Abstract

There is no underlying fact to ignore the importance of asset-liability management policy to ensure profitability and long-run sustainability of financial institutions in any economy. The study has been conducted to investigate the impacts of ALM policy on the profitability of sample banks working in Bangladesh. The rationality of this study is to observe the degree of relationship of different assets and liability variables with profitability through applying Statistical Cost Accounting (SCA) model using time series data from 2003 to 2014. Financial ratios and different statistical tools like Pearson Correlation, Descriptive analysis and regression analysis have been applied to identify the relationship among the variables. After analysis, Loans & Advances is found to have a significant positive relationship with banks’ profitability.

Keywords: Asset-Liability Management, Banks, Loans and Advances, Statistical Cost Accounting Model.
Introduction

Managing Assets and Liabilities to foster a sustainable growth is one of the key issues of banking industry (Bangladesh Bank, 2015). As the landscape of the financial services, industry becomes increasingly competitive, with rising costs of intermediation due to higher capital requirements and liquidity requirements, financial institutions face a loss of spread income. In order to protect the loss in profitability due to such developments, financial institutions may be forced to deliberately mismatch asset/liability maturities in order to generate higher spreads. Asset Liability Management (ALM) is a mechanism to address the risks faced by financial institutions due to mismatch between assets and liabilities and due to liquidity or changes in interest rates (Oracle Corporation, 2008). An insightful view of ALM is that it simply combines portfolio management techniques (that is, asset, liability and spread management) into a coordinated process. Thus, the central theme of ALM is the coordinated - and not piecemeal - management of a bank’s entire balance sheet.

Banks bear costs for their liabilities and earn income from their assets. Thus, profitability of them is directly affected with the management of their assets and liabilities. In addition, there are other macroeconomic and market concentrated factors that affect the profit making capacity of the financial institutions (Sayeed et. al, 2012). There are substantial number of researches in the field of asset-liability management strategies and their direct impact on profitability of banks (Hester & Zoellner, 1966; Kwast & Rose, 1982; Vasiliou, 1996; Kosmidou et al, 2004; Asiri, 2007 and Sayeed et. al, 2008). These studies profoundly focused on both developed and developing countries. But, asset-liability management and its impact on profitability in developing countries has received little attention. Among the studies most recently Sayeed et. Al (2008) studied impact of ALM on profitability of Bangladesh commercial banks using the time series data from 1995 to 1996. In the eve of global economic contraction and share market crisis in Bangladesh, it is necessary to find out how banks at present are managing their assets and liabilities to sustain profitability trends. Therefore, the objective of this study is to bring down the existing research gap.

To have an idea about their impact on profitability this study considers two first generation and one second generation commercial bank of Bangladesh. Statistical Cost Accounting Model is applied to test the sampled banks’ performances in managing assets and liabilities. This study has tried to have significant impact to the existing literature relating to the Asset and Liability Management of financial institutions. First, it examines the factors that create income from assets and costs for liabilities. Secondly, it focuses the degree of relationship among the factors.

Along with this introduction, the study has been shown in six sections. Section two provides a brief overview of banking industry in Bangladesh. Section three gathers the existing literature relating to the Asset and Liability Management of financial institutions and their impacts on profitability. Section four deals with methodology of the study. Section five ascertains the analyzed results and findings. After all, section six provides summary of the study.

Overview of Banking System in Bangladesh

A bank is a financial intermediary accepting deposits and granting loans offering the widest menu of services of any financial institution (Rose, 2012). According to Economic Review of Bangladesh (2015), there are four types of scheduled banks operating in the banking sector in Bangladesh such as state owned commercial banks (SOCBs), specialized banks (SBs), local private commercial banks (PCBs) and foreign banks (FBs). As of June 2015, there are 56 scheduled banks among them 6 state owned commercial banks (including BASIC Bank and Bangladesh Development Bank Ltd), 2 specialized banks, 39 local private commercial banks (PCBs) and foreign banks (FBs). As of June 2015, there are 56 scheduled banks among them 6 state owned commercial banks (including BASIC Bank and Bangladesh Development Bank Ltd), 2 specialized banks, 39 local private commercial banks and 9 foreign commercial banks. Apart from these banks, 6 non-scheduled banks such as Ansar VDP Unnayan Bank, Shamobaya Bank, Karmasangsthan Bank, Grameen Bank, Jubilee Bank Ltd. and Probashi Kalayan Bank are also operating in the banking sector in Bangladesh. The structure of banking system and share of total deposits and assets because of types of banks are shown in Table 5.6.

1Statistical Cost Accounting (SCA) model is described by Hester & Zoellner (1966) as a regression method by which “rates of return are imputed to earning assets and deposit liabilities” (P-373).
and the interpretive framework of asset-liability management in order to identify and interpret the foreign and domestic balance sheet strategies of large U.S. banks in the context of the "crisis in lending to LDCs." Their study found that the least profitable very large banks have the largest proportions of foreign loans and the most profitable very large banks have the smallest proportions of foreign loans.

Kosmidou et. al (2004) at their study of asset-liability management of domestic and foreign Banks in the UK found that liability management contributes more in creating the profitability differences among the banks, which is contrast with the findings of Vasiliou (1996).

Asiri (2007) examined eight Kuwaiti banks applying Statistical Cost Accounting method and found that assets are positively and liabilities negatively related to the profitability.

Sayeed et. al (2012) attempted to examine the impact of asset and liability management on the profitability high profitable and low profitable and private and public banks working in Bangladesh applying Statistical Cost Accounting (SCA) methods and found high earning banks experience higher returns from their assets and lower returns from their liabilities than the low earning banks. They further articulated that assets management of large commercial banks is better than that of small banks, but there are no significant differences in terms of liability management.

Objectives and Hypothesis

This study is an attempt to understand the impact of Assets and Liability Management (ALM) on profitability of private commercial banks in Bangladesh. As such, the objective of this study is to complete this existing research gap and to provide a descriptive analysis of assets and liability positions held by the sampled banks. Therefore, the objectives of this study are:

- To have a descriptive view of selected assets and liabilities variables of sample banks.
- To understand the trend of the selected variables.

To verify the hypotheses through multiple regressions analysis and following alternative hypotheses have been designed:

H1.1: There exists a significant relationship between loans & advances and profitability.
H1.2: There exists a significant relationship...
between balances with other banks and profitability.

H1.3: There exists a significant relationship between investment and profitability.

H1.4: There exists a significant relationship between term deposits and profitability.

H1.5: There exists a significant relationship between total other liabilities and profitability.

H1.6: There exists a significant relationship between borrowing from other banks and profitability.

Methodology

To examine the impacts of ALM on commercial banks’ profitability working in Bangladesh, the Statistical Cost Accounting (SCA) model is described by Hester & Zoellner (1966) with some modification proposed by Kwast & Rose (1982) is used. The model works as a regression method assumes that the rate of return on earning assets is positive and varies across assets, and the rate of cost on liabilities is negative and varies across liabilities.

Financial institutions generate revenue from their lending, investment and other services and brokerage functions provided. On the other hand, they also admit costs for their liabilities and other financing contracts and also their other operating expenditures. Operating profit is the subtracted result of operating income by operating costs. The variation in commercial banks’ operating income is expressed by the traditional SCA model which was developed by Hester and Zoellner (1966) for bank b in time t which will be used in this study is as follows:

\[ Y_{bt} = \alpha_1 + \Sigma a_{2i} A_{ibt} + \Sigma a_{3j} L_{jbt} + e_{bt} \]  

Where,

- \( Y_{bt} \) = net operating income
- \( A_i \) = ith asset
- \( L_j \) = jth liability
- \( \alpha_{2i} \) = net fixed income that is not dependent on assets and liabilities.
- \( e_{bt} \) = stochastic term
- \( a_{2i} \) = marginal rates of return on assets
- \( a_{3j} \) = marginal costs of liabilities.

Due to wide variations in their business volume of sampled institutions it would be inefficient to use the book value of the assets and liabilities (Kosmidou et al, 2004) and that's why all the variables of equation (1) are divided by a banks’ total asset (Abt). Thus equation (2) takes the form of:

\[ Y_{bt}/A_{bt} = \alpha_1/A_{bt} + \Sigma a_{2i} A_{ibt}/A_{bt} + \Sigma a_{3j} L_{jbt} /A_{bt} + e_{bt} \]  

Here, \( \mu_{bt} \); the stochastic term is assumed to be normally distributed by a zero mean is found by dividing \( e_{bt} \) by \( A_{bt} \).

This study uses a multiple regression model assuming only net operating income (\( Y_{bt} \)) as dependent variable where Hester & Zoellner (1966) and Kwast & Rose (1982) considered both total operating income and net operating income in their studies. The rationality for the exclusion of total operating income as dependent variable is that total operating income structure consists of several income heads where ALM can affect in no way. Nevertheless, these income heads usually require different level of operating costs. Therefore, using Net Operating Income can be rational reflection of ALM efficiency.

Net operating income (\( Y_{bt} \)) is the portion of total income that is left out after deducting operating costs from the total income which is the dependent variable in the regression, each element of \( a_{2i} \) is assigned to reflect the market rate of return earned on the appropriate asset and therefore, should have a positive value. The return on liability, \( a_{3j} \); may also be positive or zero for banks as they impose service charges on deposit accounts but for the NBFIs it is negative as they are allowed only to have term deposits. Such coefficients are negative for other liabilities. The \( \alpha_1 \) coefficient, the constant term, will measure income flows that are unrelated to ALM issues. In the total income regression, \( \alpha_1 \) is expected to be positive.

All assets and liabilities are not included as independent variables in this model. The reasons are: to conduct the comparison only the identical assets and liabilities are considered. Again, since balance sheet identity is that total assets are equal to total liabilities and owners? equity, inclusion of all assets and liabilities would create perfect co-linearity within the independent variables (Sayeed et al, 2012). Actual figures of explanatory variables i.e. assets, liabilities and total assets are used in the calculations. The explanatory variables used in the study have been mentioned below:
This study considered three domestic commercial banks (Pubali Bank Ltd, AB Bank Ltd & Bank Asia Ltd) for the period from 2003 to 2014. Therefore, the number of observation is 210. Data is mainly collected from the annual reports of the sampled banks and from Bangladesh Bank, central bank of Bangladesh.

### Analysis & Findings

The descriptive statistics of all explanatory and explained variables with their absolute value in this study have been presented through Table-3. It is based on a panel data set organized from three commercial banks operating in the Bangladeshi banking market during the period from 2003 to 2014.

### Table-3: Mean Values of Explanatory and Explained Variables (Amounts in Million Taka)

<table>
<thead>
<tr>
<th>Year</th>
<th>A1</th>
<th>A2</th>
<th>A3</th>
<th>Li</th>
<th>L2</th>
<th>L3</th>
<th>TA</th>
<th>ROA (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>18302.61</td>
<td>1558.25</td>
<td>3591.12</td>
<td>24515.82</td>
<td>3443.11</td>
<td>347.12</td>
<td>29691.00</td>
<td>1.00</td>
</tr>
<tr>
<td>2004</td>
<td>18805.58</td>
<td>1974.61</td>
<td>5241.16</td>
<td>27187.84</td>
<td>2747.85</td>
<td>793.25</td>
<td>32205.00</td>
<td>1.00</td>
</tr>
<tr>
<td>2005</td>
<td>23965.63</td>
<td>1363.36</td>
<td>3952.10</td>
<td>30122.79</td>
<td>3007.79</td>
<td>989.26</td>
<td>38059.00</td>
<td>2.00</td>
</tr>
<tr>
<td>2006</td>
<td>31311.68</td>
<td>9631.21</td>
<td>4876.10</td>
<td>38681.84</td>
<td>3327.73</td>
<td>596.13</td>
<td>45623.00</td>
<td>2.00</td>
</tr>
<tr>
<td>2007</td>
<td>39975.69</td>
<td>1365.24</td>
<td>22884.39</td>
<td>47126.81</td>
<td>4822.84</td>
<td>1538.27</td>
<td>57846.00</td>
<td>2.00</td>
</tr>
<tr>
<td>2008</td>
<td>59491.75</td>
<td>1902.25</td>
<td>8639.11</td>
<td>61338.81</td>
<td>6831.91</td>
<td>1734.23</td>
<td>75770.00</td>
<td>2.00</td>
</tr>
<tr>
<td>2009</td>
<td>65118.68</td>
<td>2175.23</td>
<td>12734.13</td>
<td>75591.80</td>
<td>7806.83</td>
<td>2910.31</td>
<td>94385.00</td>
<td>3.00</td>
</tr>
<tr>
<td>2010</td>
<td>85637.70</td>
<td>2755.23</td>
<td>14385.11</td>
<td>92720.77</td>
<td>10179.84</td>
<td>7551.62</td>
<td>122216.00</td>
<td>3.00</td>
</tr>
<tr>
<td>2011</td>
<td>96281.65</td>
<td>3379.32</td>
<td>20307.14</td>
<td>111618.77</td>
<td>12823.90</td>
<td>4128.29</td>
<td>143405.00</td>
<td>1.00</td>
</tr>
<tr>
<td>2012</td>
<td>109186.64</td>
<td>4317.25</td>
<td>28651.16</td>
<td>133558.78</td>
<td>16603.98</td>
<td>3919.23</td>
<td>169914.00</td>
<td>1.00</td>
</tr>
<tr>
<td>2013</td>
<td>130671.64</td>
<td>2794.14</td>
<td>37469.18</td>
<td>157724.78</td>
<td>20175.10</td>
<td>5733.29</td>
<td>201117.00</td>
<td>1.00</td>
</tr>
<tr>
<td>2014</td>
<td>151134.66</td>
<td>3240.41</td>
<td>39661.17</td>
<td>177296.72</td>
<td>24341.10</td>
<td>7741.42</td>
<td>229765.00</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Source: Data collected from Annual Reports of Sampled Banks and compiled by researchers using MS Excel. Figures in the parentheses indicate the percentage of total assets.

Table-3 represents data in absolute value and percentage as of total assets. Loans & advances (A1) has received the core concentration in the sampled banks’ asset portfolio. Over the study period loans & advances and balances with other banks (A2) components maintained relatively stable proportions of total assets. But, there are some ups and downs in case of investment (A3) proportion. It has the highest ratio; 39.56 percent in 2007 and lowest in 2005 as 10.38 percent. In liabilities part, fixed and time deposit (L1) remained as dominating one. Almost 80 percent of total assets has been financed through fixed and time deposits over the study period. Current and other non-interest bearing liabilities (L2) and other borrowings and funding (L3) did not change so extremely in assets proposition over the study period. Return on Assets (ROA) was increasing to 3 percent till 2010 then it remained constant by 1 percent.
ratio (L2) and other borrowing to total assets ratio (L3) have the means of 0.637, 0.0263, 0.138, 0.732, 0.079 & 0.043 with the standard deviations of 0.129, .0111, 0.0351, 0.129, 0.0218 & 0.028 respectively.

Most of the commercial banks operating in Bangladesh have financed their source of funds through total deposits (L1) that is used the fund for provision of loans and advances (A1). Surprisingly, these two variables have same level variations in the sampled banks’ study period.

Pearson’s Correlation Matrix

From Table-6, it can be observed that dependent variable, ROA has a significant positive relationship with A1 (0.598), poor positive relationship with A2 (0.054) and A3 (0.045). ROA has significant negative relationship with L2 (.566) and poor negative relationship with L1 (0.61) and L3 (.386). There is also significant negative relationship between L1 and L3 (.752).

Table-6: Pearson’s Correlation Matrix

Most of the commercial banks operating in Bangladesh have financed their source of funds through total deposits (L1) that is used the fund for provision of loans and advances (A1). Surprisingly, these two variables have same level variations in the sampled banks’ study period.

Table-5: Descriptive Statistics of explanatory and explained variables

Variables | Sampled Banks | Mean | Std. Deviation
--- | --- | --- | ---
ROA | .0179375 | .00938116
A1 | .6372042 | .12864894
A2 | .0262817 | .01115602
A3 | .1375287 | .03514877
L1 | .7322374 | .12876705
L2 | .0790167 | .02175653
L3 | .0429893 | .02763498

Source: Data collected from Annual Reports of Sampled Banks and compiled by researchers using MS Excel.

[[Year 2013 has been considered as base year therefore it has been remained blank in growth figure].

Table-4 shows that total assets have been increased by almost 14 percent in 2014 where it was just 9 percent in 2004. On an average the growth of total assets is 20.62 percent over the study period. Total assets experienced an increasing growth till 2010 after that it has decreasing growth. Loan & Advances (A1) has a moderate increasing growth but decreasing growth is in Balances with other institutions (A2). Investment (A3) also tends to be decreasing. These all indicate that banks’ total assets position is largely approaching to loans & advances portfolio.

Table-5 provides the summary descriptive statistics analysis of all dependent variables and independent variables. Looking at them, generally, the statistics indicate a wide variability exist in among the balancesheet variables which have effect on commercial banks profitability Return on Assets that is, the profitability ratios of banks has a mean of 1.79 percent with standard deviation of 0.94 percent. The independent variables, total loans & advances to total assets ratio (A1), balances with other banks to total assets ratio (A2), investment to total assets ratio (A3), deposits to total assets ratio (L1), other current liabilities to total assets ratio (L2) and other borrowing to total assets ratio (L3) have the means of 0.637, 0.0263, 0.138, 0.732, 0.079 & 0.043 with the standard deviations of 0.129, .0111, 0.0351, 0.129, 0.0218 & 0.028 respectively.

Table-5: Descriptive Statistics of explanatory and explained variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Sampled Banks</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROA</td>
<td>.0179375</td>
<td>.00938116</td>
<td></td>
</tr>
<tr>
<td>A1</td>
<td>.6372042</td>
<td>.12864894</td>
<td></td>
</tr>
<tr>
<td>A2</td>
<td>.0262817</td>
<td>.01115602</td>
<td></td>
</tr>
<tr>
<td>A3</td>
<td>.1375287</td>
<td>.03514877</td>
<td></td>
</tr>
<tr>
<td>L1</td>
<td>.7322374</td>
<td>.12876705</td>
<td></td>
</tr>
<tr>
<td>L2</td>
<td>.0790167</td>
<td>.02175653</td>
<td></td>
</tr>
<tr>
<td>L3</td>
<td>.0429893</td>
<td>.02763498</td>
<td></td>
</tr>
</tbody>
</table>

Source: Data collected from Annual Reports and compiled by the researchers using SPSS
Regression Result

Table 7: Regression Model

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>Beta</th>
<th>T-Statistics</th>
<th>Sig.</th>
<th>Relation</th>
<th>R-Square</th>
<th>Adjusted R-Square</th>
<th>F</th>
<th>Sig Probability (F-Statistics)</th>
<th>Durbin-Watson</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-0.068</td>
<td>-0.742</td>
<td>0.491</td>
<td>Neg</td>
<td>961</td>
<td>0.742</td>
<td>0.461</td>
<td>0.179</td>
<td>2.240</td>
<td></td>
</tr>
<tr>
<td>A1</td>
<td>0.096</td>
<td>0.668</td>
<td>2.467</td>
<td>0.05</td>
<td>Pos</td>
<td>961</td>
<td>0.742</td>
<td>0.179</td>
<td>2.240</td>
<td></td>
</tr>
<tr>
<td>A2</td>
<td>0.168</td>
<td>0.248</td>
<td>0.743</td>
<td>0.491</td>
<td>Pos</td>
<td>961</td>
<td>0.742</td>
<td>0.179</td>
<td>2.240</td>
<td></td>
</tr>
<tr>
<td>A3</td>
<td>0.017</td>
<td>0.167</td>
<td>0.679</td>
<td>0.532</td>
<td>Pos</td>
<td>961</td>
<td>0.742</td>
<td>0.179</td>
<td>2.240</td>
<td></td>
</tr>
<tr>
<td>L1</td>
<td>0.032</td>
<td>0.144</td>
<td>0.303</td>
<td>0.774</td>
<td>Pos</td>
<td>961</td>
<td>0.742</td>
<td>0.179</td>
<td>2.240</td>
<td></td>
</tr>
<tr>
<td>L2</td>
<td>-0.196</td>
<td>-0.344</td>
<td>-1.218</td>
<td>0.277</td>
<td>Neg</td>
<td>961</td>
<td>0.742</td>
<td>0.179</td>
<td>2.240</td>
<td></td>
</tr>
</tbody>
</table>

Source: Based on data collected from Annual Report and compiled by the researchers using SPSS

Conclusion

The main purpose of this study is to bring out the impacts of Asset Liability Management Strategies on Banks’ profitability based on twelve years’ secondary data. Results indicated loans & advances (A1) of sampled banks has a significant positive relationship with profitability in the study period. However, findings do not support other alternative hypotheses, as the relationships are found insignificant. We assume that further research option is available here to focus the validity of the hypothesis considering more time series data. The findings of the study have implications for bank management, bank regulators and policy makers in Bangladesh. There should be optimum asset and liability portfolio mix to overcome the problems of mismanagement in the banking sector of Bangladesh.

References:


