Abstract

The purpose of the paper is to identify the impact of trade deficit of the economy on liquidity crisis of banks and develop the model of foreign currency bond to solve the problem in the banking industry of Bangladesh. From the data of 20 years, statistically significant negative correlation (-0.946) has been found between trade deficit of the economy and demand deposit of banks. Hence, simple linear regression has been applied to assess the impact of trade deficit on demand deposit of banks. Besides, a model of foreign currency bond in association with central bank and commercial banks has been proposed to solve the problem of liquidity crisis resulting from trade deficit. The period studied in this paper is 20 years out of available data of 25 years (1993-2018) omitting the data of 5 years due to outliers in value and unavailability of data just after Liberation War 1971. Besides, only trade deficit has been taken into consideration as determinant of liquidity crisis ignoring other factors as non-performing loan and statutory liquidity reserve however only trade deficit demonstrates 89.5 percent of the variation in the demand deposit of banks under this study. The paper is significant for the banking industry as it faces the problem of liquidity crisis frequently where the proposed model will generate fund for the commercial banks to solve the problem.
Keywords: Foreign currency; Advance to deposit ratio; Supply of liquidity; Banking;

JEL Classification: G21, O16, O24.

1. Introduction

A number of reasons are responsible for liquidity crisis as evidenced from experts’ opinion especially excess lending, holding low proportion of demand deposit, statutory liquidity reserve, non-performing loan (The World Bank, 2018) and trade deficit. Liquidity risk resulting from non-performing loan and liquidity gap significantly affects bank’s profitability with negative relationship (Arif and Anees, 2012). It has been evidenced that higher regulatory capital results in lower liquidity creation of banks in BRICS countries requiring trade-off between regulatory capital and liquidity creation by bank management (Umar et al., 2017). Excess liquidity of Islamic banks can not be invested in conventional means due to Shariah consideration that can be utilized for financing government budget deficit of the country in Islamic way (Boumediene, 2015). Strong quality of institutions results in significantly higher liquidity creation not only under normal economic condition but also in financial crisis (Baradwaj et al., 2016). Besides, due to increased mobility of capital flow, liberalization of capital control has statistically significant positive impact on liquidity creation of banks (Baradwaj et al., 2016).

Bangladesh, India and Nepal demonstrate strong form of sustainability but Sri Lanka and Pakistan show weak form of sustainability in the context of current account (Shastriet al., 2018). Current account deficit of India is widening due to fiscal deficit, trade growth terms, trade openness issues, rise in gold and oil price etc. despite comfort from service sector and private sector remittances requiring export growth with high-value product export for sustainable current account (Behera and Yadav, 2019). Higher bank capital and complete implementation of Basel III consequence creation of lower on-balance-sheet liquidity and profitability (Umar et al., 2016).

A study on BRICS countries reveals that banks risk-taking is significantly negatively affected by liquidity risk as lower funding liquidity and liquidity risk consequences higher bank risk-taking (Dahiret al., 2017). The study also suggested further research on how new liquidity
standard of Basel III can be handled to reduce bank risk taking. In the OIC countries, it has been evidenced that capital ratio, foreign ownership, credit risk, monetary policy, deposit insurance have statistically significant negative correlation with liquidity of banks but profitability, size, efficiency and market capitalization have statistically significant positive correlation with bank’s liquidity (Harbi, 2017). The study provided further research direction to identify new liquidity determinants of banks such as, depositors trust, interbank rate, unemployment rate in developing or less-developing economies (Harbi, 2017). Hence, the study ignored the impact of trade deficit on liquidity of banks in the context of developing or less-developing countries as most of the other relevant literatures.

In the context of Bangladesh, liquidity crisis seems severe again in 2019 amounting on an average liquidity of BDT 76,750 crore taking into account the data of last 6 quarters (Uddin, 2019). Together with the liquidity crisis, banks face the problem of higher advance to deposit ratio (ADR) frequently (The World Bank, 2018). Central bank extended the term for lowering the ADR ratio to 83.5 percent from 85 percent and 89 percent from 90 percent for conventional banks and Islamic banks respectively (Banerjee, 2018) for fourth term (each term is 6 months) but 59 banks failed to comply with the circular (Star Business Report, 2019).

Bangladesh is facing trade deficit for more than last 25 years. Commercial banks are buying foreign currency from central bank for importers against Bangladeshi taka that is a vital reason for liquidity crisis which is usually ignored by the experts during discussing about liquidity crisis where empirical analysis is needed urgently. Experts usually blame those factors as responsible for liquidity crisis which seem out of control of central bank and commercial banks or ineffective in the context of depositors confidence since long such as non-performing loan and statutory liquidity reserve (SLR). But, the issue of trade balance should be addressed with utmost importance because the impact of trade deficit on liquidity crisis can be solved by proper foreign currency management in association with central bank and commercial banks.

There is ongoing discussion among researchers on how banks can solve the problems of liquidity crisis and comply with regulatory ADR but literatures have been found rarely that show the solution of the problems rather than only identifying the probable reasons for the problems without empirical analysis in the context of Bangladesh. Hence, the aim of the paper is to identify the main reason for liquidity crisis based on empirical
analysis rather than only blaming the so-called assumed factors and develop a comprehensive model in association with central bank and commercial banks to solve the problem of liquidity crisis. The study will answer the question of what is the main reason for liquidity crisis in banks and how the problem can be solved in the context of Bangladesh.

2. Literature Review

Study of Ismal (2010) evaluated only three aspects of liquidity management namely asset side of banks, liability side of banks and liquidity management policy of banks where Indonesian Islamic banking industry stands between index grade excellent, good and satisfactory. The study also suggested further analysis from the aspects of liquidity behavior and withdrawal decision of depositors as well as central bank and government policies as banking regulators (Ismal, 2010). Liquidity of banks does not depend on size of the bank except the issue of funding liquidity in emerging economics where funding liquidity is explained by profitability and riskiness (Umar and Sun, 2016). Besides, profitability and leverage determine bank-specific liquidity creation (Umar and Sun, 2016). The study suggested further research on the impact of changes in capital on bank liquidity and how the determinants of bank liquidity differ at different stages of development in the context of least developed countries (Umar and Sun, 2016).

From the analysis of Ong (2017), significant evidence has not been found to conclude that exchange rate volatility has effect on demand for foreign currency account (FCA) in the long run. Hence, foreign currency account seems not appropriate hedging tool compared to forward foreign exchange facility to firms that import raw material to produce and sell goods in the local market (Ong, 2017).

The trade balance of Bangladesh is negative since long. Trade balance weakens instantly after devaluation as it stimulates the exports demand but not exports supply because Bangladesh has to import huge capital goods for its vital exporting industries under this disadvantageous situation of importers (Murshed et al., 2014). Throughout the previous years, import of principal primary commodities has declined but import of principal industrial and capital goods has increased marginally (Rahman, 2008). Trade deficit in Bangladesh has increased because of rise in import cost more than export earnings resulting from importing huge capital machineries by the entrepreneurs for new investments (Hasan, 2018).
More than five months’ import payment bills can be paid with the existing reserve (Hasan, 2019). Average demand deposit of banking industry has been around 11 percent of total money supply since more than last 20 years where time deposit has been around 77 percent and currency outside banking system has been around 12 percent on an average for the same period (Bangladesh Economic Review, 2018). As liquidity has inverse relationship with profitability of banks, recent liquidity scenario has evidenced higher operating profit in spite of liquidity crisis in 23 banks under the observation of The Daily Star (Uddin, 2019), a leading newspaper in Bangladesh. Hence, targeting to increase the proportion of demand deposit shifting fund from time deposit sacrificing profitability of bank may not be wise decision for banking industry.

Statutory liquidity reserve has been settled for the safeguard of depositors which is essential for banking industry to manage reputational risk as depositors provide around 90 percent of working capital of a bank. So, reducing the ratio can be a shortcut tool but it will make the banks more vulnerable to the depositors and hamper depositors’ confidence which is a matter of concern in the present scenario of banking industry as addressed by Professor Shibli Rubayat-Ul-Islam (Islam, 2019). Hence, developing alternative solutions keeping the depositors confidence at a higher level is urgent need to solve the problem of liquidity crisis of banks which has been studied rarely in the existing literatures.

3. Conceptual Framework

Commercial banks will face liquidity trap resulting borrowing fund from central bank at higher cost if depositors withdraw their deposits which is lifeline of banking business (Jeanne and Svensson, 2007; Diamond and Rajan, 2001). Holding sufficient fund to meet unexpected demands of depositors seems extremely expensive due to losing investment opportunities and cost of fund (Holmstrom and Tirole, 2000). As majority of the assets are funded by demand deposit, it causes severe liquidity risk resulting from maturity mismatch or liquidity gap (Central Bank of Barbados, 2008). Liquidity crisis can be resulted from non-performing loan generated from especially long-term corporate lending (Akhtar, 2007). Following situations have been hypothesized in the above literatures by the authors:

H1: Increase in deposits increases profitability of bank
H2: Increase in cash reserves decreases the profitability of bank
H3: Increase in the maturity mismatch or liquidity gap causes a reduction in profitability of bank
H4: High provisioning for NPLs causes decrease in profitability of bank

The above mentioned hypotheses have been tested by Arif and Anees, (2012) where it has been evidenced that deposits boost up profitability of bank. Besides, increase in cash reserve does not decrease profitability of bank (Arif and Anees, 2012). The research also found that increase in liquidity gap and high provisioning for NPL reduce bank’s profitability (Arif and Anees, 2012). Following hypothesized model has been drawn from the analysis of Arif and Anees, 2012:

**Figure 1. Hypothesized liquidity risk model**

As increasing cash reserve ratio does not significantly reduce bank’s profitability, maintaining adequate level of statutory regulatory reserve is must to safeguard the bank’s liquidity crisis. Besides, managing perfect liquidity position matching the demand and supply of deposit depends on the competence of the management of bank where we have little to work with it. Besides, bringing the NPL ratio to lower level is a long term process that is remaining within the range of 5-12 percent for more than last 20 years which is currently 10.30 percent. Now, total number of defaulters is 170,390 with defaulted loans amounting BDT 102,315.19 crore according to the speech of current Finance Minister AHM Mustafa Kamal (Star Online
Huge amount of ever growing defaulted loans are under legal action which are not possible to be resolved overnight as evidenced in last 20 years.

Surprisingly, none of the above mentioned literatures worked on the mechanism of increasing the deposit of the commercial banks for better liquidity management resulting higher profitability. As above mentioned tested hypothesis (H1) demonstrates that increase in deposit ensures better liquidity management resulting higher profitability of bank, the research paper aims to identify and test a new source of deposit of bank under the following hypothesis:

**H1: Higher trade deficit causes decrease in demand deposit of bank**

4. Research Methodology

4.1 Sample Characteristics

The paper is based on secondary data only. Secondary data were gathered from journals, books, and Bangladesh economic review. The study focuses on only the demand deposit of all conventional banks and Islamic banks in Bangladesh under different liquidity risk management structure and trade balance (trade deficit) of entire country. Data of trade deficit in US dollar have been converted to Bangladeshi taka at foreign exchange rate of each year under observation. The data cover total amount of demand deposit of 56 scheduled commercial banks and total amount of trade balance, trade deficit in the context of Bangladesh, respectively for last 25 years (1993-2018) because of unavailability of data just after the Liberation War 1971. Finally the data of 20 years out of 25 years have been taken as sample size for the analysis omitting 5 years due to having outliers in Q-Q plot of normality of data for both the variables.

4.2 Variables

The collected data are time series in nature. In this research paper, two variables have been taken into consideration namely trade deficit and demand deposit. Trade balance refers to the amount of money by which export exceeds import in a country. If import is greater than export then it is regarded as trade deficit. In the context of Bangladesh, the trade balance is always negative resulting trade deficit. Trade deficit lies in the heart of current account deficit in the context of South Asian countries including...
Bangladesh where reduction in import, increase in export or combination of both measures can result reduced trade deficit (Shastri et al., 2018). Moreover, demand deposit of bank is repayable to customer on demand which can be withdrawn by the depositor without any prior notice. Liquidity risk of a bank refers to the ability of the bank to repay the short term debt obligations.

5. Result and Analysis

Simple linear regression model has been applied to analyze the data. Before constructing the model, values of descriptive statistics have been obtained to test the normality of data and satisfy the requirements of regression model. Table-01 shows that the mean value of trade balance is negative which means that on an average Bangladesh is facing trade deficit with BDT 21922.19 million. Besides, the mean value of demand deposit is positive with on an average of BDT 268375.50 million which means that banks are holding significant portion of demand deposit which may not be enough to handle liquidity crisis in continuous changing scenario of demand for liquidity. Standard deviation of sample mean seems satisfactory for both the variables under the study.

<table>
<thead>
<tr>
<th>Table 1: Descriptive Statistics</th>
<th>Trade Balance (Trade Deficit)</th>
<th>Demand Deposit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>-21922.19</td>
<td>268375.50</td>
</tr>
<tr>
<td>Median</td>
<td>-14934.07</td>
<td>186500</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>18977.45</td>
<td>214159.91</td>
</tr>
<tr>
<td>Standard error</td>
<td>4243.49</td>
<td>47887.61</td>
</tr>
<tr>
<td>Skewness</td>
<td>-.923</td>
<td>.914</td>
</tr>
<tr>
<td>Standard error (skewness)</td>
<td>.512</td>
<td>.512</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>-.497</td>
<td>-.483</td>
</tr>
<tr>
<td>Standard error (kurtosis)</td>
<td>.992</td>
<td>.992</td>
</tr>
</tbody>
</table>

Source: Developed by author from data analysis
To test the normality of the data set under the study, skewness and kurtosis have been used as two numerical measures of shape. Besides, normality plot has been used as graphical method.

**Figure 2.** Normal Q-Q plot of trade balance

**Figure 3.** Normal Q-Q plot of demand deposit

With a skewness of \(-0.923\) (SE=0.512, z-value = \(-0.923/0.512 = -1.80\)) and a kurtosis of \(-0.497\) (SE=0.992, z-value = \(-0.497/0.992 = -0.50\)) for the trade balance and a skewness of \(0.914\) (SE = 0.512, z-value = \(0.914/0.512 = 1.79\)) and a kurtosis of \(-0.483\) (SE = 0.992, z-value = \(-0.483/0.992 = -0.49\)) for the demand deposit where all the four z-values are within +/- 1.96 (Das and Imon, 2016), we can assume that the data are approximately normally distributed in terms of skewness and kurtosis (Ghasemi and Zahediasl, 2017).
2012). Besides, from the visual inspection of above mentioned normal Q-Q plots of both the variables, the data have been found as approximately normally distributed for both the trade balance (TB) and demand deposit (DD).

Table 2: Correlation and Simple Linear Regression

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>t-statistic</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>34372.508</td>
<td>24758.103</td>
<td>1.388</td>
<td>0.182</td>
</tr>
<tr>
<td>Trade balance (trade deficit)</td>
<td>-0.946</td>
<td>0.863</td>
<td>-12.37</td>
<td>0.000</td>
</tr>
<tr>
<td>Trade balance (trade deficit)</td>
<td>-0.946</td>
<td>0.863</td>
<td>-12.37</td>
<td>0.000</td>
</tr>
<tr>
<td>Source: Developed by author from data analysis</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Fitted simple linear regression model:

\[
\text{Demand Deposit} = 34372.508 \text{ million} - 0.946 \text{ (Trade Deficit)} + \varepsilon \ldots (i)
\]

Table - 2 shows the results of correlation and simple linear regression where correlation value depicts that demand deposit is highly negatively correlated with trade balance (trade deficit). The value of correlation coefficient, \( R \) is 0.946. The result demonstrates very high degree of correlation and the negative sign (-) in the value of Beta indicates the correlation is negative (Gujrati, 2012). The value of \( R^2 \) is 0.895 which shows that 89.5 percent of the variation in the demand deposit can be explained by the variation in trade deficit (Gujrati, 2012). The value of adjusted \( R^2 \) is 0.889 which implies that 88.9 percent of the variability in demand deposit is due to the fitted model as per improved estimation. The value of adjusted \( R^2 \) depicts that addition of more independent variables may not have
significant impact on the dependent variable. The value of Darbin-Watson statistic is 1.629 which is close to 2.00 (Kothari, 2004).

The null hypothesis of the study reveals that trade deficit is not related to demand deposit of bank that is \( R^2 \) is 0. The value of \( F \)-test for testing the null hypothesis evidences that the null hypothesis is rejected \( (F=152.93, p<0.01) \). Therefore, it can be concluded that trade deficit is related to demand deposit of bank. The model fitness seems authenticated and the relationship between trade deficit and demand deposit is strong as \( p<0.01 \). It can be estimated from table -2 that there would be 0.946 unit negative change in the demand deposit of bank as a result of one unit positive change in trade deficit. The \( t \)-statistic for the coefficient of trade deficit is -12.37, statistically significant, and the \( p \)-value for the coefficient is \( <0.01 \). Hence, \( H1 \) has been accepted with 99.99 percent confidence level and 1% significance level \((\alpha)\) which reveals that the alternative hypothesis higher trade deficit causes decrease in demand deposit of bank is accepted.

From the above fitted simple linear regression model, it is clear that there is statistically significant highly negative correlation between trade balance (trade deficit) and demand deposit of banks. So, a model of foreign currency bond has been proposed as follows to solve the problem of liquidity crisis generated from trade balance specially trade deficit in the context of Bangladesh.

6. Unique Propositions of the Proposed Foreign Currency Bond

The proposed model has targeted the factor trade balance (trade deficit) to develop a tool to solve liquidity crisis in association with central bank and commercial banks. This model will play vital role to handle foreign currency so that banks’ demand deposit can be used properly to overcome the problem of liquidity crisis and regulatory ADR.
6.1 Issuer and Investor

The proposed foreign currency bond can be issued in dollar as widely accepted international currency. Bangladesh Bank in association with commercial banks can introduce foreign currency bond to tackle liquidity crisis to bring discipline in banking industry. To meet up the trade deficit, commercial banks purchased foreign currency of around BDT 178400 crore in 2018 which has been decreased to BDT 149898 crore in 2019 equivalent to trade deficit. But, experts are mostly blaming so called NPL as the major responsible factor of liquidity crisis which is significantly lower amounting BDT 93370 crore in 2019 compared to trade deficit. Hence, huge amount of deposit is being shifted to central bank from commercial banks due to purchasing foreign currency by commercial banks and foreign currency is being sent to abroad for making payment to exporters resulting liquidity crisis in commercial banks. But, this fund can be added to the demand deposit of banks or kept in banks for short term investment in the form of demand loan to handle liquidity crisis if central bank purchases foreign currency bond from commercial banks rather than selling foreign currency.
against Bangladeshi taka. Issuance cost including direct cost and regulatory compliance cost for the proposed bond have to be minimum for both issuer and investor so that it cannot adversely influence the price of products imported by importers (Raghavan and Sarwono, 2012; Khan, 2012).

6.2 Maturity

Around 60 percent letter of credit are sight L/C where banks usually do working capital financing for importers in Bangladeshi taka equivalent to the foreign currency paid for making import payments on behalf of the importers. The proposed bond can be issued for 90 days or more to meet the liquidity crisis of bank in this period. The maturity period can very according to import of machinery or raw materials on case to case basis. Interest of bond can be repaid monthly and principal can be repaid at the maturity date. It will be convenient for bank if it can fix the maturity date of the bond matching with the nature of goods of import and settle the bond just after getting payment from the importer. The bank will regularly review the importer so that importer can sell the imported or produced goods within 90 days or more and repay the short term credit of the bank.

6.3 Interest Rate

Central bank can purchase the proposed bond at bank rate which is 5 percent. Commercial banks can lend money to the importer at maximum 10 percent interest rate maintaining regulatory spread. Hence, the profitability of commercial banks will not be hampered, Central bank will be able to get some return against such bond besides maintaining discipline in banking industry and importer will get advantage of around 1 percent to 3 percent reduction of interest rate as importer has to pay around 11 percent to 13 percent interest rate for this period of three months or more if importer wants to avail working capital financing from commercial banks. As bank will collect installment from importer and pay interest of bond to central bank, the liquid funds which could be shifted from commercial banks to central bank for purchasing foreign currency will remain in the commercial banks to maintain adequate liquidity and ADR ratio. As bank will generate required return from the importer against credit backed by foreign currency bond, investing the liquid fund to be kept for maintaining liquidity will not be required urgently and bank will get some comforts to handle liquidity crisis and regulatory ADR. L/C commission of around
0.40% with required margin will be taken from the importer under existing mechanism of commercial banks.

6.4 Regulatory Issues

Foreign exchange rate of the proposed bond will be the spot rate during purchasing the bond which will not change during the maturity period of the bond because derivative securities like call options or put options are not available in the financial market of Bangladesh to minimize exchange rate risk. Bondholders can sell bond according to the nature of bond (Thukral et al., 2015) but the proposed foreign currency bond will be purchased by central bank from commercial banks which will not be sold by central bank later. Besides, commercial banks can not issue any bond in foreign currency or domestic currency to raise capital according to Bank Company Act 1991 and Bangladesh Bank cannot purchase any bond from commercial banks as per Bangladesh Bank Order, 1972. Hence, some minor amendments in the existing acts will be required taking into consideration the proposed model. All the tools of credit control as bank rate policy, open market operations and variable reserve ratio will exist in the banking industry to control money supply besides the proposed bond. Some regulatory issues in the existing bond market in Bangladesh have to be addressed during developing the proposed bond including poor credit assessment process of banks, poor regulatory framework to bring integrity in market for investor’s confidence, weak financial infrastructure of fixed income market, poor liquidity, weakness in rating mechanisms, demand and supply situation of bonds and lack of liquidity in the government bond market (Sridhar and Joshi, 2015).

7. Conclusions

The research paper evidenced that trade balance (trade deficit) has statistically significant impact on demand deposit of banks which is used to meet up short term debt obligation of banks. However, the correlation between trade balance (trade deficit) and demand deposit is negative but targeting to minimize the trade deficit for bank liquidity will not make any sense in a country as Bangladesh with higher GDP growth rate above 7 percent which has targeted to be developed economy from developing economy within 2041. Hence, a new source of supply of liquidity has been identified through instigating foreign currency bond that has been unveiled.
first time through this study in the context of Bangladesh. Hence, proposed foreign currency bond will support the banking industry to overcome the problems of liquidity crisis and regulatory ADR under the control of central bank and commercial banks without influencing the trade balance specially trade deficit of the country.

Acknowledgement

I would like to thank Professor Shibli Rubayat-Ul-Islam, Dean, Faculty of Business Studies, University of Dhaka for initiating the idea of foreign currency bond. Besides, I acknowledge the support of Dr. Md. Azizul Baten, Professor, Department of Statistics, Shahjalal University of Science and Technology for reviewing the paper and making suggestions to do the statistical analysis properly.

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