent in 2017 where China had the lowest bank's cost to income ratio which was 33.52 percent in 2013 and 32.30 percent in 2017. Nepal had the highest Bank's return on assets which was 1.65 percent in 2013 and 2.17 percent in 2017. On the other hand, India had the lowest bank's return on asset which was 0.99 percent in 2013 and -0.16 percent in 2017.

Although the Spread of the banking sector of Bangladesh is relatively higher than that of the other countries, the ROA is one of the lowest here. This phenomenon is due to a high level of NPL ratio. For making the picture better, Bangladesh may also address the NPL management problems.

6. Empirical Analysis on Liability and Profitability Management of Banks: Results and Discussions

6.1 Panel Unit Root Tests

Based on the Panel Unit Root Test Summary of Levin, Lin & Chu (LLC test), all variables⁵ are found stationary on first-differencing of the data at varying levels of significance. But, as per Im, Pesaran and Shin W Stat (IPS), all variables except LROA are stationary at first differencing. We move forward in line with the result of LLC test. It is assumed that all variables in the panel data set depict I(1) behavior, although IPS shows stationary for all variables except LROA at first differencing (Table-6.1).

⁵ ROA= Return on Assets (ROA), UR= Urban vs. Rural Deposit, HC= Household vs. Corporate Deposit, PT= Public Deposit in Total Deposit, CSFD= Current and Savings Deposit vs. Fixed Deposit.

Table 6.1: The Panel Unit Root Tests: Summary for 2009q1-2020q2

Variables	First Differencing			
	Levin, Lin & Chu t (LLC)		Im, Pesaran and Shin W Stat (IPS)	
	First Differencing		First Differencing	
	Statistic	P-value	Statistic	P-value
LROA	-5.47	0.000	LROA is stationary at level.	
LUR	-2.68	0.0036	-9.86	0.000
LHC	-2.3626	.0091	-9.22	0.000
LPT	-1.42	0.0770	-9.60	0.000
LCSFD	-2.26	0.0118	-4.32	0.000

Source: Authors' Calculations.

Notes: LROA = Logarithm of Return on Assets; LUR = Logarithm of Urban vs. Rural Deposit; LHC = Logarithm of Household vs. Corporate Deposit; LPT = Logarithm of Public vs. Total Deposit and LCSFD = Logarithm of Current and Savings Deposit vs. Fixed Deposit.

*The results for $I(0)$ behavior are not reported here.

6.2 Panel Cointegration

When each series is independently integrated in the same order, then those can be cointegrated (Granger, 1988) meaning that there are chances of some linear combinations between them. To examine this possibility, Pedroni panel Cointegration test methodology is implemented which consists of seven tests (Table-6.2)⁶.

Table 6.2: Panel Cointegration with Individual Intercept and Individual Trend

Alternative hypothesis: <i>Common Autoregressive (AR)</i> (within-dimension)				
	Statistic	Prob.	Weighted	
			Statistic	Prob.
Panel v-Statistic	-0.051916	0.5207	-1.343549	0.9105
Panel rho-Statistic	-2.203139	0.0138	-2.073636	0.0191
Panel PP-Statistic	-6.247803	0.0000	-7.447438	0.0000
Panel ADF-Statistic	-4.828569	0.0000	-2.997678	0.0014
Alternative hypothesis: <i>individual Autoregressive (AR)</i> (between-dimension)				
	Statistic	Prob.		
Group rho-Statistic	-1.846940	0.0324		
Group PP-Statistic	-9.205132	0.0000		
Group ADF-Statistic	-4.150496	0.0000		

Source: Authors' Calculations.

Table-6.2 reveals evidence of panel co-integration among the variables in terms of the associated p-values of all tests except Panel v-Statistic. In effect, 6(six) tests statistics lend support in favor of cointegration. As all are well recognized methods of testing cointegration, we have ignored the results of Panel v-Statistic. It means the presence of long-run equilibrium relationship between profitability and liability management of banks has been accepted.

⁶In a panel cointegration test, Pedroni suggests seven categories of statistics. First four of the seven statistics are the within-dimension statistics which are popularly known as panel cointegration test statistics while the remaining three are the between-dimension statistics and are known as the group mean panel cointegrating test statistics (Pradhan et. al., 2013).

6.3 Error Correction

Cointegration, however, fails to determine the direction of causality between the variables with regard to which variables are leading and which one are lagging. We employed the vector error correction modeling technique to know causality direction and the results are reported in the following Table.

Table 6.3: Panel Vector Error Correction Model

Dependent Variable: D(LROA)		Std. Error	t-Statistic	Prob.
Method: Panel Least Square				
Variable	Coefficient			
C	0.007138	0.065299	0.109305	0.9132
RES(-1)	-0.174814	0.081565	-2.143241	0.0351
D(ROA(-1))	-0.417791	0.104911	-3.982345	0.0001
D(ROA(-2))	-0.173059	0.102298	-1.691717	0.0946
D(UR)	-0.374694	0.657740	-0.569670	0.5705
D(UR(-1))	-0.253707	0.723539	-0.350647	0.7268
D(UR(-2))	0.211292	0.737682	0.286428	0.7753
D(UR(-3))	0.543079	0.610879	0.889012	0.3767
D(UR(-4))	0.158039	0.525584	0.300692	0.7644
D(HC)	-0.074089	0.408325	-0.181447	0.8565
D(HC(-1))	0.096454	0.424166	0.227396	0.8207
D(HC(-2))	-0.859450	0.443745	-1.936812	0.0563
D(HC(-3))	-0.830385	0.347592	-2.388962	0.0193
D(HC(-4))	0.060468	0.289845	0.208622	0.8353
D(PT)	0.423635	0.097334	4.352376	0.0000
D(PT(-1))	0.661208	0.131273	5.036886	0.0000
D(PT(-2))	0.304608	0.144851	2.102908	0.0386
D(PT(-3))	0.037655	0.121542	0.309808	0.7575
D(PT(-4))	0.131619	0.094700	1.389854	0.1684
D(CASAFD)	0.813750	0.436814	1.862920	0.0661
D(CASAFD(-1))	0.922076	0.477734	1.930103	0.0571
D(CASAFD(-2))	-0.109121	0.472291	-0.231046	0.8179
D(CASAFD(-3))	-0.795383	0.399476	-1.991063	0.0499
D(CASAFD(-4))	-0.386876	0.370657	-1.043758	0.2997
R-squared	0.465023			
Adjusted R-squared	0.311217			
F-statistic	3.023436			
Prob(F-statistic)	0.000136			
Durbin-Watson stat	2.345306			

Source: Authors' Calculations.

As observed in Table-6.3, the co-efficient of the error-correction term (RES (-1)) has expected negative sign and statistically significant at the 5 percent level. However, its reasonable numerical magnitude (0.174814) implies the moderate speed of adjustment for convergence toward long run equilibrium. Thus, the long-run causal flow from the explanatory variables to the dependent variable is quite clear. But the short-run net interactive feedback effect is mixed.

The sum of the short-run coefficients of lagged changes in urban vs. rural deposits over the 4-quarter lagged period is marginally positive without the statistical significance indicating subdued net positive effect of urban vs. rural deposits on the current change in ROA in banks. Further, coefficients of all lagged changes in public deposits to total deposits over the same four-lagged periods is positive with the statistical significance in terms of the associated t-values in the first two quarters along with the contemporary quarter implying significant net positive short-run effect on the current change in profitability of banks. However, the coefficient of current and savings deposits to fixed deposits reveals a positive impact on ROA in the current and first quarter, later it starts to show negative impact on the following quarters. In case of household deposits, assorted interactive feedback effects have been observed in the short run. A positive impact exists in the first and fourth quarters with statistical insignificance whereas a negative short-term effect is observed in the second and third quarters with the statistical significance in terms of the associated t-values. The F-statistics (3.023436) shows the joint significance of lags of each of the differenced variables. The adjusted R^2 of 0.311217 means nearly 31 percent of changes in ROA is explained by the changes in the lagged regressors. It is therefore ostensibly clear that proper liability particularly deposit management is highly important for maintaining profitability in all banks in Bangladesh.

6.4 Random Effect Model (REM)

Next, Hausman model specification test result is reported for appropriateness of Random Effect or Fixed Effect model as follows:

Table 6.4: Correlated Random Effects - Hausman Test* (Chi-Sq. Statistic)

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	5.030645	5	0.4122

Source: Authors' Calculations.

The Hausman Chi-square test result is low at 5.030645 with p-value of 0.4122. This suggests that estimation of RE model is more appropriate than FE model. However, such inference on model selection should be taken with a grain of salt.

Finally, estimation of random-effect model is as follows:

The slope coefficients of column 2 (two) show significant random effects of all explanatory variables except CASAFD meaning their fluctuating positive impact on growth of profitability of banks. In the third column, when we assess the impact of GDP and Non-performing loan (NPL) on the relationship between profitability and liability management in banks, the coefficients of each component of liabilities reveals almost the same results. Additionally, NPL 's coefficients indicate highly significant negative impact on ROA of banks whereas GDP's coefficient confirms subdued positive impact on banks' profitability, as coefficient of GDP is positive but insignificant. These results largely endorse the findings

of panel Vector Error Correction Models (VECM) shown in the previous section of the analysis.

Table 6.5: Random Effect Model

Col. 1	Col.2	Col.3
Variables	Random Effect Model (RE)	Random Effect Model with Additional variables (LGDP, LNPL)
Log Urban vs. Rural Deposit (UR)	0.620294***	0.670056***
Log Household vs Corporate Deposit (HC)	0.345911***	0.347513**
Log Public vs. Total deposit ratio (PT)	0.235645**	0.26403**
Log CASA –Fixed Deposit (CASAFD)	-0.15436	-0.08691
LGDP		0.055318
LNPL		-0.223***
Constant	3.166846***	-2.12024
R-squared = 0.2792 Adjusted R-squared = 0.262117 F -Statistic = 16.36362 Prob(F-statistic) =0.0000		R-squared = 0.35 Adjusted R-squared = 0.326 F -Statistic = 14.30793 Prob(F-statistic) =0.0000

1. Dependent variable: Log ROA
2. *** p < .001, ** p < .05

Source: Authors' Calculations.

In details, positive impacts of urban vs. and rural deposits (UR) as well as public vs. total deposits are documented in both VECM and REM, although short term effect of UR is not statistically significant as per VECM. This might be attributed to the fact that magnitude of urban deposits over rural deposits firmly contributes more to the banks' ROA in long term but in the short term its positive impact on profitability is insignificant. Impact of public deposits is significantly positive in both short and long-term signifying that this contributes solidly in banks' profit both in the short and long term. With respect to Household vs. Corporate Deposit (HC), REM clearly recommends significant positive impact, but VECM records assorted interactive short-term feedback effects. This is possibly because most of the household deposits are kept in banks for long time in the mode of different recurring or conventional fixed deposits. The coefficient of Current Account and Savings Account (CASA) vs. Fixed Deposits (FD) is negative and insignificant in both analyses. It is in against of traditional beliefs and understanding as current and saving deposits supposed to impact positively on profitability of banks because CASA is less costly than fixed deposits. We conjecture that inattentive asset liability management for differentiating long-term and short-term deposits to invest funds/ to give loan for different periods is the cause of this result. The F-statistics shows significance of both models. The adjusted R^2 shows moderate capacity to explain.

7. Findings and Policy Recommendations

7.1 Main Findings

SOCBs have been experiencing the lower ROA with more involvement in the rural segments of deposits and advances whereas FCBs have been experiencing the highest Return on Assets (ROA). As usual, they are not focusing on rural deposits and advances. The overall fund management efficacy, maintaining good asset quality, updated automation and predominance of cheaper sources of fund possibly contributes toward the higher ROA of FCBs. The rural and urban composition of banks' advances and deposits presents the sheer dominance of urban concentration. This is evident from the gap of deposits between urban and rural areas for private commercial banks which is over around 70 percent. Regarding division wise per head deposits, Dhaka has the highest amount and Rangpur has the lowest amount. In case of public sector deposits, SOCBs have been holding the highest share of deposits followed by SBs. With respect to composition of different types of deposits, the fixed deposit has higher portion indicating that the depositors prefer to invest more on time deposits. In terms of CAGR, resident foreign currency deposits record the highest growth rate indicating the growing preference of NRBs to deposit money in foreign currency in Bangladeshi banks. The deposit turnover ratio is highest in case of current deposits followed by convertible taka account. The Foreign Commercial Banks have the highest percentage of current & savings deposit whereas the Islamic Banks have the lowest percentage of current & savings deposit during 2015 to 2019. The Division-Wise Advance-Deposit ratio has increased over the years for all the divisions. Rangpur has the highest ADR followed by Dhaka division. The possible reason of lower ADR ratio in Sylht and Barishal divisions is the less demand for financing. In examining the position of Bangladesh among neighboring countries, the spread for Bangladeshi banking sector is relatively higher than that of other countries, but the rate of return on assets is the lowest. This phenomenon is due to a high level of NPL ratio. The share of deposit to GDP is also lower in Bangladesh as compared to other countries.

Positive impacts of Urban vs. and Rural Deposits (UR) as well as Public vs. Total Deposits (PT) on profitability of banks are documented in both VECM and REM, although short term effect of UR is not statistically significant as per VECM. Impact of

public deposits is significantly positive in both short and long-term signifying that this contributes solidly in banks' profit. REM clearly recommends significant positive impact of household vs. corporate deposit although VECM records assorted interactive short-term feedback effects. The coefficient of Current Account and Savings Account (CASA) vs. Fixed Deposits (FD) is negative and insignificant in both analyses. NPL significantly shows negative impact on profitability of banks. The adjusted R^2 shows moderate capacity of explanatory variable to explain profitability of banks.

7.2 Policy Recommendations

The paper unveils structure of deposits of banks in different dimensions along with its impact on profitability of banks. The result suggested that as part of liability management particularly deposit management in banks drives nearly 30 percent of banks' profitability (adjusted R^2 in VECM and REM = 0.311217 and 0.262117, respectively), it is expected that regulators, policymakers and bankers will come forward with great strategies to manage deposits in banks. NPL is another cause why people are not interested to deposit money into banks. Therefore, banks need to address the issue and should build trust to mobilize deposit. Moreover, Banks should identify the factors affecting deposit behavior of customers and the factors impact on building such trust. As evidence suggests sheer dominance of urban deposit in total deposits and its positive impact on profitability, emphasis is required to be given to source more urban deposits along with rural deposits. Some new entrepreneurs can be created in the rural areas so that more funds can be invested there to reduce the disparity. Also, rural deposit can be invested into rural areas. Significant positive impact of public deposits with around 20 per cent share of total deposits is also clearly documented. This happens because this deposit is kept in banks with the less interest rate mostly as Short-Term Deposits (STD). In this context, proper Governments' policy for allocation of their deposits among individual banks is important. Government may prioritize social contribution as well quality of banks in framing policy for perking their deposits.

Significant long-term positive behavior of household vs. corporate deposit with short term assorted behavior postulates that banks' planning in collecting and using household deposit in short term is poor. Appropriate deposit products for household depositors, offering acceptable financial benefits as well as few non-financial benefits to them and

proper planning to use this fund can bring discipline in household deposit management. Insignificant negative impact of Current Account and Savings Account (CASA) vs. Fixed Deposits (FD) deserves further research. However, we posit that banks cannot use current and saving deposits in profitable venture as it has high turnover. Optimum mix of liability should not be the option rather it should be mandatory for each bank. Significant negative impact of NPL on profitability of banks reiterates the most deserving expectation to reduce soaring bad loans of banks to enhance their performance.

Additionally, enhancing trust on banks, ensuring financial literacy, launching strong software for collecting deposits in online, initiating a separate department for liability management in banks, issuing bond for collecting long-term deposits, bringing at least one person from each family under bank services, encouraging people to keep deposit in banks in place of pillow cover, motivating diaspora community to send their saved money to Bangladesh, emphasizing on monitoring for proper recovery, Adoption of FinTech and introduction of more customer friendly alternative delivery channels, informing vital features of deposits to probable customers and doing proper asset - liability management in banks can improve the quality of liability management which will, in turn, enhance the profitability of banks. Besides, making available banking services in all corners of the country, increasing branch network through launching new branches, agent banking, internet banking, mobile banking, and strong websites with appropriate marketing can also be useful in proper liability management in banks.

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Appendix 1: Questionnaire for Interview

Requirements:

1. Can you provide some materials related to policy/guidelines/circulars/circular letters on Deposit, Borrowing and Loan pricing?
2. Is there any requirement in BASEL framework for deposit, borrowing and spread?
3. Is there any limit for borrowing from Capital market? (private and public placement)
4. Is there any limit for borrowing from Money market?
5. How much of “Savings deposit” considered as ‘Time deposit’ and ‘Demand deposit’? (please mention in percentage)
6. Leverage ratio of your bank (as per BASEL-III)

Appendix 2: List of Interviewee along with their Institutions

Sl. No.	Name of Institutions	Number of Interviewee
1.	Sonali Bank Ltd.	2
2.	Bank Asia Ltd.	2
3.	Islami Bank Bangladesh Ltd.	5
4.	Al-Arafah Islami Bank Ltd.	2
5.	Standard Bank Ltd.	1
6.	Trust Bank Ltd.	3
7.	Pubali Bank Ltd.	5
8.	NRB Bank Ltd.	2
9.	Dutch-Bangla Bank Ltd.	2
10.	Social Islami Bank Ltd.	1
11.	First Security Islami Bank Ltd.	5
12.	Woori Bank	2
Total Number of Interviewees		32

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