Investigating the Impact of Net Liquidity Gap on Profitability of Banking Business: A Study on Some Selected Commercial Banks in Bangladesh

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Abstract
Managing Liquidity in a commercial bank whether it is a private or nationalized bank is very crucial task for a successful venture. Now banks are compelled by rules to disclose their liquidity position through a statement of liquidity as per the rule circulated by Bangladesh bank. Besides that a commercial bank always is pressured to keep certain part of its deposit for liquidity. But higher liquidity can cause lower investment and lower liquidity can cause insolvency. In this dilemma, this study focuses on the total liquidity gap derived from net liquidity gap of each maturity bucket of six private commercial banks to find its relationship with some profitability and by business profitability indicative ratios such as ROA, ROE and EPS. This study also measures the liquidity position of the banks in both short term and long term tenure. It is a descriptive research where the tools of analysis are trend analysis, simple regression method, F-test etc. Six banks are chosen for the analysis and these are chosen based on convenience and availability of required data. The findings of the study show that there is a strong relationship between TLG and three profitability indicators, namely ROA, ROE and EPS in few banks, and the relationship is found negative based on the coefficient value of the simple regression equation.

Keywords: Net Liquidity Gap; Liquidity Management; Business Profitability; Banking Business
1. Introduction

Any commercial bank, conventional or Islamic, is required to monitor and manage its liquidity position effectively and cautiously. Liquidity management is a part of the larger risk management framework of the financial services industry, which concerns all financial institutions. Studying liquidity management issues is a critical and complex subject as failure to address the issue may lead to dire consequences, including banking collapse, and eventually, jeopardizing the stability of the financial system. In fact, most banks fail due to difficulties in managing their liquidity problems. High liquidity maintenance reduces investment fund and may decrease the profit of a bank. Bangladesh Bank started slashing liquidity support to the commercial banks from November 28 that continued until December 21 2010 for implementing its present monetary policy. On December 21, 2010, the Central Bank received 24 bids of one-day tenure, amounting to Tk. 113.1967 billion but provided Tk. 39.2593 billion against the bids (Financial Express, December 22, 2010). The crisis of the liquid fund in the private commercial banks resulted in the rise of call money rate of up to 190 percent. It signifies the need of liquidity management and its effect, but surprisingly the problem of liquidity has not come abruptly and the officials of banks knew it would be a problem in liquidity crisis if they invested more in unproductive sectors like the capital market. This study intends to identify why banks take the risk of the liquidity crisis. The reasons are possibly to have a more profitable business which is the major objective of the research.

2. Objective of the Study

The objective of this study is to analyse and evaluate the relationship between the financial performance indicators and net liquidity gap of different types of banks of Bangladesh. To accomplish the objective, the profitability ratios are calculated, the liquidity position of different banks is examined and evaluated, and finally, the influence of total liquidity gap on ratios of profitability is analysed.

3. Research Methodology

A systematic methodology is followed to conduct this research. It has been discussed in detail in the following passages. The description covers design of the research, analytical framework, source of data and its collection, sampling procedure and data analysis.
3.1 Research Design

The net liquidity gaps for different banks are calculated. In order to do that, it is necessary to collect maturity-wise data for both assets and liabilities, which are segmented according to the following maturity classification as stated in annual reports of different banking organizations in Bangladesh. The following figure shows the classification of assets and liabilities based on liquidity as it is shown in annual reports.

*Figure 1: Classification of assets and liabilities for calculating total liquidity gap (annual report)*

Generally, for fulfilling reserve requirements and safety purposes, banks have to hold a specific portion of liquid assets. Liquidity specifically refers to the ability of the financial intermediaries to meet deposit withdrawals, honouring loan requests at maturity (Ghannadian and Goswami 2004). Positive total liquidity gap implies that the bank has sufficient assets to satisfy the liabilities of the same maturity bucket and negative net liquidity gap implies that the liabilities exceed the assets for that particular maturity bucket.

3.2 Theoretical Framework

As stated in the research objective, this study is mainly focused on liquidity management and its relationship with profitability indicators. To do this, three very common
profitability indicators are chosen: Return on Asset (ROA), Return on Equity (ROE) and Earnings per Share (EPS). The theoretical framework is shown in the following figure –

Figure 2: Analytical design of the research

Phase 1: Liquidity Position and Liquidity Gap Analysis

Phase 2: Simple Regression Analysis

Return on Asset (ROA)
Return on Equity (ROE)
Total Liquidity Gap (TLG)

Dependent variables
Independent variable

To give the above framework an analytical design in a practical model like an OLS regression analysis lets

\[ Y = f(X_1) \]

Where,

\[ Y_1 = \text{Return on Asset (ROA)} \]
\[ Y_2 = \text{Return on Equity (ROE)} \]
\[ Y_3 = \text{Earnings per Share (EPS)} \]
\[ X_1 = \text{Total liquidity gap (TLG)} \]

Then the regression model will be

\[ Y_1 = a + b_1 X_1 + e_1 \]
\[ Y_2 = a + b_2 X_1 + e_2 \]
\[ Y_3 = a + b_3 X_1 + e_3 \]
In the three models shown above, ‘a’ is the intercept of the regression line and ‘b’ is the slope of the regression line where \(i = 1, 2, 3\). There is an error term associated with the \(i^{th}\) observation, denoted as ‘e’ and the value of \(i = 1, 2, 3\).

### 3.3 Sampling Procedure and Data Analysis

This research is mainly based on secondary data. The data used are of total liquidity gaps, and data for calculating various ratios of performance indicators. These data are collected mainly from the annual reports of the respective banks. The research sample includes each year’s financial performance of a bank. For the purpose of this study, six banks have been selected to analyse their liquidity management and profitability. The time horizon of the data used in this research is from 2007 to 2012. The selected banks are First Security Islami Bank Limited (FSIBL), IFIC Bank (IFIC), United Commercial Bank Limited (UCBL), Southeast Bank Limited (SEBL), Mercantile Bank Limited (MBL), and Arab Bangladesh Bank Limited (ABBL). The data gathered for the research are analysed using various techniques. The key profitability indicators are analysed using graphs and tabulation to give a practical perspective in the form of trend analysis. The liquidity position is also analysed as the analysis of the ratios of performance of banks, but there is a division of long term and short term liquidity position with the aggregate figure. Finally, the relationship is analysed using simple regression model, analysis of variance (ANOVA), F-test, P-value etc., and all these values are given in tables and then explained. For all these analysis, Microsoft Office Excel is used; its ‘data analysis’ tools were especially useful.

### 4. Literature Review on Liquidity and Profitability of Commercial Bank

There are extensive studies done on liquidity management and its relation with performance measure, efficiency and profitability. In the financial system, banks’ liquidity can be categorized into two types: funding (or liability) liquidity risk and market (or asset) liquidity risk. Market-liquidity risk is related to the banks’ inability to easily counterbalance or sell assets at the market price as a result of inadequate market strength or market distraction. Funding-liquidity risk on the other hand is associated to the risk whereby the bank is unable to efficiently meet its obligations as they become due (Basel Committee, 2008). Vittas (1991) said that measuring bank efficiency is difficult because there is no satisfactory definition of bank output.
Neither the number of accounts nor total assets, total loans or total deposits can provide a good index of output. He also says that banks in developing countries operate with a relatively widespread. For instance, a wedge between loan and deposit rates, at least for the non-privileged customer of banks, is created by the imposition of onerous reserve requirements and other forms of bank taxation, the operation of directed credit programs and a high level of inflation. In addition, high operating cost, large loan losses and large profits from uncompetitive are also translated into wide bank spread.

Islam and Chowdhury (2006) found that the Islamic banking system is in a comparatively better position in liquidity management than other conventional banks. Islamic banking organization like Islami Bank Bangladesh Limited (IBBL) showed lower liquidity volatility and their performance in terms of earning per share, return on asset, and return on equity are comparatively better than a traditional commercial bank like Arab Bangladesh Bank Limited (ABBL). But in the long term with respect to liquidity management, ABBL performs better than IBBL. From their regression analysis, it was found that profitability ratios had a greater influence on liquidity than other indicators. The key performance indicators like EPS, P/E ratio, ROE, ROA all had influential role in determining the extent of liquidity (Ratnovskil 2013, Griffin 2012, Ahmed et al. 2011.

Saunders and Cornett (2006) found that that banks was in “knife-edge situation because holding too many liquid assets penalizes their earnings” and a bank holding excessive amounts of liquid assets was unlikely to survive long. Profit-oriented liability management demands that banks should build prudential levels of liquid assets and maintain a liquidity structure that reduces large amount of liquid asset. Banks can insulate their balance sheet from liquidity risk by managing the liability structure of their portfolios. Akhavein et al. (1997) and Smirlock (1985) found a positive and significant relationship between size and bank profitability. Demirguc-Kunt and Maksimovic (1998) suggest that the extent to which various financial, legal and other factors (e.g. corruption) affect bank profitability is closely linked to firm size. In addition, as Short (1979) argues, size was closely related to the capital adequacy of a bank since relatively large banks tend to raise less expensive capital and, hence, appear more profitable. Other internal factors, such as credit or liquidity were considered as bank specific factors, which are closely related to bank management, especially risk management. The need for risk management in the banking sector is inherent in the nature of the banking business. Poor asset
quality and low levels of liquidity are the two major causes of bank failures and are represented as the key risk sources in terms of credit and liquidity risk and attracted attention from researchers who examined their impact on bank profitability.

As Golin (2001) mentioned, it was critical that a bank carefully guards against liquidity risk-the risk that it will not have sufficient current assets such as cash and quickly saleable securities to satisfy current obligations; for example, those of depositors, especially during times of economic stress. Without the required liquidity and funding to meet obligations, a bank may fail. However, liquid assets are usually associated with lower rates of return. In terms of liquidity measurement, the ratio of liquid assets to customer plus short term funding and the ratio of liquid asset to total deposit and borrowing are the most common ratios used in research as a measure of liquidity. The higher this percentage, the more liquid the bank was and less vulnerable to operational inefficiency and even failure. (Vento & Gang 2009, Franck & Kraus 2007).

In the aftermath of the recent financial crisis, there is a general sense that banks had not fully appreciated the importance of liquidity risk management and the implications of such risk for the bank and the wider financial system. As such, policymakers have suggested that banks should hold more liquid assets than in the past, and this will help self-insure against potential liquidity or funding difficulties. This has led to an international desire for common measures and standards for liquidity risk, culminating in ongoing work by the Basel Committee on Banking Supervision (BCBS 2010). Referring to previous studies, the results concerning liquidity were mixed. Molyneux and Thorton (1992) among others, found a negative and significant relationship between the level of liquidity and profitability. Consistent with their results, Guru et al (1999) also found a negative relationship between liquidity and bank profitability. However, Bourke (1989) and Kosmidou and Pasiouras (2005) found a significant positive relationship between liquidity and bank profits. Therefore conclusion about the impact of liquidity on bank performance remains ambiguous and further research is required, especially in the context of the banking sector of Bangladesh.

5. Research Findings and Analysis

The collected data is analysed using different tools and techniques. The performance of different banks is depicted in graphs so that the trend of last three years financial performance can be shown. The liquidity position of different banks is then tabulated and shown in the form
of graphs. In analysing liquidity position of banks, both short term and long term position is analysed separately. Finally, the relationship among the dependent (ROA, ROE and EPS) and independent (Net liquidity gap) variables are analysed.

5.1 Performance Based on Different Financial Performance Indicators

Among the six banks, the best return on asset ratio was in 2007, when AB bank (ABBL) acquired 3.41 percent of its total asset as net income. This bank is very consistent in maintaining the top return on asset ratio over the last three years. In the year 2007, IFIC Bank managed to achieve second position by acquiring 2.42 percent.

**Figure 3: Return on Asset ratio of several banks. (Annual reports and own calculation)**

Another important indicator of financial performance of a bank is return on asset (ROA). In the six year time frame, ABBL was the most successful bank in the first four years, and then the bank had a downward trend in its return on asset in comparison with the other five banks. FSIBL has been growing from the year 2007 to 2010 but then it also started dropping. In the last two years, it is observed that the all six banks had decreasing ROA compared to previous years. In the year 2010, all six banks had better ROA compared with that of other years.
The final indicator of profitability is the earnings per share. Here, some contrasting observations are noticed. The previous two ratios show AB Bank, DBBL etc. banks as the top performers. But in the analysis of EPS, the top performer is UCBL. The reason behind the contrasting picture is the number of shares outstanding which is caused the dissimilarities. UCBL was top performer in terms of the earning from each of its share in the all three years. DBBL was in the second best performer, and later AB Bank took that place in the year 2008 and 2009.
ABBL has been performing well in all the three profitability indicators, although in the last two years, 2011 and 2012, the bank had downward trend in its profitability. Another bank, UCBL has been continuing a consistent trend of profitability in its banking business.

5.2 Liquidity Positions of Different Banks

In a financial disclosure of different banks, the liquidity position is given in a separate financial statement, known as liquidity statement. There are five columns that describe the maturity of different asset and liabilities. These can be classified into two broad categories. In this study, the short term liquidity position is contained in the liquidity gap which has maturity of less than one year, meaning the maturity of one month, three to six months and six to less than one year. In the analysis of the short term liquidity position, AB Bank had secured its position by staying in front of all six banks in the year 2009 and 2012. In the year 2011, Mercantile Bank gained the best short term liquidity based bank. DBBL and Mercantile Bank was also in a better position in the other two years. Actually, these three banks shared the top three places in the all three years. The following graph shows the trend of the banks in those four years.

Figure 6: Short-Term Liquidity position of different banks (Annual report)

In the analysis of the long term liquidity position of banks, it can be seen that there is relatively low presence of negative figures. This is because the liquidity is mostly needed in the short term financing and in case of long term financing, banks can consider other alternatives. In the following table, Southeast Bank is the best performer in all three years because it had the highest surplus of liquid money on the basis of long term liquidity needs. The bank has an
upward or increasing trend of the long term liquidity. FSIBL and UCBL also performed well in these years.

**Figure 7: Long-Term Liquidity position of different banks (annual reports)**

![Graph showing long-term liquidity position of different banks]

Since the short and long term liquidity gaps are already analysed, the analysis now involves the aggregate data analysis. The net or total liquidity gap is analysed in this section. In managing net liquidity gaps, IFIC bank was the leader among the six banks to manage its net liquidity gap to be minimal in the last six years starting from 2007 to 2012. This bank has been maintaining a stable and consistent level of liquidity over the last six years.

**Table 1: Total Liquidity Gaps of six banks in Bangladesh. (Source: Annual reports)**

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSIBL</td>
<td>1,134,290,942</td>
<td>2,538,573,006</td>
<td>2,865,410,755</td>
<td>3,920,011,486</td>
<td>4,500,173,333</td>
<td>5,664,479,782</td>
</tr>
<tr>
<td>IFIC</td>
<td>2,613,782,109</td>
<td>3,200,735,797</td>
<td>4,197,456,238</td>
<td>5,748,467,030</td>
<td>6,567,893,180</td>
<td>6,867,443,808</td>
</tr>
<tr>
<td>UCBL</td>
<td>3,137,223,404</td>
<td>4,384,243,088</td>
<td>5,705,466,765</td>
<td>3,137,000,000</td>
<td>4,384,000,000</td>
<td>18,171,016,134</td>
</tr>
<tr>
<td>SEBL</td>
<td>6,144,469,101</td>
<td>7,357,274,431</td>
<td>11,329,177,287</td>
<td>12,329,177,287</td>
<td>14,329,177,287</td>
<td>10,329,177,287</td>
</tr>
<tr>
<td>MBL</td>
<td>2,929,303,879</td>
<td>3,617,332,110</td>
<td>4,296,251,751</td>
<td>7,185,685,263</td>
<td>9,659,333,276</td>
<td>10,924,549,884</td>
</tr>
<tr>
<td>ABBL</td>
<td>4,722,000,000</td>
<td>6,722,000,000</td>
<td>10,086,000,000</td>
<td>13866508215</td>
<td>14,852,700,507</td>
<td>16,033,805,870</td>
</tr>
</tbody>
</table>

UCBL was the second best bank in liquidity management. This bank has been managing lower Total Liquidity Gap (TLG) except in the year 2012. Moreover, the bank is increasing the total liquidity gap, which means it had increasing rate of liquidity surplus for supporting the liquidity needs. And the trend of the liquidity gap is upward. In the following figure, the trend of the TLG is shown.
It is important to strike a balance between investment opportunities and liquidity reserve in the form of TLG. To guard liquidity risk, an optimum level of TLG should be maintained; otherwise some investment opportunities can be lost, which can affect business profitability adversely.

5.3 Regression Analysis between TLG and Business Profitability Indicators

As given in the research methodology, this study analyses the relationship between TLG and three business profitability indicators. The relationships among variables are analysed and examined whether the relationship is significant or not. To analyse the relationship, a number of tests are done which include the F-test, value of $R^2$ and P value. In the first regression model, it is found that only three banks among the six banks show significant relationship between ROA and TLG.

In the second regression model, the relationship between ROE and TLG is found to be significant for only two banks. According to the regression equation shown in the following figure, the influence of TLG on ROE is negative. Almost every bank studied in this study, had their ROE influenced negatively by TLG, indicating that a positive change in ROE is depended on a negative change in TLG. UCBL and ABBL can increase their ROE for each unit that is depended on a decrease in TLG of 0.0000095 and 0.000021 respectively.
### Table 2: Simple Regression Analysis between ROA vs. TLG (Source: own calculation)

<table>
<thead>
<tr>
<th>Banks</th>
<th>Regression Equation</th>
<th>$R^2$</th>
<th>F-test Value</th>
<th>P-value of F-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSIBL</td>
<td>ROA = 0.00345 - 0.0000040 TLG</td>
<td>0.71448</td>
<td>10.0096</td>
<td>0.03458</td>
</tr>
<tr>
<td>IFIC</td>
<td>ROA = 0.0289 – 0.0000029 TLG</td>
<td>0.39955</td>
<td>2.66485</td>
<td>0.17795</td>
</tr>
<tr>
<td>UCBL</td>
<td>ROA = 0.0166 – 0.000005266 TLG</td>
<td>0.60435</td>
<td>6.11088</td>
<td>0.06825</td>
</tr>
<tr>
<td>SEBL</td>
<td>ROA = 0.01578 -0.00000002 TLG</td>
<td>0.00072</td>
<td>0.00365</td>
<td>0.95435</td>
</tr>
<tr>
<td>MBL</td>
<td>ROA = 0.11154 + 0.0000005 TLG</td>
<td>0.08235</td>
<td>0.35901</td>
<td>0.58133</td>
</tr>
<tr>
<td>ABBL</td>
<td>ROA = 0.04715 -0.00000213 TLG</td>
<td>0.68955</td>
<td>8.88395</td>
<td>0.04075</td>
</tr>
</tbody>
</table>

### Table 3: Simple Regression Analysis between ROE vs. TLG (Source: own calculation)

<table>
<thead>
<tr>
<th>Banks</th>
<th>Regression Equation</th>
<th>$R^2$</th>
<th>F-test Value</th>
<th>P-value of F-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSIBL</td>
<td>ROE = 0.19796 -0.000018 TLG</td>
<td>0.14290</td>
<td>0.66690</td>
<td>0.45990</td>
</tr>
<tr>
<td>IFIC</td>
<td>ROE = 0.1939+ 0.000008 TLG</td>
<td>0.02874</td>
<td>0.11832</td>
<td>0.74812</td>
</tr>
<tr>
<td>UCBL</td>
<td>ROE = 0.24994 – 0.0000095 TLG</td>
<td>0.71735</td>
<td>10.17235</td>
<td>0.03325</td>
</tr>
<tr>
<td>SEBL</td>
<td>ROE = 0.1897-0.000004 TLG</td>
<td>0.14732</td>
<td>0.86392</td>
<td>0.39535</td>
</tr>
<tr>
<td>MBL</td>
<td>ROE = 0.2022-0.000004 TLG</td>
<td>0.34754</td>
<td>2.13082</td>
<td>0.21815</td>
</tr>
<tr>
<td>ABBL</td>
<td>ROE = 0.4781 -0.000021 TLG</td>
<td>0.68795</td>
<td>8.81723</td>
<td>0.04145</td>
</tr>
</tbody>
</table>

### Table 4: Simple Regression Analysis between TLG vs. EPS Source: own calculation.

<table>
<thead>
<tr>
<th>Banks</th>
<th>Regression Equation</th>
<th>$R^2$</th>
<th>F-test Value</th>
<th>P-value of F-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSIBL</td>
<td>EPS = 9.04927-0.0011TLG</td>
<td>0.14070</td>
<td>0.65500</td>
<td>0.46373</td>
</tr>
<tr>
<td>IFIC</td>
<td>EPS = 9.34 -0.001032 TLG</td>
<td>0.64254</td>
<td>7.19033</td>
<td>0.05514</td>
</tr>
<tr>
<td>UCBL</td>
<td>EPS = 23.050-0.001066TLG</td>
<td>0.21900</td>
<td>1.12169</td>
<td>0.34927</td>
</tr>
<tr>
<td>SEBL</td>
<td>EPS =5.5341-0.000190TLG</td>
<td>0.27993</td>
<td>1.94346</td>
<td>0.22198</td>
</tr>
<tr>
<td>MBL</td>
<td>EPS = 3.1805-0.000001 TLG</td>
<td>0.00262</td>
<td>0.01054</td>
<td>0.92316</td>
</tr>
<tr>
<td>ABBL</td>
<td>EPS = 13.755-0.000517TLG</td>
<td>0.34154</td>
<td>2.07481</td>
<td>0.22313</td>
</tr>
</tbody>
</table>
In the final model, IFIC bank showed significant relationship between its EPS and TLG. IFIC has significant influence of TLG on its EPS at 95% confidence level. 64.25% variation in EPS is explained by the TLG for IFIC. In this equation, the relationship is found to be similar to the previous two regression equations; the increase in EPS is depended on decrease of TLG.

For all three profitability measures, their relationship with TLG is found to be negative for most of the banks studied. It is discussed in the beginning of the paper, that total liquidity gap is derived from total assets in different maturity bracket minus total liability. In this study, most banks had positive TLG, which is decreased when asset is utilized more, resulting in a higher profitability.

6. Conclusion

In previous researches, the relationship between liquidity management and profitability was found to be ambiguous because excess liquidity can cause underperformance. So it can become a dilemma and the bank has to decide whether it wants to keep higher or lower liquidity. In this study, FSIBL, UCBL, ABBL and IFIC Banks have significant negative relationship between TLG and three profitability indicators, ROA, ROE and EPS. This is an indication that the banks managed their liquidity at an optimum level, which resulted in a significant influence of TLG on profitability indicators. It is critical that a bank carefully guards against risks arising from shortage of liquidity. In the literature review, policy maker and experts suggested that banks should hold more liquid assets than they had in the past. In this study, an upward trend of net liquidity gap is noticed, which supports policymakers’ suggestion. The research can be more valuable and evident if more samples are added in the analysis. But the unavailability of required data and inconsistency of data sources create obstacles to cover more samples. But further investigation and availability of adequate resources can be helpful overcoming these limitations.

References


