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## **Managing Banking Liquidity Risk in the Current Economic Conditions: A Conceptual Framework**

*Rifki Ismal*

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# Managing Banking Liquidity Risk in the Current Economic Conditions: A Conceptual Framework

Rifki Ismal\*

## Abstract

The paper attempts to analyze the conceptual basis for managing banking liquidity risk in the current economic conditions. After identifying and profiling risks in banking institution, the current concept of liquidity risk management requires the banks to set up a liquidity risk management process. It consists of determining liquidity risk management policies, setting the roles of ALCO, establishing an effective information system and, conducting internal control system for liquidity management. Further, after analyzing factors triggering asset-liability imbalance, the banks prepare techniques to mitigate liquidity imbalance and liquid financial instruments to fulfill the demand for liquidity. Finally, this comprehensive concept is expected to help banks to properly manage liquidity in the challenging economic/business condition nowadays.

**Keywords:** ALCO, Board of Directors, Maturity mismatch, Asset-liability balancing

## Background

In the theories of financial intermediation, the two most outstanding reasons regarding the existence of financial institutions, especially banks, are their provision of liquidity and financial services. The banks are valuable as the providers of liquidity services because they provide depositors with liquidity insurance (Brynt, 1980; Diamond and Dybvig, 1983 as cited in Santos, 2000:4). However, the bank role in transforming the short-term deposits into the long term loans makes it inherently vulnerable to liquidity risk (BIS, 2008b:1).

Principally, the concept of liquidity in finance lies in two areas: (a) the liquidity of financial instruments in the financial market and; (b) the liquidity related to the solvency. The former is about liquid financial market and financial instruments. For examples are marketable financial instruments, smooth transactions and no financial barriers. The latter, where this paper is focusing, discusses with the obligation of a bank to make payments to the third parties (Fiedler, 2000:442). For examples are setting up liquidity management policies, reserving liquidity, and preparing liquid financial instruments. Actually, the main idea in liquidity management is to balance the demand for liquidity from the liability side of the bank balance sheet and the supply of liquidity from the asset side. If the banks fail to balance those two sides, do not have sufficient internal liquidity reserves and, fail to obtain funds from the external sources, they are in liquidity risk problems.

The paper attempts to analyze the conceptual basis for managing banking liquidity risk in the current economic conditions. The forthcoming sections will identify and describe the profile of liquidity risks in banking institution. Then, the main output of the paper is to explain the liquidity risk management process. Finally, after analyzing factors triggering asset-liability imbalance, the paper investigates the

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\*E-mail: rifki.ismal@unswin.ac.id

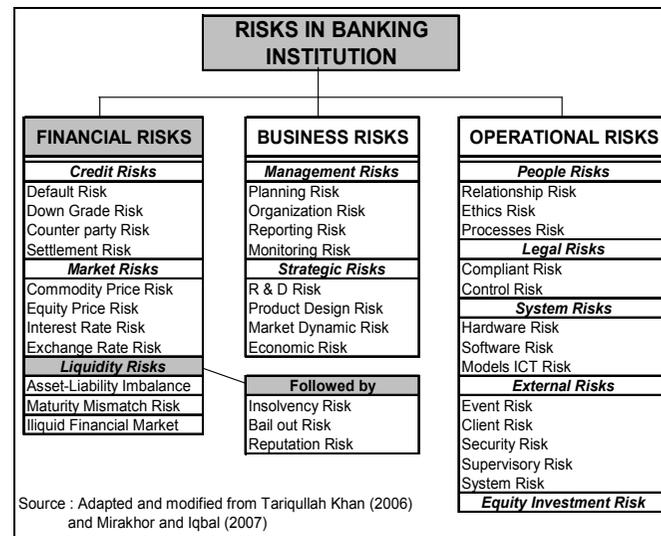
techniques to mitigate liquidity imbalance and propose some liquid financial instruments to fulfill the demand for liquidity.

## Liquidity Risk in Banking Institutions

### Risks in Banking Institution

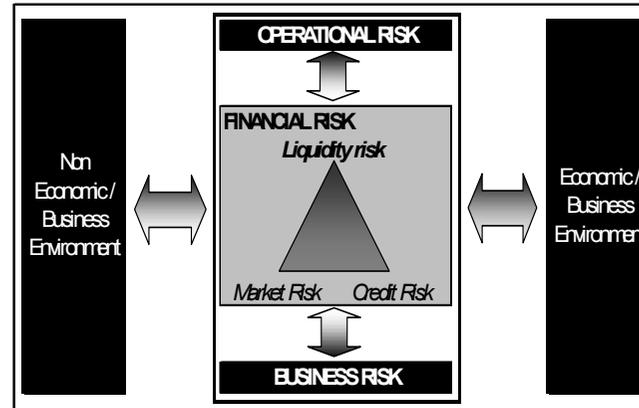
Risk in financial terms is usually defined as the probability that the actual returns may differ from the expected returns (Howells and Bain, 1999: 30). In the financial system, there are at least three broad categories of risks: (1) financial risks; (2) business risks and; (3) operational risks (Khan, 2006: 5) as seen in figure 1. Financial risks are related to the risks coming from banking activities while business risks and operational risks are related to the internal affairs of the banks. In this respect, liquidity risk is classified under financial risk category along with credit risks and market risks.

Figure 1 Risks in Banking Institution



However, the treatment of risks should be arranged within the casual and interactive systems because the impacts of one type of risk cannot be isolated from the other types of risks. All risks have correlations and influence each other (see figure 2). For example, market risks and credit risks might cause liquidity risk and vice versa; business risks and operational risks can trigger liquidity risk as well. In the case of banks, liquidity risk can appear because of the asset-liability imbalance or maturity mismatch risk. As such, the banks should alert and foresee the factors causing financial risks, business risks and operational risks, as these can contaminate factors leading to liquidity risk. They may not ignore the other types of risks while handling liquidity risk.

As illustrated by figure 2 below, there are economic and non economic environments affecting the operations of a bank. Both of them may cause financial risks, business risks and operational risks to happen which in the end can cause liquidity risk because of the interconnection between liquidity risk, market risk and credit risk. Indeed, the global financial crisis 2007-2008 occurred because of the failures in derivatives markets which impacted the ability of banks to provide liquidity to the third parties (Siddiqi, 2008: 3-9).



**Source:** Adapted and modified from Arani (2006), Moreno (2006), Sach (2007) and Zhu (2001). Therefore, managing liquidity risk is more challenging nowadays. The financial innovations and global markets development have transformed the nature of liquidity risk (BIS, 2008a:2). There are currently less reliance on bank deposits, increased reliance on capital market and an easy access to the global financial markets. These conditions have made the banks volatile with the financial market issues such as the one happened during the global financial crisis. Moreover, it has to be noticed that the banks should not mitigate the problem of liquidity risk as a single entity because the liquidity problems in one bank does not only impair the bank itself but also a financial system even the overall economy.

Therefore, the cooperation among bank management, stakeholders, banking regulators and public is required to set up the strong foundation for a sound banking liquidity management. In addition, the 2007-2008 global financial crisis has given important messages for the banks to prudentially deal with the unsecured derivative markets, avoid excessive and imprudent bank credits and, increase the market discipline (Chapra, 2008: 2-15).

Particularly, to successfully manage liquidity, the banks should currently establish a robust liquidity management framework (BIS, 2008a:3). The framework, first of all, prevents the banks from the negative impacts of unfavorable economic conditions. Secondly, it helps the banks to provide liquidity on the liability side and extend credit on the asset side. The last but not the least, it avoids the banks from liquidity risk problems, bank rush and government's bail out to the default banks. In fact, most of the failures of banks<sup>3</sup> occurred due to insufficient liquidity management system solving adverse circumstances.

### **Profile of Liquidity Risk in Banking**

In a simple word, liquidity risk management in banks is simply the risk of being unable to raise funds without incurring unusually high costs (Moreno, 2006:74). This happens when the depositors collectively decide to withdraw more funds than the bank has immediately on hand (Hubbard,

2002:323). Hence, liquidity risk applies symmetrically to the borrowers in their relationship with the banks<sup>4</sup> and to the banks in their relationship with the depositors<sup>5</sup> (Greenbaum and Thakor, 1995:137).

In practice, the banks regularly find imbalances (gap) between asset and liability sides that need to be equalized because, by nature, banks issue liquid liabilities but invest in illiquid assets (Zhu, 2001:1). If a bank fails to balance such gap, liquidity risk might occur followed by the other exposures such as insolvency risk, government's bail out the default banks and, reputation risk. These failures or inefficient management of liquidity is somehow determined by how strong is the liquidity pressure, how well the banks prepare the liquid instruments, how is the bank conditions in the time of liquidity pressure and, the inability of the banks to find liquid sources either inside or outside the banks. Figure 3 below lists some internal and external factors in banks that may potentially lead to the liquidity risk problems.

**Figure 3. Internal and External Factors Leading to Liquidity Risk Problems**

Internal Banking Factors	External Banking Factors
High off-balance sheet exposures	Very sensitive financial market and depositors
The banks rely heavily on the short-term corporate deposits	External and internal sudden economic shocks
A gap in the maturity date of asset and liability	Low economic performances
The banks rapid asset expansions exceed the liability side	Decreasing depositors trust on the banking sector
Short-term deposit concentration	Non economic factors (political unrest, etc).
Less allocation in the liquid government instruments	A sudden depositors withdrawals
The banks do not attract placement in the long term deposit	Government needs liquidity for the public projects

**Source:** Adapted and modified from Mirakhor and Iqbal (2007), Antonio (1999), Alsayed (2007) and Tariq and Ali (2005)

One of the tools used in finance to analyze the position of bank liquidity and detect potential liquidity problems is financial ratios. First of all is the ratio of liquid assets to liquid liabilities. This ratio might be higher in a country with (a) no government intervention on meeting the funding gaps; (b) risk averse financial institutions; (c) fixed interest rates deposits and; (d) difficulty in hedging (Moreno, 2006:73). The survey from Bank for International Settlements (BIS) in 2006 identified that Korea, Czech Republic, Turkey, Poland, Hong Kong, Mexico, Saudi Arabia and Hungary are in high liquidity ratio.

Secondly is the ratio of demand deposits to private sector credits. Given that the credits to private sector are illiquid, a raising share of demand deposits could trigger liquidity mismatch and invite liquidity risks. Thirdly is the non performing loan (NPL) ratio. In a high NPL, the banks might be difficult to facilitate any liquidity withdrawal from the depositors. The last but not the least is the loan to deposit ratio (LDR) ratio. The higher LDR ratio should be accompanied by the higher liquidity reserves in the banks.

### **The Process of Liquidity Risk Management**

With respect to the current economic conditions, Bank for International Settlements recommends banks to organize the liquidity management process to identify, measure, monitor and control the liquidity risk (BIS, 2008b:3). Such process entails at least four elements: (i) the liquidity management policies of the Board of Directors (BOD); (ii) the roles of asset liability committee (ALCO); (iii) the roles of internal control system for liquidity management and; (iv) the effective information system for monitoring and reporting liquidity risk. The following sections will explain each elements of the process in detail.

### **Liquidity Management Policies**

The liquidity management process begins with the stipulation of liquidity management policies by the BOD as the ultimate guidance for all entities in the organization. For this purpose, there are at least three requirements for the BOD to do (BIS, 2008b:3-4): (a) The BOD have to understand the bank liquidity risk profiles, the internal and external business environments and stipulate the liquidity risk tolerance; (b) The BOD have to determine and approve the strategies, policies and practices of liquidity risk management; (c) The BOD have to disseminate, communicate and guide senior managers to manage liquidity effectively and; (c) The BOD have to align risk-taking incentive of each bank business line with the liquidity risk exposures their activities create for the bank as a whole.

Certainly, liquidity management policies are vary across banking institutions, but at least four components below should be incorporated in the policies (Greenbaum and Thakor, 1995:521-559):

1. The policies must contain the specific goals and objectives with respect to managing liquidity, including the short-term and long-term liquidity management strategies;
2. The policies determine the roles and responsibilities of the bodies involved in liquidity management process, including asset and liability management policies and, relationship with the other financial institutions and regulators.
3. The policies determine the structure of identification, reporting, monitoring and reviewing the bank liquidity conditions;
4. The policies set the liquidity risk tolerance and prepare the contingency plan to handle and mitigate liquidity pressures.

When preparing and formulating the liquidity management policies, BOD may entail and incorporate ideas from the bodies in charge with managing liquidity risk such as the Chief Executive Officer (CEO) and the heads of risk management departments (divisions). Even, inputs from the banking regulators and stakeholders are also very important to be considered (see figure 4). This intensive and integrative cooperation and coordination will make the board fully understand the real conditions of the internal and external business environment in order to be able to formulate the applicable and sound liquidity management policies.

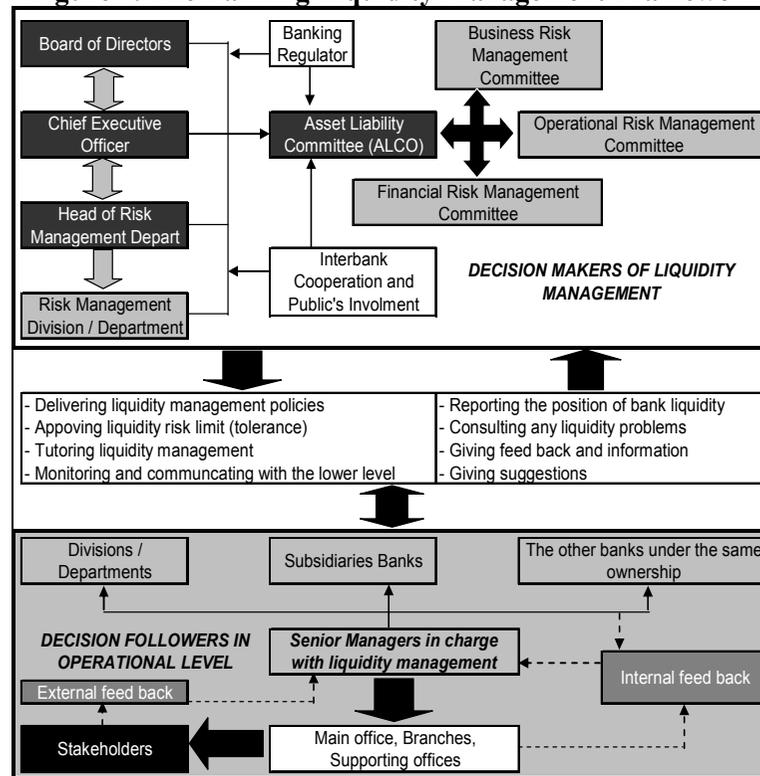
### **Asset Liability Committee (ALCO)**

In order to implement the liquidity management policies, the BOD assign a body to carry out the policies in the lower level, namely Asset Liability Committee (ALCO) (see figure 4). ALCO arrange the strategies to implement the liquidity management policies in the practical level in cooperation with the business risk management committee, operational risk management committee and, financial risk management committee. Particularly, ALCO: (i) manage and monitor the daily liquidity position and collaterals on the asset and liability sides; (ii) detect any liquidity imbalance; (iii) determine strategies to mitigate the liquidity imbalance and; (iv) maintain relationship with the external parties

Meanwhile, in the operational level, the application of the liquidity management policies and ALCO's strategies are carried out by the senior managers in every subordinate level. The senior managers manage the liquidity under instructions and cooperation of the upper level bodies. The primary responsibilities of the senior managements are amongst others:

- a. Transforming the liquidity management policies, objectives, and strategies of the upper level bodies into the operational level and managing the liquidity adhering to their lines of authority and responsibility.
- b. Ensuring the effectiveness and soundness of the liquidity management process within their area of responsibility;
- c. Monitoring the implementation of liquidity management process and delivering the related information to the upper level bodies.

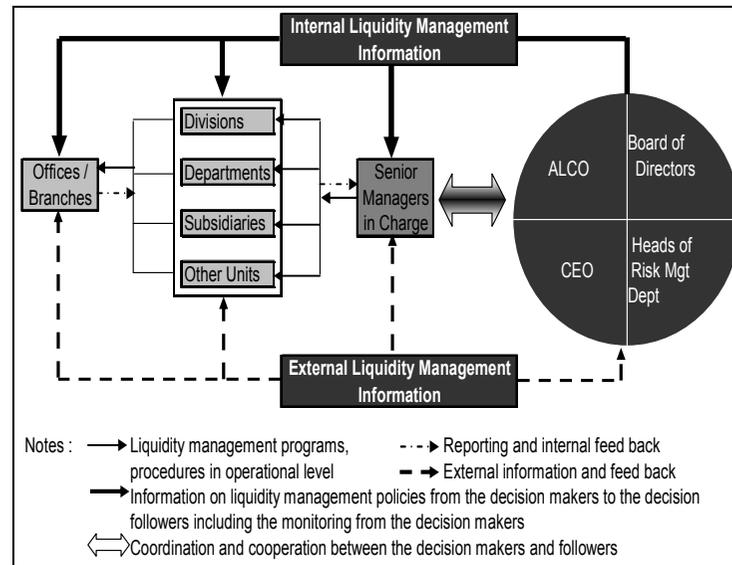
**Figure 4. The Banking Liquidity Management Framework**



**Effective Information System for Monitoring and Reporting**

Following the liquidity management policy and, the role of ALCO and its counterparts, the effective information system comes to support the liquidity management process (BIS, 2008a:6). This system enables the banks to monitor and control liquidity risk exposures and funding needs inside and outside the organization. In general, the effective information system comprises of two actors: (i) the top decision makers and; (ii) the decision followers in operational level. The former, who consist of BOD, ALCO, heads of risk management departments and CEO, deliver the full information on liquidity management policies, strategies and guidance to the latter who consist of

**Figure 5. Liquidity Management Information System, Monitoring and Reporting**



Practically, the senior managers assign their subordinates, monitor the implementation of liquidity management process and report to the decision makers based on the internal reports of the subordinates. Meanwhile, the decision makers coordinate and monitor the entire implementation of liquidity management process. The decision makers also receive internal reports, prudential reports and market information from the decision followers. In some cases, the management of the banks publishes such reports for the public disclosure to enable market participants to make an informed judgment about the soundness of the bank liquidity risk management framework and liquidity position (BIS, 2008b:4-5). These effective information system, comprehensive coordination and communication between the decision makes, decision followers and all related parties in the organization create a strong mechanism to manage and control liquidity risk.

### **Internal Control System for Liquidity Management**

In order to maintain the soundness of the liquidity management process, the banks should have an internal control system to ensure the compliance of the implementation of liquidity management policies by the decision followers with the one stipulated by the decision makers (BIS, 2008a:6) (see figure 5). This internal control system can be assigned to ALCO as a representative of BOD to bridge between the decision makers and decision followers. In the case of liquidity risk problems, ALCO investigate the level of liquidity risk and mitigate it based on the guidance of the decision makers. But in a serious liquidity risk problem, ALCO consult with the decision makers for the necessary and immediate actions.

However, the regular functions of the internal control system are to comprehensively assess the liquidity management framework, liquidity position and, when necessary, propose revision or enhancement of the liquidity management process to the BOD (decision makers). Further, the organization can cooperate and communicate with the external supervisors such as government body to assess the adequacy of a bank's liquidity risk management framework and level of liquidity (BIS, 2008b:2-5).

### Asset-Liability Imbalance and Maturity Mismatch Risks

The two main causes of liquidity risk are asset-liability imbalance and maturity mismatch which can happen because of two conditions (Helmen et al, 1994:164-165); (a) the liquid assets are available in larger portion than the volatile liabilities, namely liquidity gap or (b) the predicted amount of funds needed on the asset side for financing is bigger than the predicted amount of funds available on the liability side, namely liquidity need (see figure 6). Identifying and mitigating these two causes of liquidity risk may eliminate: (i) the funding liquidity risk when the depositors withdraw their short-term deposits and; (ii) the market liquidity risk when there is a disruption in the financial markets that make normally-liquid assets illiquid (Sharma, 2007).

One way to balance asset and liability of a bank is by matching the maturities or popularly known as maturity mismatch risk anticipation (Greenbaum and Thakor, 1995:172). To match the maturities of asset and liability, the bank deposits should be allocated in well-organized maturities assets. Hence, the demand for liquidity from the matured deposits could be fulfilled from the liquidity of the matured assets.

**Figure 6. Asset Liability Balancing and Liquidity Plan**

A s s e t s		S o u r c e s o f f u n d s	
L i q u i d	L i q u i d i t y g a p	V o l a t i l e	S t a b l e
N o n l i q u i d			
P r e d i c t e d l o a n g r o w t h	L i q u i d i t y n e e d	P r e d i c t e d d e p o s i t	

Source: Helmen, et all (1994).

Notes: Liquid: federal fund certificates, short-term securities, temporary investment instruments, non renewing loans. Non liquid: mortgage, consumer loans, commercial loans, premises, and equipments. Volatile: seasonal deposits, vulnerable deposits, short-term borrowings, large CDs. Stable: stable demand deposits, passbook/statement, saving, consumer CDs, long term deposits, capital notes, equity capital.

### Factors Triggering Asset-Liability Imbalance and Maturity Mismatch Risks

The first factor is when the depositors prefer depositing their funds in the short-term deposits. The banks then use some of such deposits to finance the long-term investment projects (Sharma, 2007:2). The asset-liability imbalance potentially occurs because the short-term deposits are liquid whilst the long-term investments are illiquid. Thus, when the depositors execute their short-term deposits, the banks are difficult to terminate their long-term investments to obtain immediate liquidity. Indeed, the

excessive reliance on short-term debts leaves the banks vulnerable in the financial distress (Beakley and Cowan, 2004:2).

The second factor is because the banks tend to offer a high deposit rate to attract more funds from depositors. Consequently, it is followed by a high credit rate to the entrepreneurs. Unfortunately, when the business is in down turn, a high credit rate reduces the ability of the entrepreneurs to repay the interest and principal of the debts and leave the banks in a difficult liquidity problem to repay the depositors deposits. Further, if the banks do not have access to borrow funds from the money market, this asset-liability imbalance problem could become liquidity run.

The third factor is if the big companies become the dominant depositors and locate the funds in the short-term deposits. Since the investments need long-term tenor, the maturity mismatch occurs. The banks would need an immediate liquidity if such big companies redeem their deposits without prior notice. The fourth factor is asymmetric information among depositors, banks, borrowers and regulators (Greenbaum and Thakor, 1995:173). For examples, when there is hidden (opaque) information among parties involved in bank financing activities or; unorganized liquidity behaviors between depositors and banks.

The last but not the least is business cycle that plays an important role in generating asset liability imbalance (Allen and Gallen as quoted by Zhu, 2001: 2). For example, the unfavorable business/economic conditions may disrupt the performance of the asset side which in the end may impact the balance between asset and liability sides.

### **Related Risks Following Asset-Liability Imbalance and Maturity Mismatch Risks**

When the asset-liability imbalance and maturity mismatch risks take place, there are related risks potentially following these two risks. This might happen if the banks fail to handle asset-liability imbalance and maturity mismatch risks. Such risks are insolvency risk, government take over (bail out) risk and reputation risk.

#### **A. Insolvency Risk**

Insolvency risk, which is the inability of the banks to fulfill their obligations to the depositors, happens if the banks fail to manage liquidity risk by having liquidity reserves, selling the liquid assets, or borrowing from money market. In particular, insolvency risk is the conditions where the bank liabilities exceed the bank assets causing a negative net worth in the bank balance sheet (Greenbaum and Thakor, 1995:172).

#### **B. Government Take Over (Bail Out) Risk**

Referring to the experience during the global financial crisis 2008-2009 and the other poor economic conditions (such as Asian economic crisis 1997), the government commonly acted as the lender of the last resorts for the banks. They provided emergency liquidity for the banks which faced liquidity distress or even took over the banks to save the entire economy.

#### **C. Reputation Risk**

The failures of the banks to balance the asset and liability, manage the demand for liquidity and mitigate the unexpected liquidity pressures can drop their reputation in front of the depositors and

stakeholders. In the severe cases, a low banking reputation may not only endanger the function of the banking industry but also impact the performance of the entire economy.

### **Techniques to Mitigate Liquidity**

One of the common techniques used in the banking theory to analyze the performance of asset and liability is called gap analysis and stress test. The former assists the outputs of the assets side particularly from the interest rate returns of the bank credits and the liability side in a certain time period (Heffernan, 2001:189). It suggests the banks to maintain the higher returns of the asset side than the returns paid on the liability side. In particular, the ratio of total returns from bank credits to total payments of interest on deposits should always be positive. If it is found negative, the banks can (i) increase total equity or; (ii) increase interest on bank credit, to prevent them from asset-liability imbalance and maturity mismatch risk. Meanwhile, the latter identifies potential weaknesses or vulnerabilities of the bank liquidity position. It suggests the diversification of funding sources or an increase in contingent liquidity sources (BIS, 2008a:6).

However, in practice, the banks need to maintain available liquidity to resolve the depositors' regular and irregular demand for liquidity. The regular demand for liquidity comes from the daily business activities of depositors (BIS, 2008a:5). Meanwhile, the irregular demand for liquidity can be further regrouped as: (a) the predictable irregular demand for liquidity and, (b) the unpredictable irregular demand for liquidity. The first sub group is for example the government liquidity withdrawals with respect to the fiscal operations. The second sub group is for examples the contagious banking crisis, the economic or global financial crisis, the world oil price shock (economic issues), and social and political unrest, natural disasters (non economic issues).

To manage the regular demand for liquidity, the banks had better have a stand by account on the asset side. It is a pool of funds that can be withdrawn to provide liquidity in the daily basis (BIS, 2006:4). The larger banks are required to hold larger liquid assets than the smaller banks (BIS, 2008a:6). Such account consists of (Helmen et al, 1994:151):

- a. *Currencies (cash in vault)*. These are the liquidity that the banks hold to meet the daily transaction needs and will be placed in the central bank if there is a surplus;
- b. *Central bank certificates*. These are the bank deposits which are very safe and liquid;
- c. *Other commercial bank deposits*. These are the banks short-term deposits in the other commercial banks. Although these are less liquid than the central bank certificates, they can be redeemed shortly;
- d. *Cash items in the process of collection*. It includes the cheques deposited in the central bank or the other commercial banks for which the credits have not been received yet.

Further, Greenbaum and Thakor (1995:176) proposed three techniques to mitigate the regular demand for liquidity: (a) investing more funds on liquid loans and/or keeping more cash on hand, (b) diversifying sources of funding through various depositors and (c) using the lender of the last resort which is the central bank to facilitate emergency liquidity for the depositors regular liquidity needs.

Next, for the predicted irregular demand for liquidity, the banks should arrange an estimation of the short-term demand for liquidity which is based on the past experiences (patterns of liquidity needs). Specifically the estimation process starts from the idea that the predicted irregular demand for

unless there is an error condition, the predicted irregular demand for liquidity should be identified. The banks can also communicate with their clients to know the information about the schedule of their withdrawals to further strengthen the bank estimation.

Lastly, the unpredicted irregular demand for liquidity is the most difficult one to trace. It is because the unfavorable economic/business conditions and non supportive non economic issues are sometimes unpredictable. For this type of depositors demand for liquidity, there are pro-active actions that the banks can organize, such as:

### **Contingency Funding Plan (CFP)**

CFP is composed of policies, strategies and procedures that serve as a blue print for a bank to address liquidity shortfalls in emergency situations at reasonable costs (BIS, 2006:13-16 and 2008b:4). The main purposes of CFP are to ensure that the banks can prudently and efficiently manage the extraordinary liquidity fluctuations and mitigate urgent liquidity needs both in the short and long-term periods. It is conducted through a proper estimation of the liquidity needs by the bank management under hazardous scenarios. The sophistication of CFP as an emergency liquidity plan depends on the size, nature and complexity of the business, risk exposures, and structure of organization.

Particularly, CFP anticipates the needs for liquidity through three treatments (BIS, 2008b:4). First of all is analyzing and making quantitative projections of all funds in both on and off balance sheets. CFP identifies, quantifies, and ranks all of the sources of funding based on the preference. Secondly is matching the potential sources of cash flow and usage of the funds. CFP determines the strategies on the asset and liability in the case of liquidity crises for examples selling money market securities, selling longer-term assets (on the asset side) or pricing policies for funding, regulation for the early deposit redemption and, the usage of discount window (on the liability side). Finally is setting up indicators to alert the bank management against predetermined level of potential liquidity risks.

### **Combination of Cash Flow Matching and Liquid Assets (Mixed Approach)**

With this mixed approach, the banks attempt to match cash outflows in each time bucket with the combinations of contractual cash inflows and inflows from selling of the assets, repurchase agreement or the other secured borrowing (BIS, 2006:4). The most liquid assets are counted in the earliest time buckets, while the less liquid assets are counted in later time buckets.

However, in the current dynamic financial markets and high frequency economics activities, analyzing the bank cash flows is very complicated. Hence, in order to have accurate and reliable results, the banks could combine the projections of customer behaviors and the roll over expectation of deposits. Furthermore, the banks should develop databases of the types of depositors, their types of deposits, and the geographic diversification.

### **Prudential Allocations of Assets (PAA)**

This technique could potentially reduce the refinancing risk and the risk of redemption or repurchasing the bank borrowings prior to their contractual maturities. Some courses take place to implement this technique, which are:

- a. Placing a substantial portion of the deposits to the secured and short-term investment alternatives that are very liquid and may be repurchased before the maturity dates;

d. Avoiding credit concentration on the certain types of placements (debtors)

**Integrated Structure of Banking Organization**

The modern banking organizations are indicated by the existence of the bank holding company and the bank subsidiaries. Consequently, in relation to the management of liquidity, there are two modes of liquidity: (i) liquidity of the bank holding company as the owner of the bank subsidiaries and; (ii) liquidity of the bank subsidiaries. These conditions create two styles of liquidity managements in an organization, which are centralized and decentralized liquidity managements (BIS, 2006:3). Selecting one of them and knowing how deep is their relationship depend on a number of factors, such as the bank business models, the efficiency of the banking operations, the minimization of costs of credit, the diversification of credits, the management of knowledge and, the feasibility of movable funds and collaterals.

The management of liquidity in the holding and subsidiaries companies is essential because both of them have different funding needs and sources, and is also subject to the certain regulatory guidelines and requirements (Bank of America, 2007). In practice, the subsidiary companies depend on the holding company liquidity management policies. For example, when the subsidiary companies face liquidity risk problems, while the sources of funds such as deposits, wholesale market-based funding, and asset securitization are not enough or could not be used, they need instant liquidity from the holding company. Nevertheless, the holding company often expects the subsidiaries to handle such liquidity problems themselves in the first stance, although finally they still provide the required funds and management assistance if the liquidity risk escalates up into a certain limit (BIS, 2006:4).

Therefore, establishing an integrated organization structure is very important to coordinate the liquidity management between the holding company and the subsidiaries companies. For example, the bank holding company decides a standard regulation on the necessary capital for all of their subsidiaries. Hence, the purposes of the holding company to release emergency liquidity to the subsidiaries may not only cover the demand for instant liquidity but also fulfill the capital requirement. Further, by doing this, the holding company has imposed a control to their subsidiaries. On the other hand, the subsidiary companies easily obtain the liquidity needs from the holding company rather than borrow the funds from the other companies, money market or selling the marketable assets.

**Deposit Insurance**

The deposit insurance is another contemporary technique to mitigate liquidity risk although in some extents it invites moral hazard problems (Zhu, Haibin, 2001:1). For the depositors, deposit insurance increases their deposit costs although it guarantees the repayment of deposits if the banks are default. Meanwhile, for the banks, the prevailing of deposit insurance reduces the liquidity risk exposures because there is now an external body (deposit insurance company) which covers the failure of the deposits repayment.

The deposit insurance might invite moral hazard of the banks because they face less liquidity exposures on the liability side so the financing activities are less cautious against the potential of business losses. Hence, in order to be effective, the application of deposit insurance still has to be followed by the market discipline and prudential banking supervisory (Batunanggar, 2002:8).

After setting up the liquidity management process, knowing the causes of liquidity risk and applying some techniques for mitigation, the banks prepare financing strategies in the forms of liquid financial instruments with an effective diversification of sources and tenor of investment. Initially, the bank liquidity management decisions to place some funds into several liquid financial instruments have to consider some factors (Helmen et al, 1994:170):

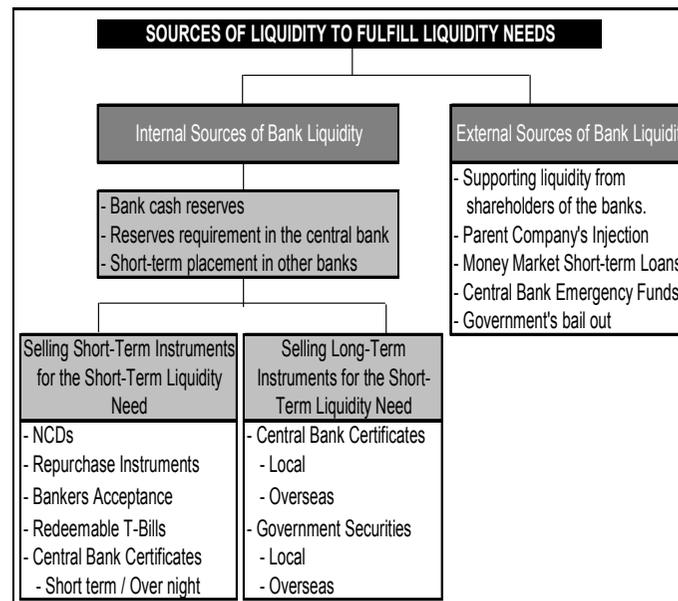
- a) The bank liquidity management policies;
- b) The purposes of the placement of funds with respect to the need for liquidity;
- c) The access to the financial markets;
- d) The costs and characteristics of the financial instruments and;
- e) The forecast of the interest rate returns.

It is also suggested that, before redeeming the financial instruments for liquidity, the banks had better determine the types of liquidity they need and the types of instruments to be terminated. For instance (Helmen et al, 1994:170), the seasonal liquidity needs fit with the timely manner financial instruments; the cyclical liquidity needs match with the well-estimated liquid assets and; the long-term liquidity needs suit with the combination of long-term liquid assets and, offering (issuing) the short-term debt instruments to the other banks bilaterally or through the money market.

Therefore, there are typically two sources of the liquid financial instruments to fulfill the demand for liquidity: (i) the internal sources of bank liquidity and; (ii) the external sources of bank liquidity. The former is further recomposed as the short-term placements and the long-term placements (see figure 2.7). In the short-term placements there are negotiable certificate of deposit (NCDs), repurchase agreement (Repos), banker's acceptance (BA), treasury bills (T-bills), and short-term central bank certificate. In the long-term placements there are long-term central bank certificates and government securities which can be traded locally and internationally. Finally, the external sources of bank liquidity consist of new liquidity from the shareholder, short-term money market loans, parent company's supporting liquidity, central bank emergency funds and, government's bail out.

However, before using such internal sources, the banks should have initial internal liquidity such as cash reserves and reserves requirement in the central bank to capture the regular demand for liquidity. If those instruments are not enough, the banks come to the second alternative which is from the internal sources of bank liquidity by terminating the short-term financial instruments. The first alternative instrument to be terminated before its maturity date is the negotiable certificate of deposit (NCDs) which is a marketable short-term instrument. Besides NCDs, the banks can repurchase the securities under repurchase agreement (Repos) facilitated by the issuer of the security.

### **Figure 7. Sources of Liquidity for Banks**



Sources : adopted and modified from Fiedler (2000), Heffernan (2001), Hubbard (2002) and Helmen, t all (1994)

Next, the banks might sell the bankers acceptance (BA) in the secondary market. Banker's acceptance is a future payment guaranteed by the issuer of BA to the BA's holders. Besides selling BA, the banks can also sell the treasury bills (T-bills) which is one of the most marketable and secured money market instruments issued by either government or central bank. T-bills are offered by the issuer for the short-term placement which are redeemable with a discount prior to their maturity date. Finally is executing the central bank certificates to the issuer or reselling to the money market. Currently, there are some complex instruments to be used for instances credit default swap (CDS), mortgage back securities (MBS) and, collateralized debt obligation (CDO). But, they are not suggested even prohibited because of the complicated assessment, non tradable and unpredicted cash flow (BIS, 2008a:4).

However, besides selling the short-term financial instruments, the banks also have an alternative to terminate the long-term financial instruments to fulfill the short-term demand for liquidity. Such long-term instruments are for examples central bank certificate (bond) or government securities (bond). These two long-term instruments are not only safe (zero risk) but also very liquid (marketable) locally and internationally.

Later, when the internal sources of bank liquidity are still not enough to serve the demand for liquidity, the banks can occupy the external sources. The first alternative is asking for the supporting liquidity from the shareholder. However, this alternative has a consequence in the internal side of the banks for example the bank management has to explain it to the shareholder. The second alternative is borrowing some funds from the parent company. Fortunately, those two alternatives only require the internal bank agreement with the shareholders and parent company which are well-known for them.

The third alternative, which needs extra requirements, is borrowing some funds from the money

banks tend to be the borrowers while the small banks tend to be the lenders in the money market (Ahmed, 2001:34). Unfortunately, using money market should alert with the liquidity run risk because of the public negative image if the certain banks permanently stand as the borrowers. One of the good anticipations is establishing a good relation banking networks in the money market.

Finally, the quickest way to obtain liquidity is from the central bank. Due to its function as the lender of the last resorts, the central bank has an emergency liquidity facility with a very short (daily) loan maturity and strict requirements<sup>6</sup> for examples collateral, certain level of capital requirement and bank performance indicators and, penalty in the deferred payment of the loans.

### **Conclusion**

In their operations, the banks might face liquidity risk as the results of asset-liability imbalance and maturity mismatch. In order to manage liquidity risk, the banks have to conduct liquidity management process which consists of determining liquidity management policies; establishing asset liability committee (ALCO); having an effective information system and internal control and; preparing techniques to mitigate liquidity risk. The Board of Directors (BOD) are responsible for setting up the bank liquidity management policies in cooperation with ALCO and the head of risk management departments/divisions. They are decision makers in the top level. Following them, there are senior managers as the decision followers in the operational level. After that, effective information system and internal control on liquidity management complement the liquidity management process. Finally, after analyzing the triggering factors of liquidity risk, the banks prepare the internal and external sources of liquidity to fulfill demand for liquidity from depositors.

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