THE MANAGEMENT OF LIQUIDITY RISK IN ISLAMIC BANKS: THE CASE OF INDONESIA

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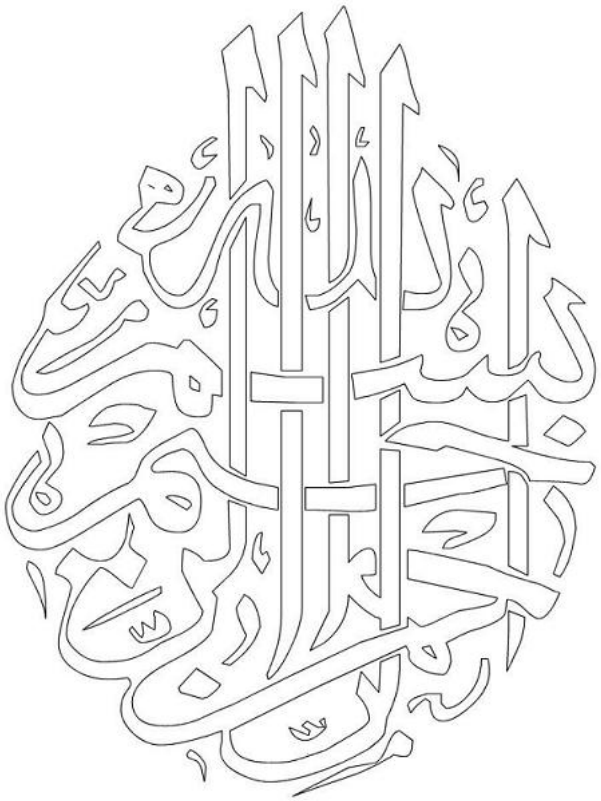

In The Name of Allah, The Most Beneficent, The Most Merciful

ABSTRACT

The Management of Liquidity Risk in Islamic Banks: The Case of Indonesia

Rifki Ismal

Islamic banking and finance has shown progressive development all over the world since its inception as a commercial banking model in mid-1970s. Indonesia, as the largest *Moslem* nation in the world, has initiated some policies to expand the Islamic banking industry in the country.

Similar to conventional banks, Islamic banks face a number of risk areas, which may affect their performance and operations. One of such risk areas is liquidity risk, which shows additional features in the case of Islamic banks. Both the international banking standards and the *Sharia* guidance suggest that banks should have: robust liquidity risk management policies, a responsive asset and liability committee, effective information and internal control systems and, methods for managing deposits to reduce on-demand liquidity, to manage liquidity risk. The aim of this research, hence, is to analyze the management of liquidity risk in Islamic banks through balancing assets and liabilities with the ultimate objective to recommend policies to improve the management of liquidity risk. This aim is fulfilled in the case of Indonesian Islamic banking industry.

The data collection and analysis method in this research involve triangulation method with a combination of quantitative and qualitative methods to achieve such aim and objective. Particularly, both the performance analysis of the industry and the econometric time series analysis were conducted to analyze the liquidity risk and its management for Islamic banking, which includes the liquidity behavior of banking depositors and Islamic banks. In addition, the primary data through questionnaire survey was also assembled with the aim of knowing the actual practices and problems of managing liquidity risk. It was investigated from the perceptions of Islamic banking depositors and Islamic bankers to shed further lights on the liquidity risk issues, which were not captured in the time-series analysis.

The empirical analyses conducted in this research demonstrate: (i) the non optimal organizational structure of Islamic banks to manage liquidity, (ii) the significant demand for liquidity withdrawals from depositors and fragility of Islamic banks to mitigate certain scenarios of liquidity withdrawals, (iii) critical factors explaining liquidity behavior of banking depositors and Islamic banks, (iv) reasons for depositors to withdraw funds from Islamic banks and the non ideal management of funds by Islamic banks and, (v) the limited Islamic money market instruments to manage the demand for liquidity from depositors.

Based on these findings, the research then constructs an integrated and comprehensive program to manage liquidity risk, which consists of three elements: (i) institutional deepening, (ii) restructuring the management of liquidity on the asset and liability sides and, (iii) revitalizing the usage of Islamic liquid instruments. This integrated and comprehensive program of liquidity risk management recommends a better way of managing liquidity risk based on *Sharia* compliant instruments and international standard banking practices.

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DECLARATION

I hereby declare that no portion of the work that appears in this study has been used in support of an application of another degree in qualification to this or any other University or institution of learning.

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LIST ABBREVIATIONS

AAOIFI	Accounting and Auditing Organization for Islamic Financial Institution
ADF	Augmented Dickey Fuller
ALCO	Asset Liability Committee
ARDL	Autoregressive Distributed Lag Model
ARO	Automatic Rolled Over
ASEAN	Association of South East Asian Nations
ASBISINDO	Association of Indonesian Islamic Banking
ATM	Automatic Teller Machine
BA	Bankers Acceptance
BCBS	Basel Committee on Banking Supervision
BI	Bank Indonesia
BIS	Bank for International Settlement
BOD	Board of Directors
BLUE	Best, Linier, Unbiased, Estimator
BPD	Regional Development Bank
BPRS	Islamic Rural Credit Bank
BUS	Islamic Commercial Bank
CAR	Capital Adequacy Ratio
CD	Certificate of Deposit
CEO	Chief Executive Officer
CFP	Contingency Funding Plan
CF	Cash Flow
DSN	National *Sharia* Board
FASBI	Bank Indonesia Overnight Facility
FDR	Financing to Deposit Ratio
FLI	Bank Indonesia's Intraday Liquidity Facility
FPJP	Bank Indonesia's Short-Term Loan Facility
FPS	Future Payment Structure
GDP	Gross Domestic Product
GII	Government Investment Issue
IDB	Islamic Development Bank
IFSB	Islamic Financial Service Board
IIFM	International Islamic Financial Market
ILIF	Islamic Leasing Investment Fund
IMA	Interbank *Mudarabah* Agreement
IMB	*Ijarah Muntahia Bittamlik*
IRR	Investment Risk Reserve
LDR	Loan to Deposit Ratio
LMC	Liquidity Management Center
LOLR	Lender of the Last Resort
LPS	Deposit Guarantee Institution
LIBOR	London Inter Bank Offer Rate

MUI	Council of Indonesian *Sharia* Scholars
NCD	Negotiable Certificate of Deposit
NPF	Non Performing Financing
NPL	Non Performing Loan
OLS	Ordinary Least Square
PAA	Prudential Asset Allocation
PER	Profit Equalization Reserve
PLS	Profit and Loss Sharing
PP	Phillip Perron
PPAP	Productive Asset Write-off Reserves
PUAS	Inter bank Islamic Money Market
ROA	Return on Asset
RR	Reserves Requirement
RTGS	Real Time Gross Settlement
SBI	Bank Indonesia Certificate
SBIS	Bank Indonesia *Sharia* Certificate
SBSN	Government Islamic Security (Government *Sukuk*)
SKNBI	Bank Indonesia National Clearing System
SME	Small and Medium Enterprise
STM	Short-term Mismatch
STMP	Short-term Mismatch Plus
SWBI	Bank Indonesia *Wadiah* Certificate
USD	United State Dollar
UUS	Islamic Banking Windows

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Chapter 1
INTRODUCTION

1. 1. BACKGROUND

The global Islamic banking industry has continuously been growing over the last three decades. At present, its assets are estimated at around USD500 billion – USD1 trillion with an annual growth rate between 10%-20% (Eedle, 2009:1). Like its neighboring countries, Malaysia in particular, Indonesia has initiated some policies to expand and foster the development of its Islamic banking industry.

These measures include, for example: (i) the Council of Indonesian *Sharia* Scholars (MUI) has released a verdict *(fatwa)* concerning the prohibition of interest in 2003, which has increased the number of Islamic banking depositors and Islamic banks; (ii) the House of Representatives has approved the Islamic Banking Act on July 16th, 2008, which gave legal foundation to the operations of Islamic banks; and (iii) the central bank has released both the blueprint and the grand design of the development of the Islamic banking industry (2005-2008), which outlined a medium and long-term development program for the Islamic banking industry.

As a result, until November 2009, there were six Islamic Commercial Banks (BUS), twenty-five Islamic Banking Windows/Units (UUS), and 138 Islamic Rural Banks (BPRS) operating in the country. The performance of the industry is also very promising when looking at certain Islamic banking performance indicators such as total assets, deposits and, financing.

However, despite the progressive development of the Indonesian Islamic banking industry, the potential problem of liquidity risk must not be ignored: the recent economic/business conditions require the banking industry (including the Islamic banking industry) to have a robust liquidity risk management program. The global financial crisis (2008-2009) has hampered some well-established financial institutions and, indeed, the global banking industry in general. Indonesia experienced periods of economic crisis and

turbulence in 1997-1998 and 2005-2006 caused by external shock and unsound liquidity management by some of its well-established banks.

Furthermore, the current development of the Islamic banking industry is facing the following issues:

1. As the industry is undergoing a period of rapid growth, it has to be accompanied by a robust liquidity risk management program; such a program is currently not being prepared effectively by banking regulators.
2. The practices of the Islamic banking industry reveal a less-than-ideal liquidity management. The banks have an orientation towards short-term financing and only a minimum contribution to long-term financing.
3. Depositors show a sensitive liquidity behavior and may withdraw their funds if the economy is in downturn or deposit interest offers a better return and;
4. Indonesia has a less developed Islamic money market with limited Islamic liquid instruments to provide Islamic banks a short-term liquidity.
5. The future development of the Islamic banking industry demands a proper liquidity management, given the complexities of banking activities and economic conditions.

These facts have highlighted the importance of having a robust liquidity management program to anticipate future liquidity risk problems.

This PhD research aims to analyze the management of liquidity risk in the Islamic banking industry with the main objectives to study liquidity behavior of depositors and liquidity management practices of Islamic banks. Particularly, the research will provide an integrated and comprehensive liquidity management program which is both applicable to Indonesia and to other countries that have the same Islamic banking industry. In addition, the output of the research will fill a gap in knowledge and understanding with regard to managing liquidity risk through balancing asset and liability sides.

1. 2. RESEARCH AIM

This research aims to analyze the management of liquidity risk in the Indonesian Islamic banking industry by balancing the asset and liability sides. Specifically, it aims to

analyze the internal Islamic banking mechanism to manage liquidity in order to understand liquidity behavior of depositors and liquidity management of Islamic banks and to construct a liquidity management program to improve the current practices of managing liquidity risk.

1. 3. RESEARCH OBJECTIVES

With the quantitative analyses, the objectives of the research are to measure the demand for liquidity withdrawals from depositors and the allocation of bank deposits in relation to managing liquidity; to find factors determining balanced assets and liabilities and factors explaining the optimal liquidity reserves; and to estimate the future performance and resilience of the industry against liquidity pressure.

In addition, with the qualitative analyses, the objectives of this research are to investigate liquidity management practices; to analyze the organizational structure of Islamic banks to manage liquidity; to identify depositors' reasons to withdraw funds from Islamic banks and Islamic banks' liquidity management strategies; and to study the limited Islamic money market instruments to manage the demand for liquidity from depositors.

1. 4. RESEARCH QUESTIONS

Following the research aim and objectives, this research has specific research questions to be answered, which are:

i. What is the liquidity behavior of depositors and how high is the demand for liquidity withdrawals from depositors?
ii. What are the current practices of liquidity risk management and the organizational structure in relation to managing liquidity?
iii. What are the available Islamic money market instruments to fulfill the demand for liquidity from depositors?
iv. What factors influence Islamic banks to balance liquidity on the assets and liabilities side and their liquidity management strategies?
v. How is the resilience of the industry with respect to liquidity withdrawals? And what regulatory measures has Bank Indonesia undertaken to limit liquidity risk?

vi. What is a proposed program to solve the problem of liquidity risk?

1. 5. RESEARCH METHODOLOGY

To realize the research aim and objectives, the research applies a quantitative research methodology. Particularly, it uses a combination of quantitative and qualitative research methods. For instance, statistical analyses and econometric models are used to exercise the secondary data of the industry. These two quantitative analyses generate important outcomes regarding:

i. the estimation of the potential short-term liquidity withdrawals from depositors;
ii. the performance of the current Islamic liquid instruments to serve liquidity withdrawals from depositors;
iii. the management of the funds on both asset and liability sides;
iv. factors determining balanced asset and liability sides and the optimal position of liquidity reserves of Islamic banks; and
v. the potential liquidity mismatch and the resilience of the industry against liquidity pressures (irregular liquidity withdrawals and liquidity run).

In addition, the questionnaire surveys completed by both depositors and Islamic bankers, complemented with bilateral discussions with Islamic bankers, provide primary data and confirm the output of quantitative analyses. Essentially, the surveys reveal:

i. the organizational structures of BUS and UUS with regard to managing liquidity risk;
ii. the understanding of depositors regarding Islamic banking operations besides their investment and liquidity behavior;
iii. the conditions where depositors take their funds or exit from Islamic banks; and
iv. Financing policies and strategies of Islamic banks to manage funds and balance the asset and liability sides.

Lastly, qualitative analyses provide interpretative discussion and recommendations by contextualizing the findings and referring to the international banking standards and *Sharia* guides on managing liquidity. Most importantly, the analyses propose an integrated and comprehensive liquidity risk management program to

improve the current management of liquidity risk in the Indonesian Islamic banking industry.

1. 6. POTENTIAL CAUSES OF THE LIQUIDITY RISK PROBLEM

This research identifies at least seven potential causes of the liquidity risk problem in the Indonesian Islamic banking industry. These are:

i. Profit-driven depositors who are sensitive to the movement of interest rates and may possibly switch their deposits from Islamic banks to conventional banks if the interest rate return is more attractive than the profit-sharing return.
ii. *Sharia*-driven depositors who are concerned with the *Sharia*-compliance of the banks, products and services being offered, networks, and other banking facilities. They might possibly withdraw their funds or switch funds among BUS/UUS if their expectations are not accommodated.
iii. Most of the depositors prefer saving money in short-term deposit instruments. As such, the total amount of funds in *Wadiah* demand deposits, *Mudarabah* saving deposits and 1-month *Mudarabah* time deposits is significant and implies the potential of short-term demand for liquidity.
iv. As such, Islamic banks prefer debt-based financing to equity-based financing, particularly because of the terms and conditions of deposits on the liability side.
v. Nevertheless, such liquidity management practices on both the asset and liability sides are not the ideal liquidity management practices of Islamic banks. The Islamic banks have to convince depositors to take part in the long-term placement of deposits to finance long-term Islamic projects. At the same time, they have to be able to manage short-term demand for liquidity from depositors.
vi. In fact, the operations of Islamic banks rely on the performance of the real sector to gain profit and share it with depositors, and banks may not continuously pay profit/return-sharing rates to depositors. Nonetheless, return-oriented depositors always expect to receive a competitive and continuous profit/return-sharing return on their deposits.

vii. Finally, with the certain quantitative scenarios of the future demand and supply of liquidity, this research finds that the industry might fail to serve the certain level of liquidity withdrawals (liquidity mismatch).

1. 7. OVERVIEW OF THE THESIS

The thesis has nine chapters that can be classified into three groups of chapters. The first group is the literature review chapters which are chapters two and three. The second group is the empirical research chapters which are chapters five, six, seven, and eight. Finally, chapters one, four and nine are complementary chapters (the third group). The overview of the chapters is described below.

Chapter 1: Introduction

Chapter one briefly explains the overall content of the thesis. It highlights the development of Islamic banking and finance and the Indonesian Islamic banking industry. It states the aim of the research, which is to analyze the management of liquidity risk in the Indonesian Islamic banking industry by balancing asset and liability sides. The objectives of the research are stated in relation to the quantitative and qualitative methods used in the empirical research chapters.

The research questions section emphasizes the issues that are analyzed in relation to the research objectives. Finally, the ultimate output of the thesis is an integrated and comprehensive program to manage liquidity that follows from the comprehensive analyses of the empirical research chapters. Such a program complies not only with *Sharia* principles and values but also with the international banking standards.

Chapter 2: Liquidity risk management issues in banking institutions

This chapter discusses the international banking standards to manage liquidity risk. It examines some strategic issues of risks in a banking institution, which are financial risk, business risk, and operational risk; it focuses especially on liquidity risk. Two conditions that could cause asset-liability imbalance and maturity mismatch risks are liquidity gap and liquidity need which are influenced by: (i) the intention of depositors to place their funds in the short-term tenor of deposits; (ii) the downturn of business conditions that cause the inability of entrepreneurs to repay the high credit rate from

banks and; (iv) the asymmetric information among depositors, banks, borrowers and regulators.

To mitigate the regular demand for liquidity, banks are recommended to: (i) have a standby account, (ii) invest more funds on liquid loans and/or keep more cash on hand, (iii) diversify sources of funding from various depositors, and (iv) use the central bank's emergency liquidity facility. For the predictable irregular demand for liquidity, the most recommended technique is to estimate accurately the short-term demand for liquidity. For the unpredictable irregular demand for liquidity, the techniques are: (i) having a Contingency Funding Plan (CFP), (ii) combining cash flow matching and liquid assets, (iii) prudently allocating the assets, (iv) having an integrated structure of banking organization, and (v) taking part in deposit insurance.

Finally, there are some liquid financial instruments that can be used as sources of bank liquidity to solve the predictable irregular demand for liquidity, such as: (i) selling the short-term financial market instruments, (ii) selling the long-term financial market instruments, and (iii) borrowing short-term funds from the money market. Sources of liquidity to solve the unpredictable irregular demand for liquidity are: (a) shareholders' lending, (b) parent company's lending, (c) central bank emergency funds, and (d) government bail-out funds.

Chapter 3: *Sharia* issues in liquidity risk management

First of all, Chapter 3 recognizes characteristics of Islamic banks facing liquidity risk and Islamic banking risks related to liquidity risk, which are: (i) the liquidity management program is arranged throughout the real business transactions; (ii) minimizing the potential of liquidity risk internally and externally; (iii) the banking operations are free from injustice such as *Riba*, speculation and *Gharar*; (iv) applying a profit and loss sharing (PLS) concept; (v) Islamic banks face various kinds of business and market risks.

Secondly, the chapter highlights how liquidity risk in Islamic banks entails other risks which do not specifically exist in conventional banks. The examples are *Sharia*-compliance risk, uncertainty financing risk, and displaced commercial risk. Furthermore,

there are issues that challenge the management of liquidity risk on the asset and liability sides because *Sharia* demands the management of liquidity to be more than just matching assets and liabilities.

Thirdly, the Islamic Financial Service Board (IFSB) provides two guides with respect to managing risk, including liquidity risk management in Islamic banks. They emphasize the importance of arranging two activities to manage liquidity, which are: (i) preparing a robust liquidity management program; and (ii) designing and developing the Islamic financial markets to support the liquidity management process.

Fourthly, the approaches to manage liquidity based on *Sharia* call for both: (i) the roles of depositors and entrepreneurs, and (ii) the roles of Islamic banks, to manage liquidity in an integrated process. Finally, techniques to mitigate the regular demand for liquidity risk based on *Sharia* entail the individual bank's internal policies, whereas to mitigate the predictable irregular demand for liquidity Islamic banks might sell the short-term Islamic placements, the long-term Islamic placements, or borrow the short-term Islamic funds. Furthermore, the techniques to mitigate the unpredictable irregular demand for liquidity are to borrow the emergency liquidity from external liquidity providers.

Chapter 4: Research methodology and method

Chapter 4 explains the complete process of the PhD thesis. First, the chapter provides details regarding the research methodology and method, including the complete framework of the research. Second, the chapter explains the research design and strategies. Finally, the chapter shares the ideas of technical analyses in conducting both the quantitative and qualitative data in addition to describing the research limitations and difficulties.

However, the limitations and difficulties in doing the research leave the crucial message that this PhD thesis is done under certain assumptions and refers to the current economic/business conditions. If the economic/business conditions change drastically, the thesis might need a more extensive research. Moreover, realizing that the Islamic banking industry is a fast-growing industry with room for many improvements, a more advanced and comprehensive research study should be done in the future.

Chapter 5: Reviewing the performance of the Indonesian Islamic banking industry

This first empirical research chapter elaborates on the performance of the Indonesian Islamic banking industry and the liquidity risk management practices. First of all, the organizational structure of BUS informs three bodies involved in managing risk, namely: (i) the Risk Monitoring Committee, (ii) the Directorate of Compliance and Risk Management, and (iii) the Asset Liability Management Committee (ALCO).

Nonetheless, the focus of such a structure is merely on the internal side of the organization and does not fully accommodate the current economic and business environments. On the other hand, the organizational structure of UUS relies on the President Director of the parent company, a specific Director to be responsible for the operation of the UUS, and the head of UUS to manage liquidity. The liquidity risk management is not properly managed and tackled by a special internal department/division in UUS.

The next analysis of behavior and sensitivity of the demand for liquidity reveals other pieces of information, which are: (i) *Wadiah* demand deposits are found to be very sensitive to interest rates and all deposits are volatile during the unfavorable economic condition; (ii) depositors prefer placing funds in a 1-month tenor instead of long-term deposit tenors; and (iii) the rational depositors are estimated to make up 9.52% of total bank account holders.

Finally, three groups of liquid (the 1st, 2nd and 3rd tier) instruments are prepared by Islamic banks to anticipate the regular and irregular demand for liquidity. Liquidity withdrawals from *Wadiah* demand deposits and *Mudarabah* saving deposits are served by the 1st tier liquid instruments. The 2nd tier liquid instruments are prepared to tackle any demand for liquidity from the termination of 1-month *Mudarabah* time deposits. And the 3rd tier liquid instruments are used to mitigate liquidity run.

Chapter 6: Estimating the liquidity management aspects of the Islamic banking industry: econometric analysis

This chapter intends to establish factors that determine a balanced asset - liability and optimal liquidity reserves. In addition, it considers the future performance of the

demand and supply of liquidity, estimates the future amount of liquidity, and tests the resilience of the industry against any irregular demand for liquidity and liquidity run. For such purposes, four econometric models are constructed, namely: (i) the liability model, (ii) the asset model, (iii) the liquidity reserve model, and (iv) the demand and supply of liquidity models.

The econometric results of the liability, asset, and liquidity reserve models convey some important findings regarding liquidity behavior as well as the potential of the liquidity risk problem to be anticipated. These are: (i) the liquidity behavior of depositors is mostly influenced by current economic/business conditions; (ii) the injection or reduction of deposits depends on the performance of Islamic banks; (iii) depositors and Islamic banks conduct a different performance evaluation on the payment of the short-term revenue-sharing on deposits; (iv) depositors and Islamic banks value the performance of banks' business partners at a different time frame; and (v) the optimum level of liquidity is reached by improving the performance of the asset side and understanding the liquidity behavior of depositors.

However, the econometric results of the demand and supply models inform that: (i) liquidity mismatch may occur in the future; (ii) both the 1st and 2nd tiers fail to mitigate a liquidity run condition; and (iii) based on the liquidity run scenarios, the 1st tier fails to handle a liquidity run when deposit withdrawals reach 45% of total deposits and the 2nd tier fails to survive in a liquidity run when the withdrawals reach 30% of total deposits.

Chapter 7: Searching the liquidity management issues through the perception of Indonesian Islamic banking depositors and bankers

As a conclusion to the previous two empirical analyses, this chapter presents the results of the questionnaire surveys on Islamic banking depositors and Islamic bankers. The survey on depositors concludes that depositors' understanding of the operation of Islamic banks is still limited to the liability side and does not necessarily extend to the asset side. There are three segments of depositors: *Sharia*-driven, (2) profit-driven and, (3) transaction-driven in the industry; depositors attention towards Islamic banking performance is not optimal yet.

It is found that most of the depositors will close their accounts if the economic conditions require them to hold cash. Their concern over the return on deposits is classified as follows: (i) depositors who are concerned with the return on deposits and, (ii) depositors who are not concerned with the return on deposits. Regarding the liquidity behavior of depositors, the survey indicates their short-term motivation to open both *Mudarabah* time and saving deposits and they terminate deposits because of transaction needs.

However, the survey on Islamic banks finds the existence of a risk management committee (ALCO) in the internal organization of a BUS/UUS, but in UUS, the parent company coordinates the decisions on liquidity management. Furthermore, Islamic banks in practice apply two approaches to manage liquidity, which are: (i) managing liquidity reserves during normal conditions; and (ii) managing extra liquidity reserves during special conditions.

However, on the asset side, Islamic banks also carry out different approaches to manage liquidity. Most importantly, their financing strategies are: (i) financing of previously well-performed projects; (ii) requiring collateral or *Kafalah* (third party) guarantee; (iii) financing entrepreneurs who are depositors of the banks; and (iv) matching the tenor and amount of funds on the asset and liability sides.

Another important assessment involves the potential sources of liquidity problems. The banks recognize some potential sources, which are: (a) the rational depositors who are very sensitive to interest rate return; (b) the large portion of short-term *Mudarabah* time deposits (1-month); (c) non-performing financing (NPF) which can interrupt the return sharing to depositors; and (d) increasing interest rates because of the tight monetary policy.

Chapter 8: Contextualizing the findings: an interpretative discussion and recommendations

This chapter concludes the empirical research chapters. It comprehensively interprets and analyzes both the empirical research chapters and the literature review chapters. Most importantly, this chapter constructs and proposes an integrated and

comprehensive program to improve the recent practices of managing liquidity risk in the Indonesian Islamic banking industry.

First of all, the chapter proposes some ideas to improve the organizational structure of BUS and UUS, which are:

i. Establishing a direct interconnection between the three bodies in BUS.
ii. The structure should incorporate the banking regulators, inter-bank cooperation and the public in managing liquidity.
iii. BUS/UUS are strongly recommended to have: (i) a Business Risk Management Committee, (ii) an Operational Risk Management Committee, and (iii) a Financial Risk Management Committee.
iv. There should be a flow of feedback from the bottom levels to the upper levels of management.
v. ALCO in the parent company should have a special subcommittee capturing risk management in UUS.

The second part of the chapter discusses the liability side that represents the liquidity behavior of depositors and the source of short-term liquidity withdrawals. The third part elaborates on the asset side and assesses the banks' liquidity management practices, including the liquidity risk problems and Islamic liquid instruments.

Finally, the thesis proposes an integrated and comprehensive program of liquidity risk management which captures and assimilates all aspects of the issue. The program is composed of three important consecutive elements, namely: (i) Institutional deepening, (ii) Restructuring liquidity management on the asset and liability sides, and (iii) Revitalizing the usage of the Islamic liquid instruments.

Chapter 9: Conclusion

This chapter concludes this PhD thesis. Firstly, the research summary highlights the research aim and objectives, followed by a brief overview of the findings and outcomes of the literature review chapters and empirical research chapters. Following the research summary, the study suggests that policy makers and all stakeholders of the

Islamic banking industry in Indonesia consider and apply the recommended program (an integrated and comprehensive program) to manage liquidity risk.

1. 8. CONTRIBUTION TO THE KNOWLEDGE AND UNDERSTANDING

Although this research takes the Indonesian Islamic banking industry as a case study, its empirical studies and findings are also applicable to other countries that have the same Islamic banking industry. Hence, the proposal of an integrated and comprehensive program to manage liquidity can also be implemented in similar Islamic banking industries from other countries. The program is unique in recommending the application of three related elements which are applicable to different countries; and the liquidity behavior of Islamic banking depositors is more or less the same in many countries.

Moreover, the contents of the program are not specifically found in the current Islamic banking literatures so that the program makes a significant contribution to the knowledge and understanding of managing risk in Islamic banking. For example, the guiding principles of liquidity risk management of IFSB and BIS in chapters 2 and 3 do not capture the recommendation to interlink and attach every party (depositors, business partners, regulators, Islamic banks) in the process of managing liquidity. The main focus of those two guiding principles is more on the internal aspects of the banking institution in managing liquidity and the roles of financial market to mitigate liquidity pressure.

The other Islamic banking literatures on risk management such as Iqbal and Mirakhor (2007), Iqbal and Greuning (2008), Ismail (2010), Ayub (2007), and Akkizidiz and Khandelwal (2008) partially discuss the management of liquidity risk. Most of those references rely on the following factors to manage liquidity risk:

i. the composition of Islamic liquid instruments and application of PLS (Iqbal and Mirakhor);
ii. the construction of Islamic contracts and measuring the impact of the risk (Akkizidiz and Khandelwal);
iii. the role of capital market and Islamic securitization (Ayub);
iv. balancing of assets and liabilities and access to the financial market (Ismail); and

v. risk management (decision making) structure, funding strategies, limit for liquidity exposure and liquidity planning for crisis situation (Iqbal and Greuning).

In fact, proper liquidity risk management, as recommended by this program, suggests the comprehensive activities to deepen the public understanding of Islamic banking institutions, restructure the liquidity management on the asset and liability sides, and revitalize the usage of the Islamic liquid instruments. All are conducted under the *Sharia* corridor and standard banking concepts. The program should also be followed persistently and continuously by Islamic banks because it is not designed for the short-term use like the conventional program of managing liquidity.

Finally, compared with the ideas from the current Islamic banking literature on managing liquidity risk, the recommendations of the thesis are believed to be more *Sharia*-compliant and more geared towards attaching Islamic banks to the real sector activities when managing liquidity. For example, the integrated and comprehensive program starts with deepening the public understanding of Islamic banking principles and values because the understanding of depositors and involving them in the process of managing liquidity is one of the key success factors in successfully managing liquidity.

Involving depositors, entrepreneurs, the government, and the public in the business operations of Islamic banks creates the true operations of Islamic banking. It also restructures the current liquidity management practices on both the asset and liability sides. Finally, utilizing the real sector based Islamic liquid instruments or implementing the non-commercial liquid instruments, rather than commodity *Murabahah* contracts for example, is suggested to revitalize the function of the Islamic financial markets.

Chapter 2
LIQUIDITY RISK MANAGEMENT ISSUES IN BANKING INSTITUTIONS

2. 1. INTRODUCTION

According to the theories of financial intermediation, the two most crucial reasons for the existence of financial institutions, especially banks, are their provision of liquidity and financial services. Regarding the provision of liquidity, banks accept funds from depositors and extend such funds to the real sector while providing liquidity for any withdrawal of deposits. However, the banks' role in transforming short-term deposits into long-term loans makes them inherently vulnerable to liquidity risk (Bank for International Settlements (BIS), 2008b:1).

The concept of liquidity in finance principally lies in two areas: (a) the liquidity of financial instruments in the financial market, and (b) the liquidity related to solvency. The former relates to liquid financial markets and financial instruments. Examples of these include: marketable financial instruments, smooth transactions, and no financial barriers. The latter discusses the obligation of banks to make payments to third parties (Fiedler, 2000:442). Some examples of this include: setting up liquidity management policies, reserving liquidity, balancing assets and liabilities and, preparing liquid financial instruments. This PhD thesis focuses on the second area above.

The important discussion in liquidity risk management is to balance the demand for liquidity on the liability side with the supply of liquidity on the asset side. Liquidity risk problems occur if banks fail to balance those two sides, do not have sufficient internal liquidity reserves, and fail to obtain funds from external sources.

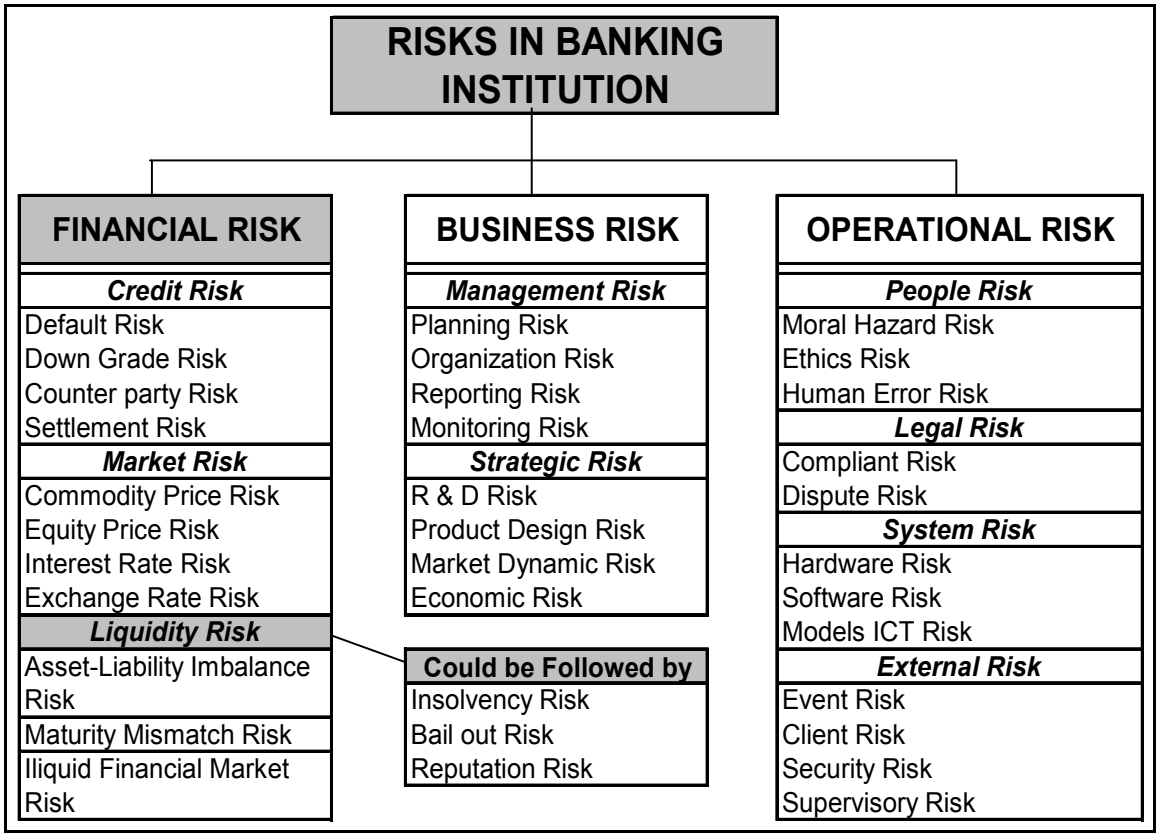
2. 2. LIQUIDITY RISK IN BANKING INSTITUTIONS

2. 2. 1. Risks in Banking Institutions

Risk in financial terms is usually defined as the probability that the actual return may differ from the expected return (Howells and Bain, 1999:30). In the financial system,

there are at least three broad categories of risks, as can be seen in figure 2.1: (1) financial risk, (2) business risk, and (3) operational risk. Financial risk concerns risks arising from the business activities of banks, while business risk and operational risk relate to the bank's internal affairs. In this respect, liquidity risk is classified under the financial risk category along with credit risk and market risk.

Figure 2. 1: Risks in Banking Institutions



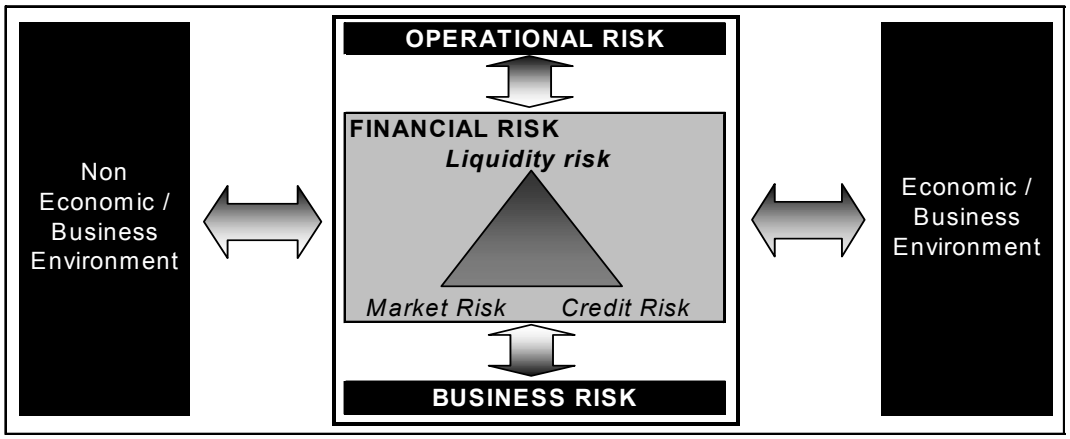
Source: Adapted and modified from Ahmed and Khan (2007), Ismail (2010), Mirakhor and Iqbal (2007).

However, the treatment of risks should be arranged under a causal and interactive system because the causes and impacts of one type of risk cannot be isolated from the other types of risks. All risks have necessary correlations and influence each other (see figure 2.2 below). For example, market risk and credit risk might cause liquidity risk and vice versa. Likewise, business risk and operational risk can also cause a liquidity risk. In the internal operations of banks, liquidity risk can happen because of an asset-liability imbalance or a maturity mismatch risk. As such, banks should be alert and anticipate the

factors causing financial risk, business risk, and operational risk, which can lead to asset-liability imbalance and finally liquidity risk.

As illustrated in figure 2.2, there are economic and non-economic environments affecting the bank's operations. Both environment may invite financial risk, business risk, operational risk, and in the end liquidity risk because of the interactive relationship among liquidity risk, market risk, and credit risk. The global financial crisis 2008-2009 is a good example of the failures in derivative markets, which impacted the ability of banks to provide liquidity to third parties (liquidity risk) (Siddiqi, 2008:3-9).

Figure 2. 2: Interactive Relationship among Risks and External Environments



Source: Adapted and modified from Ahmed and Khan (2007), Moreno (2006), Sach (2007), Zhu (2001).

Managing liquidity risk, however, is more challenging in the current financial market because significant financial innovations and global market developments have transformed the nature of liquidity risk (BIS, 2008a:2). There is currently less reliance on bank deposits, and more reliance on capital and global financial markets.

These conditions have made banks more susceptible to financial market issues such as excessive loans leading to a deep depreciation in currency (Asian economic crisis 1997-1998) as well as the issues associated with sub-prime mortgage (global financial crisis 2008-2009). Moreover, banks should not see the problem of liquidity risk in isolation because liquidity problems in one bank could impact the entire banking industry and the financial system, and could even unravel the overall economy.

In this context, cooperation among bank management, stakeholders, banking regulators, and the public is required to enhance sound liquidity risk management. The latest global financial crisis has placed great emphasis on the importance of a sound liquidity risk management program, to prudently deal with unsecured derivative markets, to avoid excessive and imprudent bank credits, and to increase market discipline (Chapra, 2008:2-15). In fact, a majority of the bank failures[1] occurred due to an insufficient liquidity management program to solve adverse circumstances (Greenbaum and Thakor, 1995:584).

A sound liquidity risk management program would prevent banks from the negative impact of unfavorable economic conditions. It would also assist banks to balance liquidity on the liability and asset sides, and most importantly it would prevent a bank rush and minimize the risk of a government bailout to defaulting banks.

2. 2. 2. Profile of Liquidity Risk in Banking Institutions

Liquidity risk management in banks is defined as the risk of being unable either to meet their obligations to depositors or to fund increases in assets as they fall due without incurring unacceptable costs or losses (Ismail, 2010:230). This risk occurs when the depositors collectively decide to withdraw more funds than the bank immediately has on hand (Hubbard, 2002:323), or when the borrowers fail to meet their financial obligation to the banks. In the other words, liquidity risk occurs in two cases.

Firstly, it arises symmetrically to the borrowers in their relationship with the banks, for example when the banks decide to terminate the loans but the borrowers cannot afford it. Secondly, it arises in the context of the banks' relationships with their depositors, for example, when the depositors decide to redeem their deposits but the banks cannot afford it (Greenbaum and Thakor, 1995:137).

In practice, the banks regularly find imbalances (gaps) between the asset and the liability side that need to be equalized because, by nature, banks accept liquid liabilities but invest in illiquid assets (Zhu, 2001:1). If a bank fails to balance such a gap, liquidity

[1] For example, Barclays Bank (1992), German BFG Bank (1993), Westpac (Australian Bank) (1992), Merrill Lynch, and Lehman Brothers (2008).

risk might occur, followed by some undesirable consequences such as insolvency risk, government bailout risk, and reputation risk. The failure or inefficiency of liquidity management is caused by the strength of liquidity pressure, the preparation of a bank's liquid instruments, the bank's condition at the time of liquidity pressure, and the inability of the bank to find internal or external liquid sources. Table 2.1 below lists some internal and external factors in banks that may potentially lead to the liquidity risk problems.

Table 2. 1: Internal and External Factors Leading to Liquidity Risk Problems

Internal Banking Factors	External Banking Factors
High off-balance sheet exposures.	Very sensitive financial markets and depositors.
The banks rely heavily on the short-term corporate deposits.	External and internal economic shocks.
A gap in the maturity dates of assets and liabilities.	Low/slow economic performances.
The banks' rapid asset expansions exceed the available funds on the liability side.	Decreasing depositors' trust on the banking sector.
Concentration of deposits in the short-term tenor.	Non-economic factors (political unrest, etc.).
Less allocation in the liquid government instruments.	Sudden and massive liquidity withdrawals from depositors.
Fewer placements of funds in long-term deposits.	Unplanned termination of government deposits.

Source: Adapted and modified from Mirakhor and Iqbal (2007), Antonio (1999), Alsayed (2007) and Ismal (2008a:5-15).

One of the tools used in finance to analyze the position of a bank's liquidity and to detect potential liquidity problems is financial ratios. The forms of ratios utilized for this purpose can be divided into four types. The first form of ratio is the ratio of liquid assets to liquid liabilities. Moreno (2006:73) suggests that this ratio might be higher in a country with:

i. no government intervention to help banks meet the funding gaps,
ii. risk averse financial institutions,
iii. fixed interest rates deposits and,
iv. difficulty in hedging.

The survey from the Bank for International Settlements (BIS) in 2006 found that Korea, Czech Republic, Turkey, Poland, Hong Kong, Mexico, Saudi Arabia, and Hungary are countries with high liquidity ratio.

The second type of ratio is the ratio of demand deposits to private sector credits. Given that the credits to private sector are illiquid and long-term tenor commitments, raising the share of demand deposits could trigger liquidity mismatch and invite liquidity risks. The third type of ratio is the Non-Performing Loan (NPL) ratio.

A high NPL is the source of asset-liability imbalance and because of that, banks might have difficulties providing liquidity to serve liquidity withdrawals from depositors. The last type of ratio is the Loan to Deposit Ratio (LDR). A high LDR ratio should be accompanied by high liquidity reserves in the banks; otherwise banks could fail to meet the short-term demand for liquidity from depositors.

2. 3. PROCESS OF LIQUIDITY RISK MANAGEMENT

Concerning the current economic conditions, BIS recommends banks to organize the process of liquidity management through identifying, measuring, monitoring, and controlling liquidity risk (BIS, 2008b:3). Such a process entails at least four elements: (i) the liquidity management policies of the Board of Directors (BOD), (ii) the roles of the Asset Liability Committee (ALCO), (iii) the effective information system for monitoring and reporting liquidity risk, and (iv) the roles of internal control systems for liquidity management. The following sections will explain each element of the process in detail.

2. 3. 1. Liquidity Management Policies

The process of liquidity management 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 BOD to carry out (BIS, 2008b:3-4): (a) the BOD has to understand the bank's liquidity risk profile and the internal and external business environment and stipulate the liquidity risk tolerance; (b) the BOD has to determine and approve the strategies, policies, and practices of liquidity risk management; (c) the BOD has to disseminate, communicate, and guide the senior managers to manage liquidity effectively; and (d) the BOD has to incorporate liquidity

costs, benefits, and risks in the internal pricing, performance measurement, and new product approval.

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

i. The policies must contain the specific goals and objectives of managing liquidity, including the short-term and long-term strategies of managing liquidity.
ii. The policies determine the roles and responsibilities of the bodies involved in the liquidity management process, including asset and liability management policies, and the relationship with other financial institutions and regulators.
iii. The policies determine the structure of identifying, reporting, monitoring, and reviewing the bank's liquidity conditions.
iv. The policies set the limit of liquidity risk and prepare a contingency plan to handle and mitigate liquidity pressures.

When preparing and formulating the liquidity management policies, BOD may consider and incorporate ideas from the bodies in charge of managing liquidity risk such as the Chief Executive Officer (CEO) and heads of risk management departments (divisions). In particular, input from banking regulators and stakeholders is also very important to be taken into account in the policies. This intensive integrative cooperation and coordination will ensure that the board fully understands the realities of the internal and external business environments in order to be able to formulate applicable liquidity management policies.

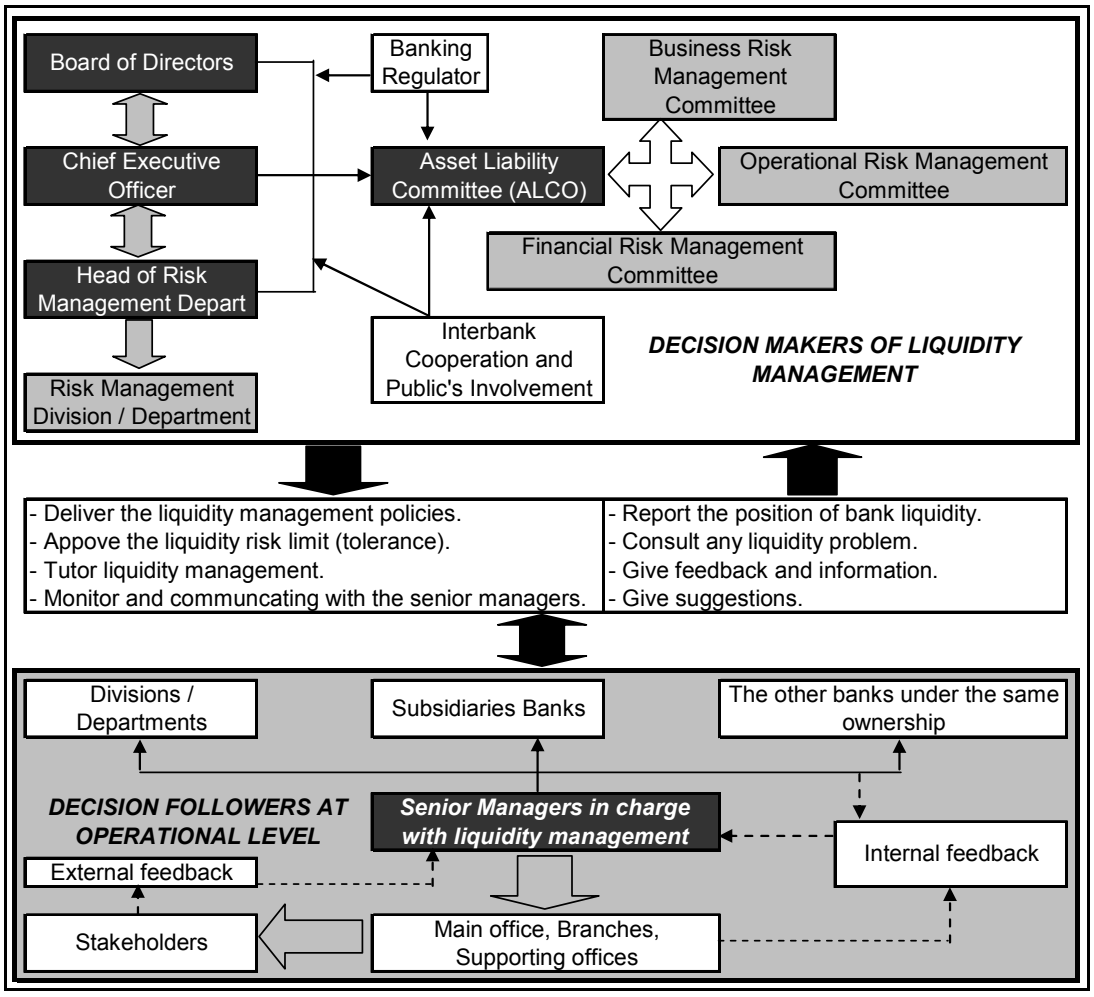
2. 3. 2. Asset Liability Committee (ALCO)

In order to implement the liquidity management policies, BOD assigns a special body to carry out and organize the policies at the lower level, namely Asset Liability Committee (ALCO) (see figure 2.3). On the practical level, ALCO arranges the strategies to implement the liquidity management policies in cooperation with the Business Risk Management Committee, the Operational Risk Management Committee, and the Financial Risk Management Committee. Particularly, ALCO:

i. manages and monitors the daily liquidity position and collaterals on the asset and liability sides;
ii. detects any liquidity imbalance;
iii. determines strategies to mitigate liquidity imbalance; and
iv. maintains good relationships with external parties to cooperatively manage and anticipate liquidity pressures.

In carrying out all of its roles, ALCO continuously consults with the BOD and the three cooperating bodies (business risk management committee, operational risk management committee, and financial risk management committee).

Figure 2. 3: Organization Framework of Liquidity Management in Banks



Meanwhile, on the operational level, the application of the liquidity management policies and ALCO's strategies are carried out by senior managers of all subordinate

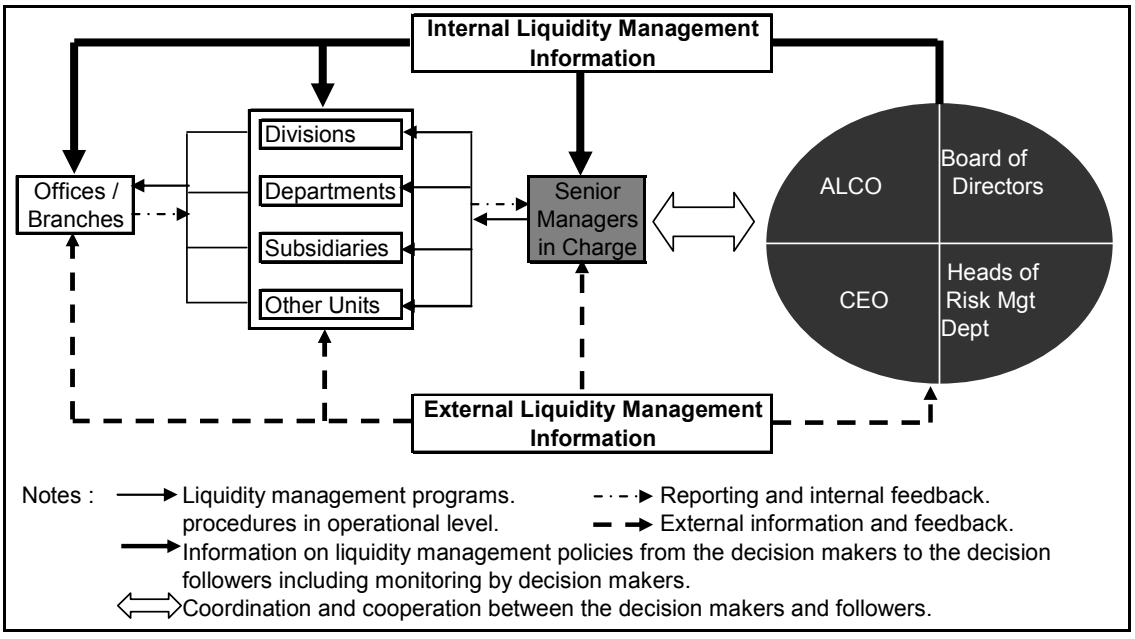
levels (see figure 2.3). They manage liquidity under the instruction of ALCO and have primary responsibilities to:

i. transform the liquidity management policies, objectives, and strategies of the decision makers to the operational level and manage liquidity, adhering to their lines of authority and responsibility;
ii. ensure the effectiveness and soundness of the liquidity management process operationally;
iii. monitor the implementation of the liquidity management processes and deliver the related information to decision makers.

2. 3. 3. Effective Information System

Following the liquidity management policies and, the roles of ALCO and their counterparts, the effective information system comes next to support the liquidity management process (BIS, 2008a:6). This system enables banks to monitor, report, and control the liquidity risk exposure and determines the funding needs inside and outside the organization.

Figure 2. 4: Effective Information System in Liquidity Management



In general, the effective information system concerns two players, namely (i) the decision makers of liquidity management and (ii) the decision followers on the

operational level. The former unit, which consists of the BOD, CEO, heads of risk management departments, and ALCO, delivers full information on liquidity management policies, strategies, and guidelines to be implemented to the latter, which consists of senior managers and their subordinates (see figure 2.4).

Practically, upon receiving the commands on managing liquidity from the decision makers, the senior managers assign and monitor their subordinates, and ask them to report the implementation of liquidity management. The decision makers receive a special internal report about any liquidity risk problem, and the internal and external liquidity management information from senior managers.

In some cases, the bank management publishes reports about the implementation of liquidity management for public disclosure to enable market participants to make an informed judgment about the soundness of the bank's liquidity risk management framework and liquidity position (BIS, 2008b:4-5). This effective information system, comprehensive coordination and communication between the decision makers, decision followers, and all related parties in the organization create a robust mechanism to manage and control liquidity risk.

2. 3. 4. 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 comply the process conducted by the decision followers with the one stipulated by the decision makers (BIS, 2008a:6). This internal control system can be assigned to ALCO as a representative of BOD to bridge the gap between decision makers and decision followers (see figure 2.4). In the case of liquidity risk problems, ALCO investigates the level of liquidity risk and mitigates it based on guidance from the decision makers. But in the case of a serious liquidity risk problem, ALCO consults with the decision makers for necessary and immediate actions.

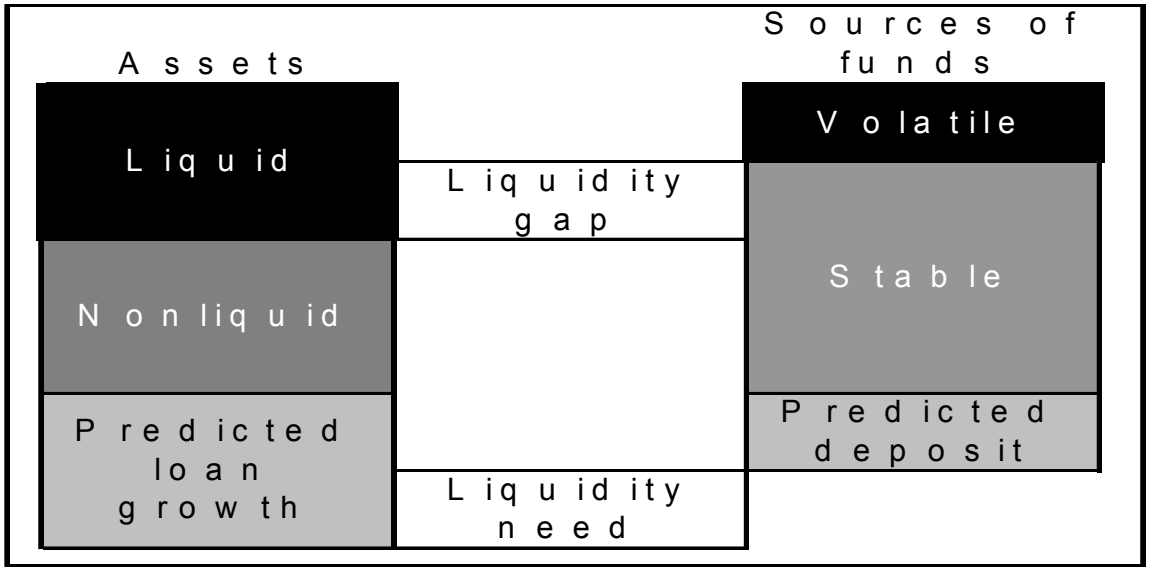
However, the regular functions of the internal control system are to comprehensively audit the liquidity management process, to evaluate the liquidity position, and, when necessary, to propose revision or enhancement of the liquidity management process to the BOD (decision makers). Further, the organization can

cooperate and communicate with external supervisors such as government bodies to assess the adequacy of a bank's liquidity risk management framework and the level of liquidity (BIS, 2008b:2-5).

2. 4. 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) liquid assets are available in larger portions than volatile liabilities, a scenario known as liquidity gap, or (b) the predicted amount of funds needed on the asset side is higher than the predicted amount of funds available on the liability side, a condition known as liquidity need (see figure 2.5). 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 which makes normally-liquid assets illiquid (Sharma, 2004:1).

Figure 2. 5: Liquidity Gap and Liquidity Need



Source: Helmen, *et al.* (1994).

Notes: Liquid: federal fund certificates, short-term securities, temporary investment instruments, non-renewing loans. Non-liquid: mortgage, consumer loans, commercial loans, premises, and equipment. 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.

One way to balance the asset and liability sides is by matching the maturities; this is commonly referred to as maturity mismatch risk anticipation (Greenbaum and Thakor,

1995:172). To match the maturities of assets and liabilities, the bank deposits should be allocated in well-organized maturities. Hence, the demand for liquidity from the matured deposits could be fulfilled from the liquidity of the matured assets. As a result there is neither a liquidity gap nor a liquidity need.

2. 4. 1. Factors Triggering Asset-Liability Imbalance and Maturity Mismatch Risks

The first factor is when depositors prefer placing their funds in the short-term tenor of deposits. The banks then use some of the funds to finance long-term investment projects (Sharma, 2004:2). The asset-liability imbalance potentially occurs because the short-term tenors of deposits are liquid, while the long-term investments are illiquid. When the depositors execute their short-term tenors of deposits, the banks may have to terminate their long-term investments in order to free up liquidity to meet the immediate demand. Indeed, the excessive reliance on short-term debts leaves the banks vulnerable to the occurrence of financial distress (Beakley and Cowan, 2004:2).

The second factor is the combination of a high deposit rate to attract more funds from depositors and the high credit rate imposed on entrepreneurs. However, when a business faces a downturn, the high credit rate reduces the entrepreneurs' ability to repay the interest and principal of the debts and leaves banks in a difficult position to repay the depositors' deposits. If banks continue not to have access to funds from the money market, this asset-liability imbalance problem could trigger a liquidity run.

The third factor occurs if big companies become the dominant depositors and locate funds in the short-term tenor of deposits. Banks would need immediate liquidity if the liquidity behavior of big companies is uncertain and unpredictable and these companies redeem their deposits without prior notice or immediately at the same time.

The fourth factor is an asymmetric or unequal distribution of information among depositors, banks, borrowers, and regulators (Greenbaum and Thakor, 1995:173). For example, where there is hidden information among parties involved in the bank's financing activities, or unorganized liquidity behaviors between depositors and banks, it is difficult to match the assets and liabilities.

The final factor is the business cycle which plays an important role in causing 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 may eventually impact the balance between assets and liabilities.

2. 4. 2. Related Risks Following Asset-Liability Imbalance and Maturity Mismatch Risks

When the asset-liability imbalance and maturity mismatch risks take place, there may be related risks following these two risks. This might happen if the banks fail to handle asset-liability imbalance and maturity mismatch risks. Such risks, amongst others, are insolvency risk, government takeover (bailout) risk and reputation risk.

A. Insolvency Risk

Insolvency risk, which is the inability of banks to fulfill their obligations to depositors, occurs if banks fail to manage liquidity risk by not having enough liquidity reserves, selling liquid assets, or borrowing from the money market. In particular, insolvency risk is the condition where the bank's liabilities exceed the bank's assets, causing a negative net worth in the bank's balance sheet (Greenbaum and Thakor, 1995:172).

B. Government Takeover (Bailout) Risk

As evident from the global financial crisis of 2008-2009 and other similar large-scale economic conditions such as the Asian economic crisis of 1997, governments commonly act as the lender of last resort for banks. They provide emergency liquidity for banks which face liquidity distress or even take over defaulting banks to save the entire economy from the adverse impact of the banks' failures.

C. Reputation Risk

The banks' failures to balance the asset and liability sides, manage the demand for liquidity, and mitigate the unexpected liquidity pressures can drop their reputation in the eyes of depositors and stakeholders. In severe cases and especially where the bank is a key driving force behind the economy, a low banking reputation may not only downgrade

the function of banks as financial intermediaries but also impact the performance of the economy.

2. 5. TECHNIQUES TO MITIGATE LIQUIDITY RISK

One of the common techniques used in banking theory to analyze the performance of asset and liability is called the Gap Analysis. This technique assists the output of the assets side (particularly from the interest rate return of bank credits) and the liability side over a certain period of time (Heffernan, 2001:189). It suggests that banks maintain a higher return on the asset side than the liability side. In particular, the ratio of total return from bank credits to total payments of interest on deposits should always be positive. If it is found negative, the banks should:

i. increase total equity or;
ii. increase interest on bank credit to prevent asset-liability imbalance and maturity mismatch risk.

Nonetheless, increasing interest on bank credit might potentially increase NPL and interrupt performance of the asset side. As such, banks are suggested to diversify their funding sources or increase the contingent liquidity sources (BIS, 2008a:6).

Further, in their daily operations, banks need to provide and maintain liquidity to resolve the regular and irregular demand for liquidity from depositors. The regular demand comes from daily business activities of depositors (BIS, 2008a:5). Meanwhile, the irregular demand can be further broken down into (a) the predictable irregular demand for liquidity, and (b) the unpredictable irregular demand for liquidity.

The former arises from non-routine business activities of depositors such as government withdrawals for fiscal operations, termination of automatic rolled over time deposits, and execution of non-mature time deposits. The latter arises from the sudden and massive demand for liquidity such as the contagious banking crisis, the economic or global financial crisis, the oil price shock (economic issues), social and political unrest, and natural disasters (non-economic issues).

To manage the regular demand for liquidity, banks ought to maintain a standby account on the asset side. It is a pool of funds that can be withdrawn to provide liquidity, if needed, on a daily basis. Obviously, larger banks are required to maintain a larger pool of liquid assets than smaller banks (BIS, 2008a:6). According to Helmen *et al*. (1994: 151), such an account should consist of:

i. Currencies (cash in vault). These are the liquidity that banks hold to meet daily transaction needs and that will be placed in the central bank if there is a surplus;
ii. Central bank certificates. These are the safe and liquid deposits in the central bank;
iii. Other commercial bank deposits. These are the bank's short-term deposits in the other commercial banks. Although these are less liquid than the central bank certificates, these deposits can also be redeemed on short notice;
iv. Cash items in the process of collection. These include the checks deposited in the central bank or the other commercial bank deposits for which credits have not yet been received.

Greenbaum and Thakor (1995:176) further propose three techniques to mitigate the regular demand for liquidity. The first one is to invest more funds in liquid loans and/or keep more cash in hand. The second one is to diversify sources of funding from various depositors. The final one is to use the central bank as the last resort to provide emergency liquidity to fulfill the regular demand for liquidity from depositors.

To manage the predictable irregular demand for liquidity, banks should have an estimate of the short-term demand for liquidity based on their past experiences (patterns of liquidity needs). Specifically, in estimating, assumptions are made that the predictable irregular demand for liquidity has seasonal, cyclical, and trend factors (Helmen *et al.*, 1994:162-165). Therefore, unless there is an error condition, it should be possible to identify the predictable irregular demand for liquidity. In order to increase the accuracy of their estimation, the banks should find out from their clients details on the schedule of their intended deposit withdrawals.

Lastly, the unpredictable irregular demand for liquidity is the most difficult one to anticipate given that unfavorable economic/business conditions and non-economic issues are sometimes unpredictable. For this type of demand for liquidity, there are various pro-active actions that banks can adopt, including: (i) having a contingency funding plan (CFP), (ii) a combination of cash flow matching and liquid assets, (iii) a prudential allocation of assets, (iv) an integrated structure of banking organization and, (v) employing the deposit insurance company. These actions are elaborated below.

2. 5. 1. Contingency Funding Plan (CFP)

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

Particularly, CFP anticipates the needs for liquidity through three treatments (BIS, 2008b:4). The first involves 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 their preference.

The second 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 example 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 windows (on the liability side). The final strategy involves setting up indicators to alert the bank management concerning the predetermined level of potential liquidity risk problems.

2. 5. 2. Combination of Cash Flow Matching and Liquid Assets (Mixed Approach)

With this mixed approach, banks attempt to match cash outflows in each time period with a combination of contractual cash inflow and inflow from the sale of assets, repurchase agreement, or other secured borrowing (BIS, 2006:4). The most liquid assets are counted in the earliest time period followed by the less liquid assets.

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

2. 5. 3. Prudential Allocations of Assets (PAA)

This technique could potentially reduce refinancing risk, redemption risk, or repurchasing the bank's borrowing prior to their contractual maturities. Some prerequisites must take place to implement this technique. These are:

i. Placing a substantial portion of deposits to the secured and short-term investment alternatives that are very liquid and may be repurchased before the maturity dates;
ii. Requiring collateral from the debtors to secure long-term investments (BIS, 2008a:4);
iii. Joining syndication loans to share the risk of credit among parties involved;
iv. Avoiding credit concentration on certain types of placements (debtors).

2. 5. 4. Integrated Structure of Banking Organizations

The modern banking organization is indicated by the existence of a bank holding company and 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 bank subsidiaries and (ii) liquidity of the bank subsidiaries. These conditions create two styles of liquidity management in an organization, namely centralized and decentralized liquidity management (BIS, 2006:3). Selecting one and studying its relationship depends on a number of factors, such as the banks' business models,

efficiency of the banking operations, minimizing of the costs of credits, diversification of credits, management of knowledge, and feasibility of movable funds and collaterals.

The management of liquidity in the holding and subsidiary companies is essential because both have different funding needs and sources. It is also subject to regulatory guidelines and requirements (Bank of America, 2007). In practice, the subsidiary companies depend on the holding company's liquidity management policies. For example, when the subsidiary company faces a liquidity risk problem and the sources of funds such as deposits, wholesale market-based funding, and asset securitization are insufficient or could not be used, it needs instant liquidity from the holding company.

On the other hand, the holding company often expects its subsidiaries to handle liquidity risk problems themselves in the first instance, although it may provide the required funds and management assistance if the liquidity risk escalates beyond a certain limit of tolerance (BIS, 2006:4).

Therefore, establishing an integrated organization structure is very important to coordinate the liquidity management between the holding company and the subsidiary companies. For example, the bank holding company establishes a standard regulation on the level of capital necessary for all of its subsidiaries. Hence, the holding company may release emergency liquidity to its subsidiaries not only for purposes of covering the demand for instant liquidity but also fulfilling the capital requirement.

By doing this, the holding company imposes a control to their subsidiaries as well. On the other hand, the subsidiary companies can easily satisfy their liquidity needs through the holding company, rather than seek funds from other companies or money markets, or by selling marketable securities.

2. 5. 5. Deposit Insurance

Deposit insurance is another contemporary technique to mitigate liquidity risk, although to some extent it may invite moral hazard problems (Zhu, 2001:1). For the depositors, deposit insurance increases their deposit costs, although it guarantees the repayment of deposits if banks are in default. Meanwhile, for the banks, the prevailing

deposit insurance reduces the liquidity risk exposures because there is now an external body (deposit insurance company) which covers the failure of deposits repayment.

As such, deposit insurance might also invite banks' moral hazard. It is because banks face less liquidity exposure on the liability side and accordingly the bank financing activities are less cautious *vis-a-vis* the potential business losses. In order to be effective, the application of deposit insurance has to be accompanied with market discipline and prudent banking supervision (Batunanggar, 2002:8).

2. 6. FINANCIAL INSTRUMENTS AS SOURCES OF BANK LIQUIDITY

After setting up the liquidity management process, studying the causes of liquidity risk, and applying some techniques for mitigation, banks prepare financing strategies in the form of liquid financial instruments with an effective diversification of sources and tenors of investments. Initially, the decision of the banks' liquidity management program to place some funds into several liquid financial instruments has to be based on some factors such as (Helmen *et al.*, 1994:170):

i. The bank's liquidity management policies.
ii. The purpose of the placement of funds with respect to the need for liquidity.
iii. The access to the financial markets.
iv. The costs and characteristics of the financial instruments.
v. The forecast of the interest rate return.

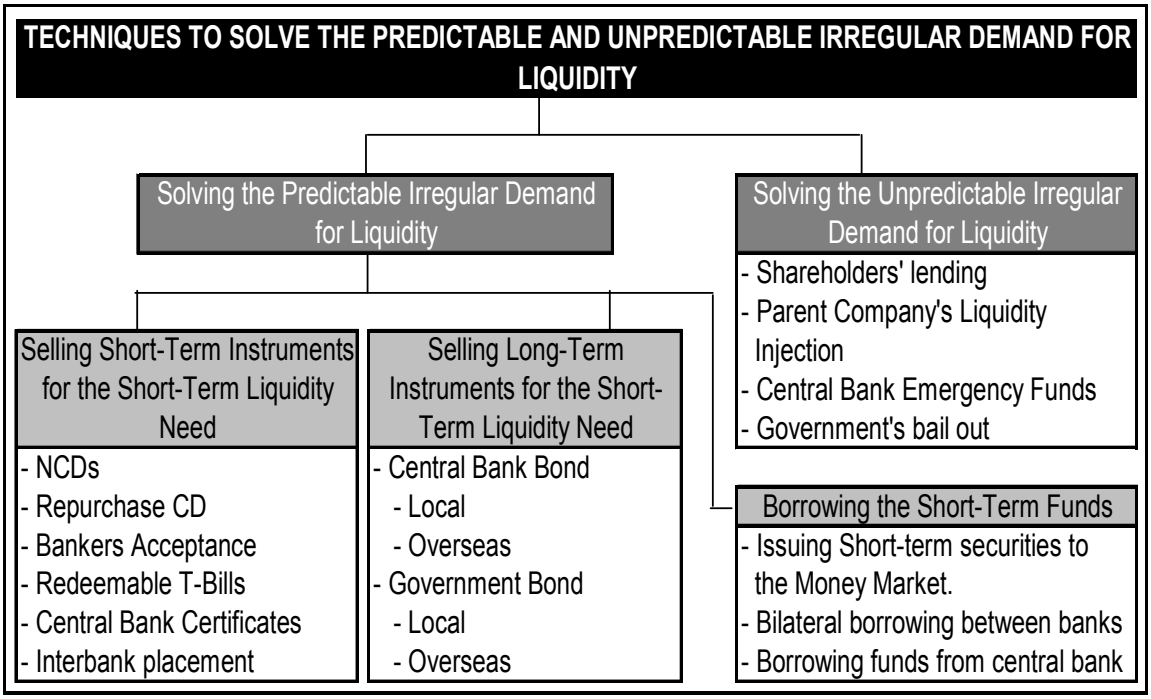
It is also suggested that, before redeeming the financial instruments for liquidity, banks should determine the types of liquidity they need and the types of instruments to be terminated. For instance, the seasonal liquidity needs fit within the time sensitive financial instruments; the cyclical liquidity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

Financial instruments actually apply to solve the predictable and unpredictable irregular demand for liquidity. To solve the predictable irregular demand for liquidity,

banks do some options, such as: (i) selling short-term instruments for the short-term liquidity need, (ii) selling long-term instruments for the short-term liquidity need, and (iii) borrowing the short-term funds (see figure 2.6). In relation to the first option, there are negotiable certificates of deposits (NCDs), repurchase certificates of deposits (CD), banker's acceptance (BA), treasury bills (T-bills), central bank certificates, and inter-bank placements.

In the second option, there are local and overseas central bank bonds and local and overseas government bonds. Finally, in the third option, there are the issuance of short-term securities to the money market, bilateral borrowing between banks, and borrowing of funds from the central bank. Meanwhile, to solve the unpredictable irregular demand for liquidity, banks have four options, namely shareholders lending, parent company's liquidity injection, central bank emergency funds, and government bailout.

Figure 2. 6: Solving the Predictable and Unpredictable Demand for Liquidity



Sources: adopted and modified from Fiedler (2000), Heffernan (2001), Hubbard (2002) and Helmen *et al*. (1994)

Among alternative instruments in the first option, NCDs is a marketable short-term instrument that can be sold in the money market. By selling NCDs, banks receive

immediate liquidity but release their ownership of the instrument. Besides NCDs, banks can repurchase the certificate of deposit to the issuer of the CD. Depending on the repurchase agreement, there is usually a charge for repurchasing a CD. Banks might also sell the bankers acceptance (BA) in the secondary market. Banker's acceptance is a future payment guaranteed by the issuer of the BA to the BA's holders.

Besides selling BA, banks can also sell treasury bills (T-bills) which is one of the most marketable and secured money market instruments issued by either the government or central bank. T-bills are offered by the issuer for short-term placement which is redeemable with a discount prior to the maturity date. The central bank also issues monetary instruments (central bank certificates) which are tradable in the secondary market and can be occupied by banks to fulfill their short-term demand for liquidity. The final option is terminating the placement of funds in other banks.

Currently, there are some complex instruments which are available in the market, for instance: credit default swap (CDS), mortgage backed securities (MBS), and collateralized debt obligation (CDO). But these are not suggested as liquid instruments in this context because of their complicated assessment, non-tradable nature, and unpredicted cash flow (BIS, 2008a:4). Meanwhile, the central bank certificates (bonds) or the government bonds (instruments of the second option) are not only safe (zero risk) but are also very liquid (marketable) locally and internationally. Banks might sell these instruments in the financial market to fulfill the short-term demand for liquidity.

Finally, the last option, rather than selling their ownership in some securities, banks can directly borrow short-term funds by issuing short-term securities to the money market, borrowing funds from the networking banks, or borrowing funds from the central bank. In fact, in the developed countries, the big banks tend to be borrowers while the small banks tend to be lenders in the money market (Ahmed, 2001:34). Indeed, this third option is an instant way to obtain liquidity but the consequence of employing this option is a negative market sentiment, particularly if banks engage in it frequently. To minimize negative sentiment, banks should establish good banking networks in the money market.

Later, if the three options above fail to meet the short-term demand for liquidity, banks can ask for assistance from external sources. The first source is to ask shareholders to lend money for the short-term period. This source has an internal consequence, for example the bank's management has to explain the reasons for borrowing funds to the shareholders. The second source is borrowing some funds from the parent company. Fortunately, this source only requires internal bank agreement with the parent company which is common among banks. However, the same consequence of receiving money from shareholders applies in this source as well.

The third source is utilizing emergency funds from the central bank. Due to its function as the lender of last resort, the central bank has an emergency liquidity facility with a very short (daily) loan maturity and strict requirements. Examples of the strict requirements are: placing collaterals, fulfilling a certain level of capital requirement, having robust bank performance indicators, and signing the strict deferred payment of short-term contracts for loans.

The final source is government bailout, which was evident in the last global financial crisis, where the US government bailed out major investments companies from collapse in order to save both depositors and the US economy. Nonetheless, this is the final source for banks to solve liquidity risk problems.

2. 7. CLOSING REMARKS

In their operations, banks might face liquidity risk as a result of asset-liability imbalance and maturity mismatch risks. In order to manage liquidity risk, the banks should conduct liquidity management processes which consist of determining liquidity management policies, establishing asset liability committees (ALCOs), having an effective information system and internal control, and preparing techniques to mitigate liquidity risk. The Board of Directors (BOD) is responsible for setting up the bank liquidity management policies in cooperation with ALCO and the head of risk management departments/divisions. They are the decision makers in managing liquidity.

Following these, there are senior managers as decision followers on the operational level. Then, the effective information system and internal control on liquidity

management complement the liquidity management processes. Finally, after analyzing the triggering factors of liquidity risk, banks should utilize financial instruments to solve both the predictable and unpredictable irregular demand for liquidity from depositors.

Chapter 3
SHARIA ISSUES IN LIQUIDITY RISK MANAGEMENT

3. 1. INTRODUCTION

The global Islamic banking industry has been growing progressively over the last three decades. At present, its assets are estimated at around USD500 billion-USD1 trillion, with an annual growth rate between 10%-20% and more than 250 Islamic financial institutions engaged in the sector worldwide (Eedle, 2009:1). Taking into account both the progressive growth of this industry and the experience of the global financial crisis in 2008-2009, Islamic banks are compelled to establish a sound liquidity risk management program to fulfill their financial obligations to third parties.

Further, based on Islamic banking characteristics and risk profiles, Islamic banks have unique approaches and techniques to manage liquidity risk based on *Sharia* principles and guidance. Recently, such approaches and techniques have even been extended to take into account the current economic and financial issues.

The Islamic Financial Service Board (IFSB) has published two references to manage liquidity risk in the contemporary business environment. These are: (i) the Guiding Principles of Risk Management for Institutions Offering Only Islamic Financial Services and (ii) the Technical Note on Issues in Strengthening Liquidity Management of Institutions Offering Islamic Financial Services: the Development of Islamic Money Markets.

Fortunately, the principal operations of Islamic banking through profit and loss sharing (PLS) concept between Islamic banks and business partners have by default minimized liquidity risk problems. Nonetheless, if liquidity risk problems still emerge, Islamic banks have options to employ Islamic money market instruments or ask the central bank for emergency liquidity facility.

3. 2. LIQUIDITY RISK ISSUES IN ISLAMIC BANKING

The latest economic[2] and financial developments have brought the potential of liquidity risk problems to all financial institutions, including Islamic banks. Like their conventional counterparts, Islamic banks need to control liquidity in order to be solvent. In particular, if Islamic banks want to be more engaged in any business activity, having a rigorous liquidity risk assessment and mechanism is very important. However, somewhat different from conventional approaches on managing liquidity, Islamic banks would need to construct a liquidity management program which complies with their characteristics and risk profiles. The most important aspect is compliance with *Sharia* principles.

3. 2. 1. Characteristics of Islamic Banks Facing Liquidity Risk

Principally, any endeavor by Islamic banks to construct a sound liquidity management program should be arranged across real business transactions (Antonio, 1999:46-53). This is because Islamic banking operations are concerned with real and asset based contracts which link together business life cycles, cooperation among business partners, and good conduct of the stakeholders. This is the cornerstone of all Islamic banking operations. Hence, if liquidity risk problem occurs in an Islamic banking system, there would be a disharmony between business partners or an unavoidable downturn of business conditions (see figure 3.1).

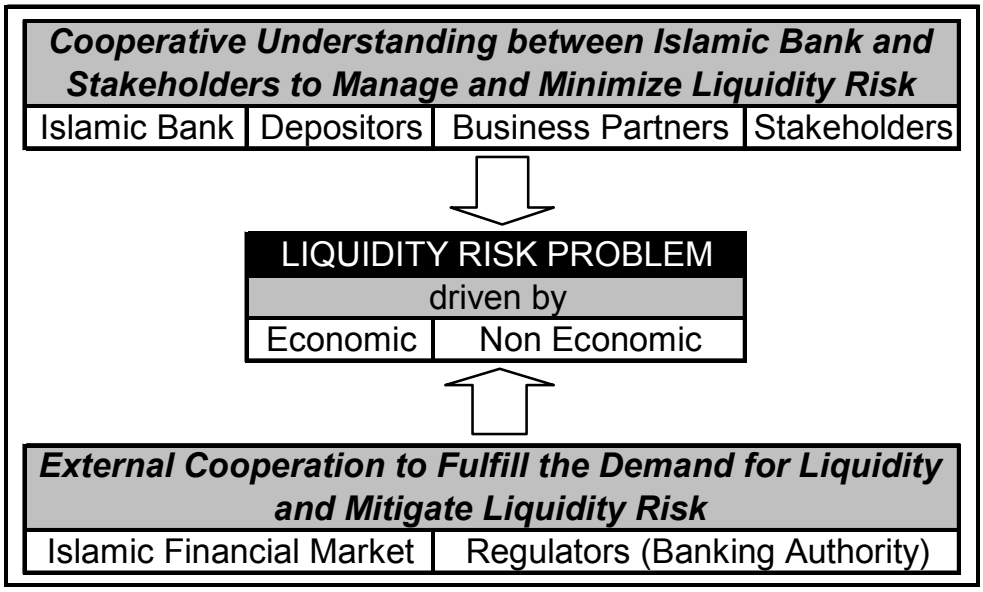
Secondly, in view of such key features, Islamic banks minimize the liquidity risk from both internal and external perspectives. *Sharia* values and principles, which permeate the industry from the inside, treat the bank management, shareholders and stakeholders as trusted business partners (Yaqoobi, 2007:3). This creates a system of cooperation, symmetric information, transparency, and equilibrium in the allocation of funds on both the asset and liability sides.

Externally, any liquidity risk problem is curtailed by the Islamic financial market mechanism which only engages in real business activities because *Sharia* requires the attachment of a real asset to every Islamic financial market contract (Kahf, 2000:2).

[2] Such as the twin deficits problem in the US (2004-2005) and the supreme mortgage and global financial crisis (2008-2009).

There is no dichotomy between the real sector and the financial sector in Islam. In addition, the banking regulators pass regulations to balance the liquidity of the industry.

Figure 3. 1: Islamic Banking Characteristics to Manage Liquidity Risk



Sources: Rosly (2005); Obaidullah (2005); Iqbal and Mirakhor (2007) (with modifications)

Thirdly, Islamic banking operations are free from modes of injustice such as *Riba*, speculation, and *Gharar* (excessive uncertainty). Instead, each party should believe in and support the other and share the risks equitably; they are forbidden from seeking to defeat other parties (*Qur'an*, 26:176-183). Because of this feature, an Islamic financial system is not an expansive but fragile financial sector which has caused the global financial crisis in 2008-2009. Moreover, there is no interest rate or exchange rate speculation in the operations of Islamic banks.

Fourthly, Islamic banking applies a profit and loss sharing (PLS) concept that mandates a sharing of risks among business participants which minimizes liquidity risks. With PLS, the equality of assets and liabilities can be maintained simultaneously because the PLS concept necessitates a full concern and understanding of all parties in a business. Nevertheless, with PLS, there is an uncertainty on the return on deposits. That is, if the actual return is less expected, some rational depositors may seek to withdraw their deposits (Ismail, 2010:226).

Lastly, because of the attachment of Islamic banking operations with real business transactions, Islamic banks are exposed to various kinds of business and market risks such as price fluctuation risk, asset losses risk, amortization, default risk, and economic downturn risk. In some instances, these risks may interrupt the performance on the asset side and result in an asset-liability imbalance.

3. 2. 2. Islamic Banking Risks Related to Liquidity Risk

The recent development in the banking industry exposes Islamic banks to new risks. The financial market conditions and economic changes such as increased market volatility and competition, financial innovations, and regulatory changes require Islamic banks to prepare a comprehensive liquidity risk management program (Iqbal and Mirakhor, 2007:227-228). However, Islamic banks should not only consider such external factors but also take into account the interconnection among risks in their business operations. After all, it is no unlikely that liquidity risk can result from other risks such as credit risk, market risk and, default risk.

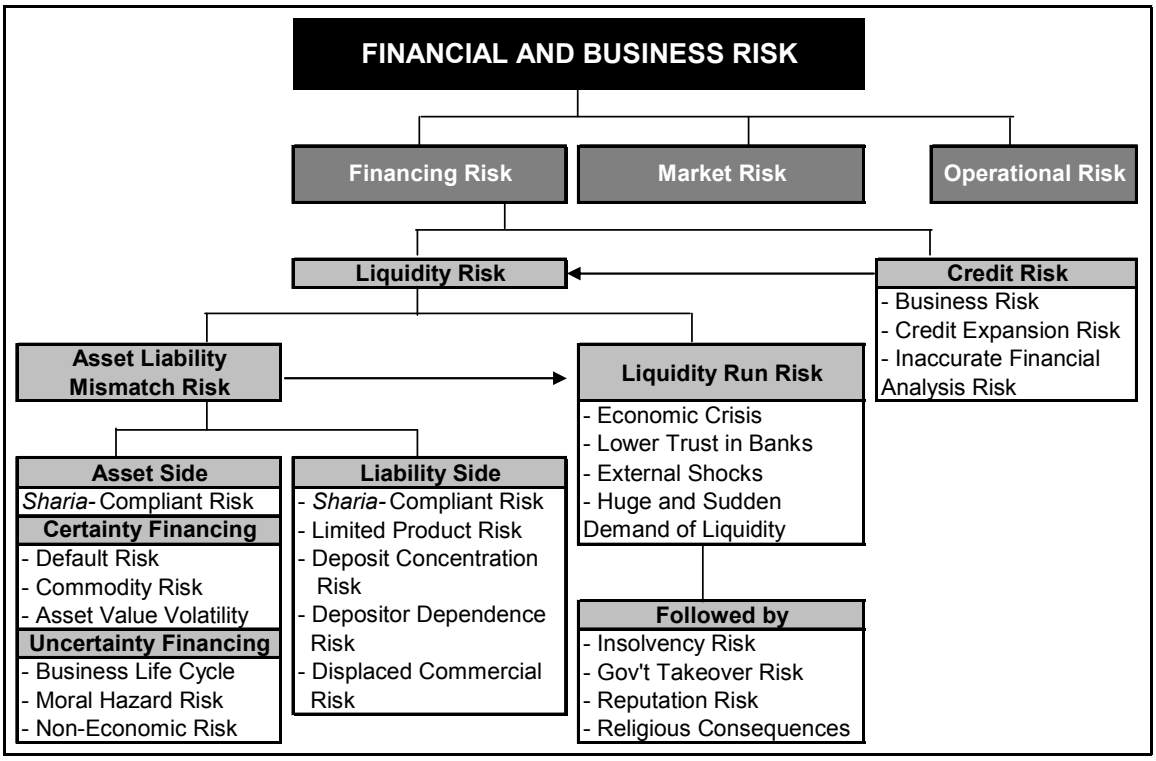
Meanwhile, among the three broad categories of financial and business risks, liquidity risk is a progeny of financing risk. Liquidity risk may occur because of: (a) the liquidity run risk which results from the banks' failure to manage liquidity; (b) the credit risk, which results from the banks' problems in managing financing; or (c) the asset liability mismatch risk, which results from various sub risks including unsolved liquidity risk problems or unfavorable economic/business conditions (see figure 3.2).

However, related to credit risk, debt-based and equity-based contracts in Islamic financing have the same chance of experiencing credit risk caused by the failure of counterparties to meet their obligations in an agreed term (Ismail, 2010:229). Such failure can disrupt the liquidity balance of the assets and liabilities. In addition, because of the fluctuation of the market value of assets, Islamic banks have to bear market risks and commodity risks on the asset side (Ahmed and Khan, 2007:145).

Some examples are inaccurate mark-up price, volatility in the leased asset prices, inflation risk, and foreign exchange risk. Business risk, which is part of credit risk, may

affect the performance of assets as well, and examples include rate of return risk, business failure risk, and a downturn business trend risk (Karim, 2006a:260-272).

Figure 3. 2: Risks Related to Liquidity Risk in Islamic Banking



Sources: Modified from Ahmed and Khan (2007); Karim (2006b); Iqbal and Mirakhor (2007); Ismail (2010).

Those risks indeed potentially cause liquidity risk and, in extreme cases, liquidity run risk. In fact, liquidity run is partly triggered by systemic problems on the asset and liability balancing or by non-Islamic banking factors, such as: (1) lower return on deposits leading to displaced commercial risk, (2) macroeconomic instability, (3) low investors' trust in banks leading to deposit redemption and, (4) abnormal financial market behaviors. Once liquidity run takes place, banks have a very limited range of alternatives; they are urged to be extra vigilant, as otherwise they could face insolvency risk.

Further, liquidity run risk might also be accompanied with a reputation risk which can destabilize the entire industry. Reputation risk arises from failures in governance and *Sharia*-compliance, business strategies, and operations. When a bank is heavily impacted by a serious liquidity run risk, the government has to take it over, which often results in a negative public image of the operations of Islamic banks (Antonio, 1999:48).

Liquidity risk can arise because of problems on both the liability and asset sides. Some examples of the problems from the former are: (i) limited deposit products restricting the financing activities of Islamic banks, (ii) concentration of funds in short-term deposit tenors, (iii) dependency on certain big depositors,[3] and (iv) domination of the return oriented (rational) depositors who seek to maximize their short-term profit, switch the deposits/banks for higher profit, and are unaware of the prohibition of interest. These are liquidity problems on the liability side that may create an asset-liability mismatch.

Meanwhile on the asset side, liquidity problems might come about when there are disturbances in both certainty and uncertainty financing. Certainty financing, which consists of trade-based contracts generating regular incomes for Islamic banks, can be infected by default risk, commodity risk, or asset value volatility risk (Ismail, 2010:228-229). For example, (i) *Murabahah* financing is extremely sensitive because of its short-term deferred payment, (ii) *Ijarah* has various problems in its leased asset, whilst (iii) risk in *Salam* and *Istisna* arise in instances of non-deliverable object risk and/or the falling of the price of the objects.

On the other hand, uncertainty financing, which consists of investment-based contracts generating unpredictable incomes for Islamic banks, depends on business life cycles such as industrial performance, good deeds of the entrepreneurs, and non-economic environments. Fortunately, Islamic banking is excused from the interest rate risk as it operates based on *Sharia* values and principles. Nonetheless, interest rate risk may still indirectly affect Islamic banks because Islamic banks operate in the same playground as the conventional banks[4] (Ismail, 2010:232).

3. 3. *SHARIA* ISSUES IN LIQUIDITY RISK MANAGEMENT

The essential feature of Islamic banking operations is the requirement to comply with *Sharia* principles and guidance, especially the prohibition against generating profit

[3] Examples are multinational corporations, government, high net worth individuals (HNWI) who have a high amount of deposits in the bank. Their saving policies might influence the liquidity position of the bank.

[4] It applies to rational investors or the impact of external shocks (tight monetary policy for instance) on Islamic banking performance.

without bearing any risk (loss). From a *Sharia* perspective, risks are inherent in all business activities of the banks and must be borne by all related business parties. There are however some issues related to *Sharia* principles and approaches to manage liquidity risk in Islamic banks, which are discussed below.

3. 3. 1. Issues that Challenge Liquidity Risk Management

The current implementation of a liquidity risk management program faces some challenging issues. The ultimate issue is that the management of liquidity means more than merely the matching of assets and liabilities. It entails profit maximization, risk minimization, and liquidity availability (Antonio, 1999:249). Hence, *Sharia* expects the combination of asset-liability balancing, profit maximization, risk minimization, and liquidity availability in every liquidity management policy. The challenging issues from both the liquidity issues on the liability and asset sides of the bank are explained in the following section.

3. 3. 1. 1. Challenging Issues on the Liability Side

The first challenge is related to the characteristics of deposits products. Islamic banks usually have a *Wadiah* demand deposit, a *Mudarabah* savings deposit and a *Mudarabah* time deposit. A detailed explanation of these deposits will be provided later in this chapter, but the main focus in this section is the *Mudarabah* time deposit. The return on a *Mudarabah* time deposit is uncertain, whereas depositors expect to know it up front and to always have a positive and continuous return on their deposits.

These expectations challenge the banks to utilize funds optimally in order to be able to provide well-expected, positive, and continuous returns on *Mudarabah* time deposits. In fact, the business conditions might not always be conducive and supportive to produce such profit/return to be shared with depositors.

The second challenge comes from the ignorance/unwillingness of depositors to bear any loss on their deposits. Under a *Mudarabah* contract, depositors are the owners of *Mudarabah* time deposits while Islamic banks are the *Mudarib*. Nonetheless, when Islamic banks face business losses in utilizing funds, it is very unlikely that depositors would want to bear such losses. Islamic banks have to cover the losses by using the

reserve fund which is commonly known as the Investment Risk Reserves (IRR) (IFSB, 2005:23). In Indonesia, it is called the productive asset write-off reserves (PPAP).

The third challenge relates to the first one. In order to maintain the sustainability of the payment on deposit return, Islamic banks are encouraged to retain some of their gross profit for the Profit Equalization Reserve (PER) (IFSB, 2005:23). Indeed, PER is not necessary if depositors fully understand the consequence of depositing money in Islamic contracts such as in the *Mudarabah* time deposits.

The fourth challenge is the domination of short-term deposit tenors. For example, a majority of *Mudarabah* time deposits in Indonesia are of short-term tenors, particularly 1-month tenor (Bank Indonesia, 2002-2008). The short-term nature of these deposits is influenced by the depositors' intention to use them for transactional and investment purposes.

Last but not the least is the limited types of Islamic deposit products. The common contracts on the liability side are the *Wadiah* demand deposits, *Mudarabah* savings deposits and *Mudarabah* time deposits. An expansion of these existing products requires a demand from the market and the understanding (familiarity) of depositors concerning the new proposed deposit products.

3. 3. 1. 2. Challenging Issues on the Asset Side

First of all, on the asset side, there is a requirement to maintain liquidity reserves by the central bank. In this sense, Islamic banks have to have two modes of reserves, which are reserves requirement in the central bank and a statutory liquidity requirement (cash in vault or cash reserves) in the internal banks. The reserves requirement in the central bank is meant to guarantee demand deposits (Ibrahim and Vijaykumar, 2004: 2). On the other hand, the cash reserves are meant to fulfill the regular demand for liquidity such as for the daily transactions of depositors.

The liquidity reserves are indeed idle funds and Islamic banks need to manage them, especially the cash reserves. One way to do this is by having a well-predicted demand for liquidity which might allow banks to locate such idle funds in the Islamic

money market, for example in *Murabahah* inter-bank or, *Mudarabah* inter–bank funds. Another way is through bilateral communication with the prime depositors, who hold a high amount of deposits, regarding their schedule of withdrawals.

Secondly, the current practice of Islamic banks prefers extending funds to the short-term debt-based financing to extending funds to the long-term equity-based financing. This is because the latter demands complicated procedures, strong efforts and appropriate knowledge and experiences in business.

Conversely, *Sharia* advises Islamic banks to earn profit from the sustainable and long-term investment projects which are the genuine financing alternatives to avoid *Riba* and improve the economic performance (El-Din, 2008:40). Nevertheless, for Islamic banks, the long-term periods of projects tend to postpone the realization of the short-term return and interrupt the supply of liquidity reserves to mitigate any demand for liquidity.

Thirdly, there is a challenge in the case of entrepreneurs' default in trade-based contracts. This is because an Islamic bank is prohibited from charging any accrued interest or imposing any penalty on defaulting entrepreneurs (Ismail, 2010:230). Yet, such a default causes a non-productive capital (asset) during the delay, and if banks do not take any action, this condition can plague the entrepreneurs with a moral hazard.

The entrepreneurs' default may also occur in equity-based contracts. Thus, besides strictly selecting business partners, Islamic banks are encouraged to have various and profitable financing portfolios that anticipate business losses and frequently monitor the performance of business partners.

Fourthly, Islamic banks have to arrange robust portfolio investments. Nonetheless, this is not easy, especially since the Islamic financial markets and banking industry are less developed. The alternatives of extending funds are debt-, equity-, and service-based financing and these will be explained in detail in the later parts of this chapter.

In order to allocate more funds and generate more profit, these financing alternatives demand extra liquidity and may surpass the available liquidity to fulfill

liquidity withdrawals. Rather than subtracting the existing liquidity, attracting new depositors (new funds) is recommended to accomplish such a demand for liquidity, but it may not disrupt the obligation to provide liquidity reserves.

Finally, the issues of a lack of easily liquidated long-term investments, minor liquid financial market instruments, and immature Islamic financial markets limit the ability of Islamic banks to optimally manage the funds. For example in Indonesia, the *Sukuk* market is still in the infancy stage of development. Also, at the moment, there are only IMA (Inter-bank *Mudarabah* Agreement) certificates, limited private *Sukuk* and government *Sukuk* (SBSN) available in the Islamic money market and capital market.

3. 3. 2. IFSB Guidance on Liquidity Risk Management

An essential part of a robust liquidity management program is the credibility and effectiveness of the risk assessment process (Alsayed, 2007:3). To this end, the IFSB, as the international standard-setting organization, has published two references, i.e. (i) the Guiding Principles of Risk Management for Institutions Offering Only Islamic Financial Services (December 2005) and (ii) the Technical Note on Issues in Strengthening Liquidity Management of Institutions Offering Islamic Financial Services: the Development of Islamic Money Markets (March 2008). These guidelines have accommodated the risk management principles of the Basel Committee on Banking Supervision (BCBS) and other international standard setting bodies.

These regulations become the main references for Islamic banks, although they are allowed to conduct any adjustment due to their typical business operations and environments. Essentially, as the infrastructures of liquidity vary from country to country, Islamic banks are also expected to comply with the local requirements and stand alone to monitor and manage liquidity risk. The first IFSB guide is explained in the following (IFSB, 2005:1-2):

> 1. General Requirement
> *Principle 1.0:* Institutions offering only Islamic Financial Services (IIFS) shall have in place a comprehensive risk management and reporting process, including appropriate board and senior management oversight, to identify, measure, monitor, report and control relevant categories of risks and, where appropriate, to hold adequate capital against these risks. The process shall take into account

appropriate steps to comply with *Sharia* rules and principles and to ensure the adequacy of relevant risk reporting to the supervisory authority.

5. Liquidity Risk
Principle 5.1: IIFS shall have in place a liquidity management framework (including reporting) taking into account separately and on an overall basis their liquidity exposures in respect of each category of current accounts, unrestricted and restricted investment accounts.
Principle 5.2: IIFS shall assume liquidity risk commensurate with their ability to have sufficient recourse to *Sharia* compliant funds to mitigate such risk.

With regard to the coverage of liquidity risk management policies, IFSB addresses some important points to be noted by Islamic banks (IFSB, 2005:20):

1. It covers strategies for managing liquidity involving effective Board of Directors (BOD) and senior management oversight;
2. It covers a framework for developing and implementing sound processes for measuring and monitoring liquidity;
3. It covers adequate systems in place for monitoring and reporting liquidity exposures on a periodic basis;
4. It covers adequate funding capacity, with particular reference to the willingness and ability of shareholders to provide additional capital when necessary;
5. It covers access to liquidity through fixed asset realizations and arrangements such as sale and lease-back and;
6. It covers liquidity crisis management.

In addition, the second IFSB guide can be summarized as follow (IFSB, 2008:1):

1. Design Islamic money market and Islamic government financing instruments with the desirable characteristics.
2. Incorporate Islamic government finance instruments as an integral part of the overall public debt and financing program and foster the development of an Islamic government securities market.
3. Actively use Islamic government finance instruments in market-based monetary operations of the central bank to manage liquidity in the Islamic money market.
4. Develop efficient trading arrangements and the associated market microstructure for Islamic money and government finance instruments, and develop in parallel the foreign exchange market.
5. Provide supervisory guidance and incentives for effective liquidity risk and asset liability management by IIFS, and in parallel foster privately issued Islamic money market securities.

These IFSB guides deliver two important messages to Islamic banks, which are: (i) to prepare a robust liquidity management program and; (ii) to design and develop the Islamic financial markets to support the liquidity management process. This chapter, as

also the topic of the thesis, focuses on the first message which concerns internal banking process in managing liquidity through balancing assets and liabilities and, constructing a robust liquidity management program.

3. 4. APPROACHES TO MANAGING LIQUIDITY RISK BASED ON *SHARIA*

Islamic banks play critical roles in liquidity management (Askari *et al*., 2009:134). They engage depositors, business partners and all stakeholders in their business operations to manage liquidity. As such, the approaches entail three important components with respect to the process of depositing and advancing funds to balance asset and liability in *Sharia* perspective (Ismail, 2010:20-30):

a) Human behaviors, because Islamic banking operations are based on trust and the sharing of risk with the counterparts.
b) Harmonization of asset and liability.
c) Measuring and monitoring of the funds.

It means that liquidity risk management in Islamic banks depends actively on the roles and contributions of depositors and entrepreneurs and on the roles of Islamic banks to harmonize asset and liability as well as to measure and monitor the funds.

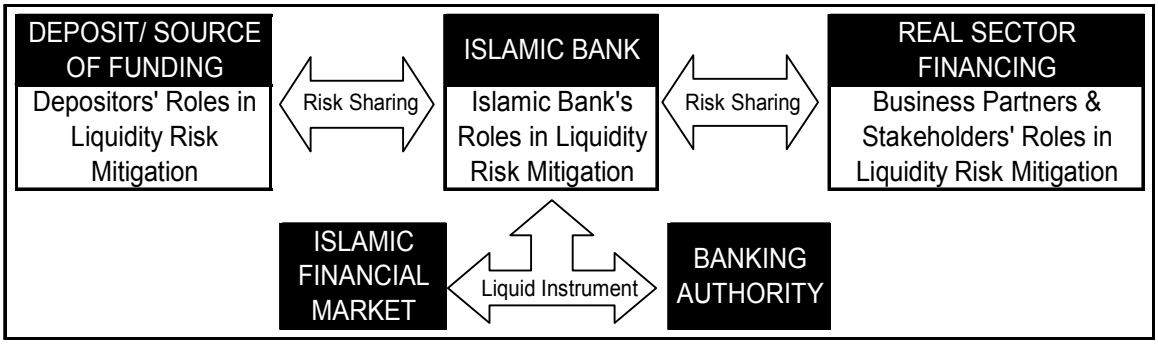
3. 4. 1. Roles of Depositors and Entrepreneurs in Managing Liquidity Risk

Indeed, the involvement of depositors and entrepreneurs in managing liquidity risk distinguishes the Islamic banking operations from the conventional ones in their approach to liquidity risk problems. From a *Sharia* perspective, depositors cannot simply receive return on deposits without any accompanying responsibility in bearing business losses (Alsayed, 2007:1). Entrepreneurs may not use funds in the projects which are non-Islamic, speculative, or do not link with real business activities.

However, engaging depositors and business partners in investment activities requires a deep understanding and acceptance of the Islamic banking principles, operations, and business consequences (see figure 3.3). The most important ones are the willingness to avoid prohibited business activities such as speculation, *Riba* and *Gambling (Qur'an*, 5:90-91, 2:275-280), and to bear the risks attached in the business of

Islamic banks. In order to develop such depositors' and entrepreneurs' understanding and awareness, Islamic banks and all stakeholders should co-operate in "Islamizing" them.

Figure 3. 3: Approaches to Managing Liquidity Risk Based on *Sharia*



Source: Alsayed (2007); Iqbal and Mirakhor (2007); Obaidullah (2005); IFSB (2005).

Well-informed depositors and entrepreneurs are good partners of Islamic banks in controlling liquidity risk on the liability and asset sides because one of the potential causes of liquidity risk problems comes from return-oriented (rational) depositors and from the ignorance of entrepreneurs concerning prudential and *Sharia*-based business (Ismail, 2010:231). The well-informed depositors are also ready to accept the profit and loss sharing (PLS) concept, unpaid (zero) return on deposits, and other unexpected results of the business.

Moreover, they will not withdraw/terminate their long-term investment deposits because they are mindful of the responsibilities of depositing money in Islamic banks. Most importantly, they realize that the funds are used by entrepreneurs and Islamic banks in relation to medium and long-term investment projects.

3. 4. 2. Roles of Islamic Banks in Managing Liquidity Risk

To alleviate liquidity risk problems, Islamic banks prepare internal guidelines based on the IFSB guides on managing liquidity, which are:

i. determining the proper liquidity risk management policies;
ii. measuring and monitoring liquidity risk by e.g. managing the funding and financing, measuring the unexpected business outcomes, and monitoring the projects and entrepreneurs;

iii. conducting prudential and *Sharia*-compliant Islamic banking operations. Islamic banks need to make proper business decisions, properly select entrepreneurs, and arrange joint business operations with other Islamic banks to share and minimize liquidity risk.

3. 4. 2. 1. Determining Liquidity Risk Management Policies

The Board of Directors (BOD), as the highest authority body in a company, has to formulate the liquidity risk management policies which will be followed by the responsible bodies and senior managers at the technical level. The four essential responsibilities of the BOD are, as stated by the IFSB (IFSB, 2005:4):

i. BOD approves the risk management objectives, strategies, policies, and procedures that are consistent with the banks' financial condition, risk profile, and risk tolerance.
ii. BOD ensures the existence of an effective risk management structure including adequate systems for measuring, monitoring, reporting, and controlling risk exposures.
iii. BOD approves limits on aggregate financing and investment exposures to avoid concentration of risk and hold adequate capital if required.
iv. BOD reviews the effectiveness of the risk management activities periodically and makes appropriate changes when necessary.

The liquidity risk management policy is implemented operationally by a special task body, namely ALCO[5], depending on the scope, size, and complexity of banking activities. In general, this body defines the operational policies and procedures, monitors compliance based on the prescribed risk limit, and reports to the top management accordingly. Next, at the technical level, senior managers take over the responsibilities and determine the successful implementation of the policies. The responsibilities of senior managers are (IFSB, 2005:4-5):

[5] Some Islamic banks such as Arab Banking Corporation Group, Meezan Bank, Maybank and Faisal Islamic Bank refer to this unit as ALCO, which is the same terminology used by conventional banks.

i. Executing the strategic direction set by the BOD on an ongoing basis and establishing clear lines of authority and responsibility for managing, monitoring and reporting risks.
ii. Ensuring that the financing and investment activities are within the approved limits and must obtain approval from the BOD.
iii. Ensuring that the risk management function is independent from the risk-taking activities and reporting directly to the BOD or senior management outside the risk-taking unit.

Liquidity management policies designed for all levels must capture: (i) strategies to manage liquidity risk involving effective BOD and senior management oversight; (ii) a framework to develop and implement sound processes for measuring and monitoring liquidity; (iii) adequate systems in place to monitor and report liquidity exposures on a periodic basis; (iv) adequate funding capacity, with particular reference to the willingness and ability of shareholders to provide additional capital when necessary; (v) access to liquidity through fixed asset realizations and arrangements such as sale and lease-back; and (vi) liquidity crisis management.

Furthermore, the policies must incorporate both quantitative and qualitative factors. Quantitative factors include the extent of diversity and sources of funds, concentration of the funding base, reliance on marketable assets, and availability of standby lines of external funding. Qualitative factors include assessing the general ability of management, the particular skills in treasury management and public relations, the quality of management information system, the reputation of banks in the market and, the willingness and ability of shareholders to provide additional capital.

3. 4. 2. 2. Measuring and Monitoring Liquidity Risk

As mentioned earlier, in order to deal with the potential liquidity risk problem in business operations effectively, Islamic banks are obliged to maintain adequate liquidity as standby reserves. The limit of such reserves shall be regularly reviewed, taking into account the condition and position of the bank's liquidity, as well as the economic climates and market conditions. Practically, to calculate accurately how much liquidity should be reserved, Islamic banks need to identify liquidity shortfall by constructing

maturity ladders based on appropriate time bands. In line with that, Islamic banks may classify cash flows and differentiate between types of cash flows as indicated below (IFSB, 2005:20-21):

i. Known cash flows. This is cash flow in which the maturities and the amounts are known in advance, for example receivables from *Murabahah, Ijarah, Ijarah Muntahia Bittamleek* (IMB) and Diminishing *Musharakah*.
ii. Conditional but predictable cash flows. Conditionality is defined in terms of the type of contract or performance of work based on the agreed terms and conditions over an agreed period.
iii. Conditional and unpredictable cash flows. In some cases, an investment in a *Musharakah* is for an open-ended period and an exit strategy may be assessed periodically. The redemption of invested capital and possible levels of return on investment is conditional upon the performance of the activities.

To measure and monitor liquidity risk, Islamic banks have to continuously measure the cash inflows of the business/projects being financed and the cash outflows of deposit withdrawals. In addition, Islamic banks should construct the structure of future payments by differentiating between the reality of payment and the forecasting of payment (Fiedler, 2000:452).

Islamic banks recognize two types of cash inflow, namely: (i) the certain inflow and (ii) the uncertain inflow. The former comes from debt-based contracts and services whilst the latter comes from equity-based contracts. Regarding cash outflows, the certain cash outflows come from time deposits and the uncertain outflows come from both saving and demand deposits.

3. 4. 2. 3. Prudential and *Sharia*-Compliant Islamic Banking Operations

Due to the fiduciary nature of the financial industry and the scope of asymmetry in access to information, it is imperative that prudential operations are carried out by Islamic banks. Islamic banks should have a special commitment to behaving optimally for the sake of shareholders and the general public when managing funds and conducting

banking activities. They have to arrange proper management of assets and liabilities based on *Sharia* principles which are explained below.

3. 4. 2. 4. Managing the Liability Side Based on *Sharia*

Continuing the earlier explanation about the three modes of accounts in Islamic banks, with a *Wadiah* demand deposit, Islamic banks are expressly or impliedly authorized to use the deposit money. They do not however pay return or profit to investors (Obaidullah, 2005:49). However, with *Mudarabah* saving deposits, banks may finance Islamic projects and share the return with depositors.

Meanwhile, *Mudarabah* time deposits have two modes, which are: (i) restricted time deposits and (ii) unrestricted time deposits. In the former, Islamic banks may only act as the fund manager, agent, or non-participating *Mudarib* (Tag El-Din, 2004:2). The banks are not authorized to mix their own funds with this account unless permitted by the account holders.

Therefore, this account is not considered as fund providers and is treated by AAOIFI as an off-balance sheet account[6]. In contrast, the latter allows the banks to actively occupy the funds and share the risks with depositors without any voting rights (Grais and Pellegrini, 2006:1-5).

In relation to managing liquidity, the demand deposit, saving deposit and time deposit require Islamic banks to have a degree of adequate standby (liquidity) reserves. In order to avoid liquidity risk on the liability side, Islamic banks are recommended to:

i. adjust the types of deposits with the projects to be financed;
ii. match the available funds on liability side and the amount of funds needed by the projects; and
iii. manage the maturity date of both deposit products and Islamic projects.

The first suggestion is suitable for restricted time deposits where the owners of deposits determine which projects could be financed with his/her funds. The second and

[6] The AAOIFI standards prefer to treat restricted investment accounts as off-balance sheet items, since the Islamic bank does not have unconditional right to use or dispose of these funds.

the third suggestions may be suitable for unrestricted time and saving deposits because these two types of deposits require an accurate determination of the amount of funds and maturity dates besides permitting Islamic banks to manage the funds.

3. 4. 2. 5. Managing the Asset Sides Based on *Sharia*

The fundamental precondition in Islamic asset management is the prohibition of *Riba* and permission of trade (*Qur'an*, 2:275). The allocation of funds goes through three modes of financing contracts, which are: (a) equity-based financing; (b) debt-based financing; and (c) benevolent loans and services. The examples of the first mode are *Mudarabah* (trustee partnership), *Musharakah* (joint venture), *Muzara'ah* (harvest yield profit-sharing) and *Musaqah* (plantation management fee, based on certain portion of yield) (Antonio, 1999:143-155).

The examples of the second one are *Murabahah* (cost-plus sale), *Ijarah* (leasing), *Salam* (deferred delivery sale), *Istisna* (manufacture-sale), and *Qardh* (benevolent loan). The examples of the last one are *Wakalah*, (opening of letter of credit), *Kafalah* (letter of guarantee) and *Hiwalah* (Obaidullah, 2005:113-115).

Similar to the liability side, on the asset side, Islamic banks are recommended to: (a) fit the characteristics of projects and the available funds on deposits; (b) match the cash inflow from projects with the schedule of PLS payments on the liability side; (c) select business partners through due diligence process and selective financing criteria; (d) conduct joint financing with other Islamic banks to share and minimize risk; and (e) establish a cooperative financing activities with entrepreneurs and all related parties.

The first two actions, which are related to the internal banking investment policies, demand a comprehensive understanding of Islamic contracts on both asset and liability sides. However, the others deal with third parties such as entrepreneurs and other Islamic banks. In this case, the good networks, reputation and trust are dominant factors to be taken into account to successfully implement those suggestions.

3. 5. TECHNIQUES TO MITIGATE LIQUIDITY RISK BASED ON *SHARIA*

According to Ismail (2010:235), account holders tend to withdraw their funds from Islamic banks because of a variety of reasons, such as:

a) A lower than expected or acceptable rate of deposit return.
b) A concern about the financial condition of the banks.
c) A bank that is non-compliant Islamic with the *Sharia* principles and values.

In this case, there are some techniques to mitigate liquidity risk problem based on *Sharia* principles and guidance. Essentially, these techniques mitigate the following three conditions:

i. The regular demand for liquidity;
ii. The predictable irregular demand for liquidity;
iii. The unpredictable irregular demand for liquidity.

For the first condition, the techniques relate to the bank's internal liquidity management policies to handle the regular demand for liquidity. Examples of these are (a) having liquidity reserves; (b) regulating the redemption time of deposits; (c) mitigating a default in both equity and debt based financing; and (d) making a liquidity agreement with the parent company (for Islamic windows).

For the second condition, the technique calls for the bank's external liquidity management policies. Principally, Islamic banks occupy Islamic financial markets to execute their liquid instruments. For the third condition, Islamic banks ask for emergency liquidity from the external liquidity providers such as central bank, government or, other parties. However, unlike the conventional banking practices, those techniques are implemented by referring to *Sharia* principles, for example:

i. There is no monetary reward on liquidity reserves because any reward on unutilized money is close to *Riba*. In conventional banking practices, the central bank commonly pays interest on banks' reserves.

ii. There is cooperation between Islamic banks and entrepreneurs in treating a business (payment) default because entrepreneurs are business partners of the banks.
iii. Each Islamic liquid instrument should have an underlying asset or project.
iv. The emergency liquidity from the central bank is free from any charge or based on a charitable loan (*Qardh hassan*). Any excess on loans is classified as impermissible (*Riba al fadl*).

3. 5. 1. Techniques to Solve the Regular Demand for Liquidity

3. 5. 1. 1. Liquidity (Standby) Reserves

As normally stipulated by the central bank, every Islamic bank needs to have and maintain liquidity reserves in order to solve ordinary liquidity withdrawals from depositors. In their application, liquidity reserves are almost similar to the ones applied by conventional banks. Nevertheless, *Sharia* does not allow for any reward/remuneration on the reserves as mentioned before. As such, the available contracts for liquidity reserves are gracious contracts such as *Wadiah*, *Qardh hassan* or, *Kafalah*.

3. 5. 1. 2. Regulating the Redemption Time of Deposits

Where Islamic financing is engaged in the projects that require specific (minimum) periods of time, contemporary Islamic jurisprudence introduces a technique called constructive liquidation (Obaidullah, 2005:61). This technique suggests the calculation of net asset values of the venture at periodic intervals by subtracting all liabilities from the asset values. Based on this, the redemption time of deposits is arranged and matched with the time of constructive liquidation so that the regular demand for liquidity is well-managed.

3. 5. 1. 3. Mitigating Business Losses and Default in Equity-Based Financing

Business losses are the responsibility of Islamic banks in *Mudarabah* contracts or of both Islamic banks and entrepreneurs in *Musharakah* contracts. To prevent business losses, Islamic banks need to audit, monitor, and evaluate the performance of the projects. However, if the entrepreneur *(Mudarib)* is in default because he does not honestly share the profit/return with banks *(Shahibul Maal)*, he could be penalized by banks.

However, money from such penalties is used for charitable purposes. Alternatively, banks can reschedule the payment of profit/return sharing from entrepreneurs without extra costs or end the contract by selling the assets/projects. Lastly, the entrepreneurs must provide collaterals or a third party guarantor (*Kafalah*) (Iqbal and Mirakhor, 2007:232-233).

3. 5. 1. 4. Mitigating Default in Debt-Based Financing

Debt-based financing always links with an asset as an object of the transaction. In leasing *(Ijarah)* contracts for example, the asset is an *Amanah* (trusteeship) for the lessee (Ayub, 2007:279). There is no compensation in trusteeship in the case of destruction of the asset values, except when the loss is because of the negligence of the lessee. However, in *Murabahah* contracts, once the contract is agreed between two parties, the ownership of an asset moves from the seller to the buyer. Accordingly, the risks of destruction, loss, and other related risks pass to the buyer as the new owner of the asset.

Further, if a payment default occurs in the contracts of a *Murabahah* or an *Ijarah* contract, the Islamic bank has at least three options to choose from, which are: (a) sell the asset and use the funds to settle the contract *(Murabahah)*; (b) make the lessee specifically liable for the damages, theft and/or loss in the assets except in the case of *force majeure (Ijarah)*; and (c) give extra time until the debtor can normally pay the debt again *(Murabahah* and *Ijarah)*. In addition, Islamic banks can insure the asset with the Islamic insurance *(Takaful)* company *(Murabahah* and *Ijarah)*.

3. 5. 1. 5. Internal Liquidity Agreement with the Parent Company

Rather than establishing a full-fledged Islamic bank, some conventional banks prefer opening Islamic banking windows as a preliminary step instead. The parent company and subordinate agreement (internal commitment) emerges at this stage, and often the parent company agrees to supply emergency funds to the Islamic banking windows (IFSB, 2005:20).

For the Islamic banking windows, this structure seems the most efficient and instant way to obtain liquidity when needed. Yet, they have to treat, use, and screen such

liquidity with caution because the parent company usually does not operate based on *Sharia* principles.

3. 5. 2. Techniques to Solve the Predictable Irregular Demand for Liquidity

Despite anticipating the regular demand for liquidity, there are also some techniques to handle the predictable irregular demand for liquidity based on *Sharia*. In this case, executing the short-term or long-term Islamic financial instruments and borrowing money from the Islamic money market are the alternative solutions.

Theoretically, Islamic banks advance funds into either real sector projects (direct financing) or Islamic financial instruments (indirect financing). Where there is a predictable irregular demand for liquidity, rather than executing the ongoing projects, they can switch the ownership of the Islamic financial instruments by selling them in the financial markets (see figure 3.4).

Nevertheless, it is sometimes difficult to sell securities in the financial markets, e.g. because of (a) the limited number of Islamic banks in the market, (b) the limited Islamic financial instruments, (c) under-developed Islamic financial markets, and (d) lack of repurchasing facilities for the Islamic central bank (government) securities.

Alternatively, Islamic banks can borrow money from the Islamic money market. Nevertheless, this option requires a good relationship among Islamic banks, smooth access to the Islamic money market, and the availability of funds in the market. The upside though is that borrowing from the Islamic money market does not deprive the bank of its ownership in an asset/project.

3. 5. 2. 1. Selling the Short-Term Islamic Financial Instruments

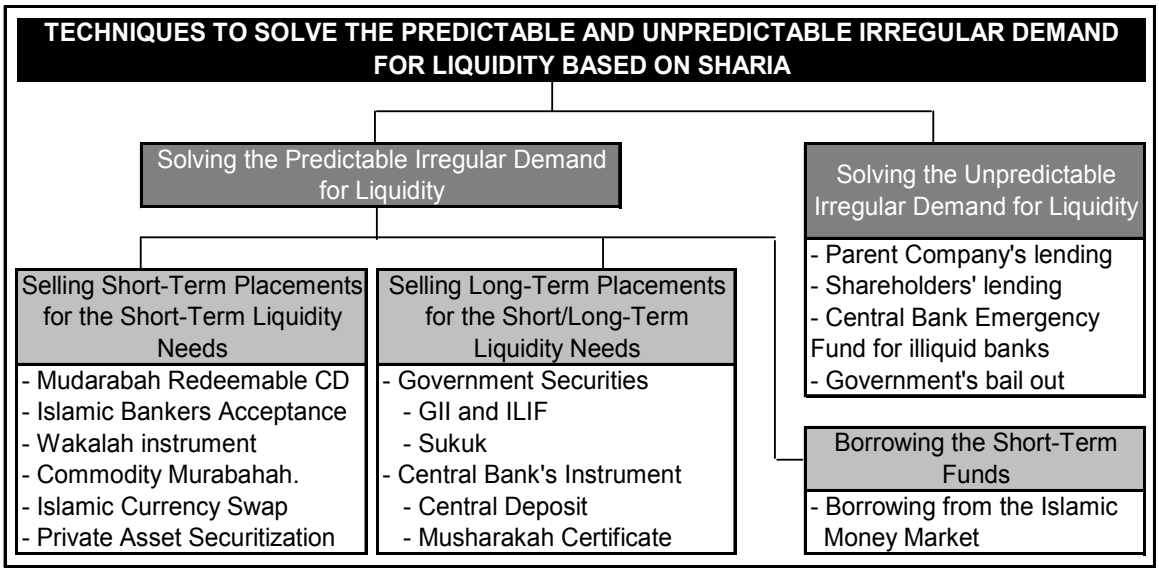
Some short-term liquid instruments are available to be sold in the Islamic money market for liquidity purposes. First of all, there is a *Mudarabah* redeemable certificate of deposit (Ahmed, 2001:76-78), which is a mutual financing agreement among Islamic banks with redemption facilities. The owner of this certificate gains liquidity through a repurchase (repos) commitment where the issuer provides liquidity by liquidating the projects or using their own fund to keep the projects ongoing.

Secondly, there is an Islamic banker's acceptance (BA). BA is issued as a guarantee for the future payment made for the BA's holder (Ahmed, 2001:23-26). In Islamic BA, Islamic banks act only as an agent and earn fixed commissions/fees from the holder for the service provided. However, if the bank (as the holder of BA) urgently requires liquidity, BA can be sold in the secondary market.

The role as an agent is also found in the third instrument, the *Wakalah* instrument, where the Islamic bank acts as an agent (*Wakeel*) of investors (*Muwakil*) to invest funds in a pre-agreed asset with fixed fee paid by the *Muwakil* to the bank. Nowadays, *Wakalah* contracts can be further broadened with the unrestricted *Wakalah* that pools the funds and allocates them into any class of asset without any restriction (Greuning, and Iqbal, 2008:199).

Fortunately, this instrument does not need intermediate parties (costless) and allows the banks to accept liquidity from both conventional and Islamic banks when they sell the instrument in the money market. Like the others, this type of instrument is tradable and liquid for the holder who wants to sell it to the new holder.

Figure 3. 4: Techniques to Solve Irregular Demand for Liquidity Based on *Sharia*



Sources: Ahmed (2001); Greuning and Iqbal (2008); Majid (2003), Kahf (2000); Al Jarhi (2004); Iqbal and Mirakhor (2007).

The fourth instrument is called commodity *Murabahah*. However, the commodity *Murabahah* has some disputes among Islamic scholars regarding its permissibility and

applications (Ayub, 2007:233). This is because the instrument permits the selling of a commodity, which is not yet owned by the seller, to a third party and leaving the debt obligation from the second party to the first party. Nonetheless, *Murabahah* is acceptable in the money market and is the dominant and favored contract of many Islamic banks. Hence, investing funds in a commodity *Murabahah* and selling it whenever needed is still preferred.

Next, there is an Islamic cross currency swap instrument for Islamic banks to mitigate foreign exchange rate risk (Ismail, 2010:264). It involves an agreement between two parties to exchange a stream of principal and profit payments in one currency for a stream of principal and profit payments of in another currency over multiple specified periods. This instrument enables the company to obtain funding in a specific currency and swap it to another currency to reduce cost.

Finally, there is private asset securitization which proposes an alternative of securitizing long-term physical assets under a certain contract (*Ijarah* for instance) for immediate liquidity needs (Ayub, 2007:297). Due to its term period, this instrument ideally matches the predictable demand for long-term liquidity whilst at the same time producing periodic return for the bank. Later on, an asset-backed security comes up as another type of such securitization as it deals with medium and long-term time frames and offers more flexibility for reselling the security.

3. 5. 2. 2. Selling the Long-Term Islamic Financial Instruments

Placing funds in the long-term tenor for long-term liquidity purposes is arranged by purchasing government or the central bank Islamic investment certificates. These certificates are tradable in the secondary market if the holders require short-term liquidity. The Islamic Leasing Investment Fund (ILIF) is one example.

ILIF is the government instrument used to finance public projects under *Ijarah* contracts (Kahf, 2000:3-7). It offers three benefits for the holders: (a) fixed return tied up with the face value of ILIF; (b) pro rated profit from the projects; and (c) being tradable in the money market.

Besides ILIF, there are Islamic government securities and central bank Islamic monetary instruments (central deposit). The former usually has forms of *Sukuk* (government bond) and Government Investment Issues (GII) under various modes of Islamic contracts such as *Mudarabah*, *Musharakah*, *Ijarah*, and *Salam*.

In the latest development of *Sukuk*, Islamic scholars have authorized Islamic banks that hold *Sukuk* to "carve-out" the *Sukuk* into short-term certificates known as short-term *Sukuk* (Ismail, 2010:152-166). A concrete example would be *Sukuk Al Salam* and *Ijarah* issued in Bahrain. Moreover, purchasing overseas or international *Sukuk* also comes into view to invest money rather than domestic *Sukuk* if it is not yet available in the market.

The latter, which is the central deposit (CD), is used under equity-based or debt-based financing contracts and functions as the Islamic monetary policy instruments (Al Jarhi, 2004:6). The liquidity absorbed from the CDs adjusts the total liquidity available in the market and at the same time is very useful for financing certain government projects. An example would be the Central Bank *Musharakah* Certificate which was issued by the Central Bank of Sudan in 1998.

3. 5. 2. 3. Borrowing from the Islamic Money Market

There are some Islamic contracts which endorse borrowing from the Islamic money market. For example, in Indonesia, there is an instrument called IMA (Inter-bank *Mudarabah* Agreement) which allows Islamic banks to borrow money from other banks under a *Mudarabah* contract.

Malaysia also has the same inter-bank borrowing instruments as Indonesia but under a *Murabahah* contract (commodity *Murabahah*). Apart from the local Islamic inter-bank money markets, the International Islamic Financial Market (IIFM) and Liquidity Management Center (LMC) have had the international Islamic money market available for their members (Iqbal and Mirakhor, 2007:240).

3. 5. 3. Techniques to Solve the Unpredictable Irregular Demand for Liquidity

The available options in this special case include: (a) parent company lending; (b) shareholder lending (c) central bank emergency liquidity funds; and (d) government bailout. The first two options are indeed the quickest way to get instant liquidity for Islamic banks. However, obtaining these options often demands a strict commitment in the internal bank because the bank's management would have to explain the rationale for requesting funding from the parent company and/or shareholders. The same commitment also applies in the conventional banking practices as has been discussed in Chapter 2.

Meanwhile, the last two options could have serious repercussions for an Islamic bank. In fact, these options should be the last resort where no other option is feasible. A central bank is not a commercial institution and if emergency funds are provided as a loan, the *Sharia* agreement between central bank and Islamic banks must be under a gratuitous contract (*Tabarru'*) (*Qur'an*, 2:176).

Related to these funds, there are commonly strict pre-requisites from the central bank to the banks which need such funds. For example, Islamic banks should: (i) maintain certain healthy banking performance indicators; (ii) have liquid collaterals; (iii) commit to the short-term repayment of the emergency liquidity fund; and (iv) agree to a penalty (charge) if they fail to repay within a prescribed schedule.

Furthermore, apart from such pre-requisites, receiving the central bank's emergency funds could potentially create a negative image in the public's eye about the robustness of the bank's liquidity management policy. For this reason, there is a recent suggestion that instead of borrowing from the central bank, Islamic banks should create a common funding pool in the central bank which they could turn for liquidity if needed.

Actually, for the central bank, providing emergency funds can function as the control mechanism of the demand and supply of short-term liquidity (Siddiqi, 1994:62). In some cases, rather than occupying a debt contract, the central bank may offer emergency funds underlined by a *Mudarabah* or *Musharakah* contract. Even so, the two contracts bring benefit for the central bank to control and determine the PLS ratio or the ceiling of the funds.

Finally, the government's bailout ends the bank's effort to survive from the liquidity distress condition. As seen during the global financial crisis 2008-2009, the US government took over the defaulting banks and injected fresh liquidity in order to save depositors and the entire economy. For Islamic banks, this option may potentially result in the following consequences: (i) ending the bank's operations; (ii) terminating and ending the short and long-term investment contracts; and (iii) ending the role of the banks in developing the economy.

3. 6. CLOSING REMARKS

The Islamic banking operations have unique characteristics related to liquidity management. In addition, there are some issues from the *Sharia* perspective that challenge the management of liquidity risk on the asset and liability sides. Fortunately, the International Islamic standard setting body (IFSB) has provided the Islamic financial institutions with guides on risk management, including liquidity risk management.

Islamic banks have unique approaches based on *Sharia* to mitigate liquidity risk which engages investors, entrepreneurs, and stakeholders in a cooperative liquidity risk management program. Finally, in order to manage the regular and irregular demand for liquidity from depositors, Islamic banks conduct internal and external liquidity management policies. The former is arranged to handle the regular demand for liquidity, while the latter is used to solve the problem of irregular demand for liquidity.

Chapter 4
RESEARCH METHODOLOGY AND METHOD

4. 1. INTRODUCTION

This chapter outlines the complete process of the research - how this research was carried out; how the empirical analyses were arranged and; how the final output of the research is constructed and proposed. The starting point is the theoretical meaning of research methodology and the research methodology used in this thesis.

Then, the chapter proceeds with the theoretical meaning of research methods, including the research methods used in this thesis. This is followed by a description of the research design and research strategy. Finally, after explaining the primary and secondary data analyses, the chapter elaborates on some limitations and difficulties encountered while carrying out the PhD research.

The thesis uses quantitative research methodology to carry out the research. Then, in the empirical research chapters, it combines the quantitative and qualitative methods to generate the required information. In brief, after studying the conceptual and theoretical aspects of liquidity risk management in chapters 2 and 3 (literature review chapters), the research continues with the empirical research chapters which are chapters 5, 6, 7, and 8. Chapter 5 uses quantitative methods (statistical data analyses) to analyze the conditions and performances of liquidity management in the Islamic banking industry.

Chapter 6 uses quantitative methods (econometric models) to find factors determining a balanced asset and liability, find factors constructing an optimal liquidity reserves, and check the resilience of the Islamic banking industry against irregular demand for liquidity and liquidity run. In addition, it also analyzes the potential liquidity risk problem in the event of Islamic banks being unable to fulfill the demand for liquidity if irregular demand for liquidity and liquidity run occurs.

Chapter 7 uses quantitative methods (statistical data analyses) to provide information related to liquidity behavior of depositors and Islamic banks. Finally, Chapter 8 uses qualitative methods (qualitative analyses) to comprehensively integrate and interpret all outcomes of both empirical research chapters and literature review chapters. Specifically, it proposes the ultimate output of the thesis which is an integrated and comprehensive liquidity management program for the Indonesian Islamic banking industry.

However, this research, which makes reference to the current economic and business conditions, was carried out based on certain assumptions. Realizing that the Islamic banking industry is a fast-growing industry with scope for extensive improvements, a more advanced and comprehensive study might be arranged in the future. Particularly, this research has not explored and referred to the roles of the Council of Indonesian *Sharia* Scholars (MUI), government, academics, and other relevant parties.

4. 2. RESEARCH METHODOLOGY

"Research methodology is the study of research process itself – the principles, procedures, and strategies for gathering information, analyzing it, and interpreting it" (Gray *et al*., 2007:14). In other words, research methodology is a "systematic controlled, empirical, and critical investigation of natural phenomena guided by theory and hypothesis about the presumed relations among such phenomena" (O'Sullivan and Rassel, 1989:209-210). In the social science context, research methodology is commonly classified into two general formats, namely quantitative and qualitative research methodologies.

4. 2. 1. Quantitative Research Methodology

In general, "Quantitative research emphasizes ordinal measures and number" (Gray *et al*., 2007:61). In particular, "Quantitative research methodology attempts to establish formal relationships between related variables. It is mostly guided by positivist philosophy" (Asutay, 2008:7). A positivist philosophy believes that social phenomena can be explained by numbers which represent such conditions. "Quantitative researchers generally accept the goal of developing an understanding that correctly reflects what is

actually happening in the real world, some quantitative researchers instead emphasize the goal of developing an authentic understanding of a social process or social setting" (Gubrium and Holstein, 1997).

It is commonly known that the quantitative research methodology involves primary or secondary data to explain what actually happens in the specific social phenomenon. Thus, quantitative researchers determine a hypothesis from a theory, collect data which contains social reality of the related field, analyze the data with respect to testing the hypothesis, and finally produce the output of the quantitative research which explains and clarifies the social phenomenon in question.

4. 2. 2. Qualitative Research Methodology

"Qualitative research is a holistic approach that involves discovery. Qualitative research is also described as an unfolding model that occurs in a natural setting that enables the researcher to develop a level of detail from high involvement in the actual experiences" (Creswell, 1994). The qualitative research methodology investigates the perceptions of people, their responses, feelings, and information regarding a specific social phenomenon. Denzin and Lincoln (1994:2) further described the qualitative research methodology as "a multi method in focus, involving an interpretive, naturalistic approach to its subject matter".

Qualitative researchers study things in their natural settings, and try to understand or interpret the social phenomena based on facts, real conditions, reactions, and behavior of people. Technically, qualitative research employs various empirical materials such as case studies, personal experiences, group discussions, life stories, interviews, observations, field surveys with questionnaires, and visual texts to describe the social case, problematic moments or the life of the society or sample population.

In another view, "qualitative research methodology is often guided by interpretivism. Interpretive social scientists believe that social reality is socially constructed. Therefore, the goals of social scientists are to understand what meanings people give to the reality and does not mean to determine how reality works apart from

these interpretations. As such, there is no concrete, objective reality that scientific methods help us to understand" (Lynch and Bogen, 1997).

Comparing the qualitative and quantitative research methodologies, the quantitative researchers treat social phenomena objectively and examine the phenomena with the data assuming that human feelings, opinions, etc. are included in them. Meanwhile, the qualitative researchers view social phenomena subjectively, work with the object, and attach the human aspects to explain the phenomena.

4. 2. 3. Research Methodology of the PhD Thesis

This thesis uses a quantitative research methodology to analyze and gather all relevant information on liquidity risk management and to construct the main output of the thesis. It analyzes primary data from direct surveys to depositors and Islamic banks and employs secondary data to make econometric models and analyze the performance of the industry. Both sources of data generate qualitative and quantitative information which will be used for the construction of the final output of the thesis.

4. 3. RESEARCH METHOD

Research method in social science can be defined as a systematic research process to study a specific social object with certain research techniques employed for such a purpose. "Research method deals with quantitative techniques such as statistical correlations as well as qualitative techniques like observation, interviewing and audio recording" (Silverman, 2000:79).

"Researchers typically select the quantitative approach to respond to research questions requiring numerical data, the qualitative approach for research questions requiring textural data, and the mixed methods approach for research questions requiring both numerical and textural data" (Williams, 2007:65).

The main goal of deciding on the most reliable research method is to gain useful information in the most effective and realistic way. Towards such a purpose, some factors have to be considered, which are (Studentmund, 2005:48): (1) what information is needed to make a decision; (2) how much information can be collected and analyzed in a low

cost and practical manner; (3) how accurate the information will be; (4) whether the selected method will get all the required information; (5) whether the information will appear as credible for a decision maker; and (6) how the information can be analyzed.

4. 3. 1. Quantitative Method

"A quantitative research method involves a numeric or statistical approach to research design. The research itself is independent of the researcher. As a result, data is used to objectively measure reality. Quantitative research creates meaning through objectivity uncovered in the collected data" (Williams, 2007:66). "The methodology of a quantitative research maintains the assumption of an empiricist paradigm" (Creswell, 2003).

This method is usually adopted if the researcher wants to explain, assess, or evaluate the social phenomena by establishing certain correlations and associations with a quantitative approach such as mathematical or statistical modeling. In many cases, the quantitative research method engages with direct exploration of the research object through field surveys or observations to gather the primary data and information.

4. 3. 2. Qualitative Method

"What constitutes qualitative research involves purposeful use for describing, explaining, and interpreting collected data" (Williams, 2007:67). Qualitative data commonly does not have a numerical interpretation as it is usually formatted in the form of participants' responses, thoughts, feelings, etc. These outputs cannot be determined from numbers or a series of data. Hence, "qualitative knowing about social setting can be essential for understanding patterns in quantitative data" (Campbell and Russo, 1999:141).

Leedy and Ormrod (2001) stated that "qualitative research is less structured in description because it formulates and builds new theories". Furthermore, there are five areas of qualitative methods: case study, ethnography study, phenomenological study, grounded theory study, and content analysis. These five areas are representative of research that is built upon inductive reasoning and associated methodologies (Williams, 2007:67).

4. 3. 3. Research Method of the PhD Thesis

With respect to this research, analyzing the practices of managing liquidity in Islamic banks and gaining real information about the perception of banking depositors and Islamic bankers regarding their liquidity behavior are the main focus of the empirical research chapters (chapters 5, 6, 7, and 8). For these reasons, this research applies both quantitative and qualitative research methods.

First of all, chapter 5 uses secondary data and information from Bank Indonesia, Islamic banks and third parties to apply quantitative methods by using statistical data analysis. The chapter analyzes: (i) the performance of the industry and the practices of liquidity risk management in Islamic banks; (ii) the techniques to manage liquidity risk used by Islamic banks; (iii) the liquid instruments available in the Islamic money market; and (iv) the regulatory measures Bank Indonesia undertook to limit liquidity risk.

Secondly, the secondary data is used again for econometric modeling in Chapter 6 to identify liquidity behavior of depositors and Islamic banks, the flow of funds, the critical variables determining the liquidity management of banks, and the resilience of the industry against liquidity distress.

Four models are constructed in the chapter, namely: (i) asset model to know liquidity behavior of Islamic banks; (ii) liability model to understand liquidity behavior of depositors; (iii) liquidity reserves model to capture factors influencing the optimal liquidity reserves position; and (iv) demand for and supply of liquidity models to trace the resilience of the industry if irregular liquidity demand and liquidity run occur.

Principally, econometrics can be defined as "the social science in which the tools of economic theory, mathematics, and statistical inference are applied to the analysis of economic phenomena" (Gujarati, 2004:1). In practice, econometrics has three major uses (Studentmund, 2005:4-6): (i) to describe economic reality by quantifying every economic activity; (ii) to test the hypothesis of economic theory; and (iii) to forecast future economic activity.

Nevertheless, as an art of mathematics and statistics, econometrics has some limitations to cover the information comprehensively because:

i. the secondary data are very limited to describe all issues of liquidity management;
ii. every equation is constructed with certain assumptions;
iii. there are always fixed and variable error components in every equation showing the unexplained part of it.

Therefore, to verify and reassure the econometric outcomes, actual information (primary data) is needed. Affirmation from direct (field) surveys will strengthen and validate the results coming from quantitative method as well as explaining the real conditions of the results.

Therefore, Chapter 7 organizes field surveys with questionnaires to both depositors and Islamic bankers to gain primary data. The surveys provide direct insight into the internal dynamic of the industry. Specifically, they assess the understanding, investment, and liquidity behavior of depositors and the liquidity management policies and strategies of Islamic banks (qualitative and quantitative analyses).

The surveys use semi-structured questionnaires to investigate various crucial issues in liquidity risk management. Further clarification from Islamic bankers by means of email complements the information from questionnaires. The overall information of this chapter is analyzed qualitatively and quantitatively to generate information concerning the perception and liquidity behavior of both depositors and Islamic banks and to confirm the findings from the previous two empirical analyses (chapters 5 and 6).

In addition, the empirical research chapters also collect published information from media (newspapers, published research papers from central bank, published books on the Islamic banking surveys from private survey companies, etc.) regarding liquidity risk management in Islamic banks. Lastly, Chapter 8 conducts a qualitative analysis to contextualize the findings from chapters 5, 6, and 7 refer to the International banking standards and *Sharia* guides on managing liquidity in chapters 2 and 3 to propose an integrated and comprehensive program to manage liquidity risk.

4. 4. RESEARCH DESIGN

A bank functions as financial intermediary between the surplus spending unit and the deficit spending unit. It allocates unutilized funds to the utilized (productive) sectors. However, with respect to managing liquidity, a bank has to balance liquidity on the asset and liability sides in order to fulfill the demand for liquidity from depositors and optimize the outcomes of the portfolio investment. A failure to balance the liquidity (liquidity mismatch) might cause liquidity risk to the bank.

Unlike the conventional banks, the Islamic banks manage liquidity based on the *Sharia* principles and guidance. For example, (i) they can only utilize the investment-based deposits like *Mudarabah* time deposits or *Mudarabah* savings deposits to finance the real sector; (ii) the funds cannot be released to non-*halal* industries, speculative trading, *Riba*-based investment, etc; (iii) the return on deposits comes from the real output of the business/projects and cannot be predetermined.

Despite balancing liquidity on the asset and liability sides (internal approach), Islamic banks may utilize the liquid instruments from the Islamic financial markets to solve liquidity risk problems (external approach). However, because this industry is still less developed in Indonesia, there are not many liquid instruments available in the Islamic financial markets. However, in the case of sudden liquidity distress, the banks can use the emergency liquidity funds provided by the banking regulators.

This research is designed by two research approaches namely: (i) literature review approach, which includes *Sharia* guides and international banking standards on liquidity risk management as presented in chapters 2 and 3 (literature review chapters) and (ii) empirical analyses approach, which amongst other aspects analyzes the organizational structures of Islamic banks (BUS and UUS) with respect to managing liquidity, finds factors that balance asset and liability sides, and discovers realities from the questionnaire surveys regarding liquidity behavior of both depositors and Islamic banks. The empirical research results are presented in chapters 5, 6, 7, and 8 (empirical research chapters).

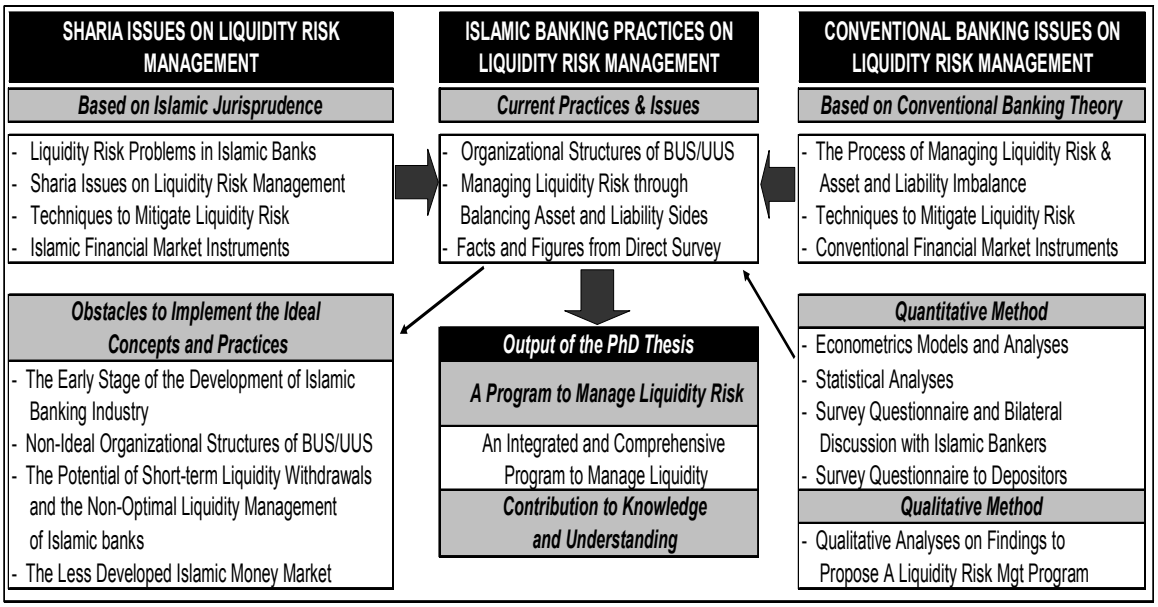
However, the practices of liquidity risk management are not on the right track and do not fully employ both the *Sharia* guidance and international banking standards in

managing liquidity. Indeed, there are some obstacles to following those two guides, which are:

i. The early stage of the development of Indonesian Islamic banking industry.
ii. The non-ideal format of organizational structures of BUS and UUS.
iii. The potential of short-term liquidity withdrawals from depositors and the non-optimal liquidity management by Islamic banks.
iv. The less developed Islamic money market.

This research examines and elaborates those obstacles by occupying quantitative methods in chapters 5, 6, and 7 and is complemented by the qualitative method in chapters 7 and 8. Most importantly, all empirical research chapters do not only provide information and research findings with regard to liquidity risk management but also provide materials to construct the most applicable and appropriate program to manage liquidity risk in the Indonesian Islamic banking industry.

Figure 4. 1: Research Design



Finally, the thesis proposes a program to manage liquidity risk; this is the ultimate output of the analyses, and it is presented in Chapter 8. The program is an integrated and comprehensive program to manage liquidity, taking into account the current conditions of the Islamic banking industry and referring to the *Sharia* guides and international banking

standards (see Figure 4.1). This final output of the thesis is hoped to be applicable and useful to Islamic banks, banking regulators, and all stakeholders of the Islamic banking industry in Indonesia. Moreover, it is also the contribution of the thesis to the knowledge and understanding of risk management in the Islamic banking literature.

4. 5. RESEARCH STRATEGY

This PhD thesis uses a deductive research strategy. It begins by reviewing the literature related to liquidity risk management based on *Sharia* guidance and the international banking standards. Then it analyzes and evaluates the performance, facts, and figures of the industry with both quantitative and qualitative methods in four empirical research chapters.

Finally, it arrives at a range of recommendations for the organizational structures of Islamic banks and an integrated and comprehensive program to manage liquidity. This final output is hoped to propose a better way of managing liquidity risk for the Indonesian Islamic banking industry.

4. 6. PRIMARY DATA ANALYSIS

Analyzing the primary data from field surveys involves several data analyses. Firstly, the inspection is conducted to check for potential errors of the questionnaire data which can happen because of the response effect[7] or less enthusiasm of participants to answer the questions in the questionnaire. In this case, the researcher ensures that the respondents fully understand all questions before answering them and gives them a chance to clarify or seek an explanation on a question which is not understood.

Secondly, the researcher tries to minimize the number of invalid questionnaires by asking strategic and confirmatory questions. Thirdly, the researcher takes into account only the most reliable questionnaire data. The surveys do not take into account incomplete questionnaires in order to guarantee the accuracy and comprehensiveness of information in the questionnaires.

[7] The difference between the actual and the true responses of the interviewee.

Fourth is analyzing the questionnaire data, which is carried out over several steps as explained in the following:

i. Understanding the purposes and content of every question in relation to the issue of liquidity risk management. Some answers give explicit information whilst the others contain implicit information which needs to be analyzed with statistical tools.
ii. Organizing the answers individually and in a group based on the similarity of the issues being investigated, the purposes of the questions, and the interconnection of information delivered by some related questions.
iii. To clarify some strategic answers, particularly from Islamic bankers, a bilateral communication/discussion is arranged.
iv. Processing the answers. In certain tables, the column of frequency of every question depicts the number of respondents who choose options of: yes, agree, my 1^{st} and 2^{nd} ranks, my priority, my consideration, and the most preferable and preferable. In addition to that, the column of mode shows the central tendency of the answers and is composed of respondents who choose the options of the most preferred, preferred, less preferred, not preferred, yes, agree, disagree, and neutral.
v. In other tables, a correlation test between two variables by using Pearson chi square and phi value (effect size) is employed. Explanation about the formulas can be found below table 7.1 in Chapter 7.
vi. In addition, a rating score is also found in certain tables. The respondents are asked to give a priority scale for each question. The highest weight is given to the top priority and the lowest weight is given to the bottom one. The score is computed as total respondents who choose a certain answer times weight divided by total respondents. An explanation of this is also found in Chapter 7.
vii. Documenting the outcomes of the surveys. All hardcopies of questionnaires and email discussions are well-documented by the researcher. The information includes email addresses of the respondents, names of the Islamic banks (BUS and UUS), date and time the questionnaires were completed, and the overall answers of every respondent. However, this thesis only delivers the results (analyses) of the surveys.

4. 6. 1. Target Respondents of the Surveys

In relation to Islamic banks, the target respondents of the survey are the President Director, Director, General Manager or Head of Risk Management Team/Division who is the actor and decision maker in managing liquidity risk in the banks. Each person represents his/her Islamic bank.

Therefore, each of the following six Islamic commercial banks (BUS) was represented by one banker: (1) Bank Muamalat Indonesia, (2) Bank Syariah Mandiri, (3) Bank Syariah Mega Indonesia, (4) Bank Bukopin Syariah, (5) Bank BRI Syariah, and (6) Bank BTN Syariah. Likewise, eleven respondents represent the eleven big Islamic Banking Windows/Units (UUS) that were surveyed.

The survey adopts a purposive sampling strategy. Hence, it engages seventeen Islamic bankers representing all (six) BUS and eleven Islamic windows (UUS). They capture 97% of the total Islamic banking market shares. The rest of the market shares belong to the Islamic rural credit banks (BPRS) which operate in rural areas and are beyond the scope of this thesis.

In relation to depositors, the target respondents of the survey are those who are depositors of any Islamic bank located in various provinces in Indonesia. All of them are educated persons and most of them (95%) hold academic degrees (undergraduate or postgraduate degree). Therefore, it is hoped that their answers are very reasonable, correct, and truly expressing their liquidity behavior with respect to managing deposits in Islamic banks. In total, there are 408 individual depositors who participated in the survey.

4. 6. 2. Designing the Questions of the Questionnaire

In order to invite full responses from respondents and gather the required information, the questions are designed as closed end, clear, and concise but meaningful. The questions avoid asking for sensitive and confidential information, which the respondents might be reluctant to provide. However, for strategic issues or crucial information, the questions ask the related banking (depositors) activities or implicit indicators which explain the issues.

Further, before being distributed to respondents, the final questionnaires are discussed with and approved by PhD supervisors and tested with some colleagues (as a pilot project). Beyond questionnaires, further investigation of the Islamic bankers' responses is arranged with a series of open-ended questions through bilateral email discussions. The questionnaires take the formats of:

i. Yes and no questions which require a single answer to clarify issues about the internal organizational structure of Islamic banks and some issues related to the liquidity behavior of depositors;
ii. Rating/ranking questions to inspect the priority and sequence of actions/strategies/policies of Islamic banks to manage liquidity risk and to discover the reactions/decision/priority of depositors related to their investment and liquidity behavior;
iii. Preference/consideration questions to understand the logic/reasoning behind every liquidity management decision and behavior of Islamic banks and depositors. In general, the design of the questions is to elaborate and understand the facts and figures of the Islamic banking industry.

4. 6. 3. Process of Collecting Primary Data

Survey questionnaire to both Islamic bankers and depositors are done through an online system. There are at least three reasons to use the online system. First and most significantly is geographical constraint. This constraint restricts the researcher from carrying out a face to face interview. Nonetheless, the second reason, although there is no face to face interaction, when the respondent fills out the questionnaires, the researcher interacts bilaterally with the respondents via email so as to minimize potential misinterpretation.

More importantly, the third one, the questionnaires distributed via an online system reach depositors of Islamic banks who are members of many mailing lists of Islamic banking depositors' communities and are living in various provinces in Indonesia. Hence, the coverage of the depositors' survey is widespread enough to be representative of the various provinces in the country.

In reality, the fourth one, the Islamic bankers prefer an online survey to a paper based survey. Mostly, it is because they are extremely busy, hence it is almost impossible for the researcher to make an appointment to meet them face to face. The online survey enables the bankers to save time and effort and still give required information on the survey.

The researcher on the other hand, can also communicate via email with them to clarify some information. This Islamic bankers' survey arranges intensive communication with Islamic bankers prior to and after the completion of the online survey to ensure their commitment, seriousness and thoroughness in answering the questionnaires.

4. 6. 4. Advantages and Disadvantages of Survey Questionnaires

Some advantages of doing a survey with questionnaires are:

i. The researcher could identify the preferences, decisions, considerations, and liquidity behavior of depositors as well as the actions, policies, and strategies of Islamic banks to manage liquidity. All of the information is gathered from the first sources which are depositors of Islamic banks and Islamic bankers.
ii. Questionnaires are simple but very useful for examining some issues of the topic being studied. The respondents, particularly in Indonesia, are very familiar and open to participating in a questionnaire-based survey rather than other forms of survey.
iii. Questionnaires can be easily distributed to reach hundreds of respondents.
iv. Questionnaires are simple to be administered and documented.

However, some disadvantages of doing such a questionnaire survey are:

i. The questions tend to direct the respondents to choose certain option(s) or answer(s), especially in the case of closed end and multiple questions.
ii. The respondents are unable to express their opinions or feelings beyond the questions stipulated in the questionnaires.
iii. The questionnaires cannot be designed as being too long as this could dissuade the respondents from participating, but must not be too short either as otherwise the research topic cannot be properly examined and explored.

4. 6. 5. Extending the Survey with Bilateral Communication/Discussion

Bearing in mind the above disadvantages of a questionnaire survey and in order to reconfirm or to elaborate certain issues, a bilateral communication/discussion is adopted, which extends beyond the scope of the questionnaires. Such a communication applies to Islamic bankers specifically, because discussing the strategic issues could further finalize and clarify their answers. On the other hand, depositors' issues have been accommodated in the questionnaires, so that the overall results of the survey to depositors are believed to correspond to their (public) expressions and there is no need for further clarification.

The format of the discussion is a one way dialogue via email from the researcher who asks (only) questions to the interviewee (bankers) who (only) answers the questions. Technically, a semi-structured interview with open-ended questions is used to discuss the extended issues and the researcher does not lead the bankers to give certain explanations/information. 'Structured' in this context means focusing the discussion on certain issues to be investigated and the 'term open-end questions' in this context allows the bankers to freely express their ideas and information.

In essence, the researcher calls the bankers to initiate a contact and to invite their positive response. After the researcher receives a positive response, he sends an email to ask several critical questions which are simple, understandable but meaningful and verifiable. This approach is taken because bankers are typically reluctant to respond to a long list of questions.

Later, after they had warmed up to the questions, the researcher asks a set of further questions. In adopting this style of interview, it is hoped that the bankers would feel comfortable, secure, and free to give information. For the researcher, this extended communication could provide further information to complete the information from questionnaires.

4. 6. 6. Collecting Information from the Third Parties (Non-Respondents)

In addition to gathering information from survey questionnaires and bilateral communication, the thesis also collects information about the liquidity risk management of BUS and UUS from third parties. For this purpose, the research considers at least three

reliable sources, which are: (a) published articles in the local newspapers or from the websites of Islamic banks; (b) published research papers from Bank Indonesia; and (c) published reports or books about the Islamic banking surveys organized by independent surveyor companies such as Mars Company. The collection of such information is done via internet, email, or personal correspondence with the persons in charge.

This supporting information is very important as the risk management activities of BUS and UUS are usually not published in the media. The Directorate of Islamic Banking (DPbS) in Bank Indonesia is also one of the leading sources of information regarding the Islamic banking industry. The directorate has a solid Islamic banking research team with a lot of research papers.

Besides the central bank, the independent surveyor companies mentioned above also have publications in books or reports about the operations of Islamic banks in Indonesia which contain information about liquidity risk management.

4. 7. SECONDARY DATA ANALYSIS

4. 7. 1. Auto Regressive Distributed Lag (Dynamic) Model

This section further elaborates on the econometrics approach which is one of the quantitative methods used in this research. Specifically, the thesis employs the Auto Regressive Distributed Lag (ARDL/Dynamic) Model to model the balance sheet of Islamic banks, simply because:

i. Every variable in Islamic banking industry can function either as an independent variable (explaining the other variables) or as a dependent variable (explained by the other variables) in an equation;
ii. Other than in level, time lag of the variable in ARDL model is also more appropriate and influential in explaining the dependent variable;
iii. Creating a multivariate equation (ARDL model) can potentially trace the causal relationship among variables and interconnection among variables.

4. 7. 2. Decision to Choose ARDL (Dynamic) Model

Technically, the ARDL models are run with OLS technique considering that the technique is well-accepted and commonly used to build a robust dynamic model. In fact, the other econometric tools and techniques require a comprehensive and extensive series of data which cannot be supplied by and are not available in the Islamic banking industry. This is because, unlike the conventional banking industry, the Islamic banking industry in Indonesia is still at a stage of growth with limited data and information.

Nevertheless, despite such limitations, variables used in the ARDL models have comprehensively captured three sectors: (1) Islamic banking sector, (2) depositors (public sector), and (3) entrepreneurs (business sector). As such, in Chapter 6, three dynamic models are derived: (a) the asset model to explain the performance and liquidity behavior of Islamic banks and their entrepreneurs; (b) the liability model to assess the preference and liquidity behavior of depositors; and (c) the optimal liquidity reserves model to analyze the Islamic banking policy to maintain the optimal liquidity reserves to fulfill the demand for liquidity from depositors.

4. 7. 3. Construction of the Robust ARDL Models

The ARDL models involve the time series data of Islamic banking variables from December 2000 to September 2008. The source of secondary data is from Bank Indonesia (central bank) and the econometrics modeling uses econometrics software, namely Eviews. Further, in an attempt to make robust dynamic models, the modeling process follows the following sequential steps (Studentmund, 2005:64-70):

i. Review the literature and develop a theoretical model.
ii. Specify the model: select the independent variables and the functional form.
iii. Hypothesize the expected signs of the coefficients.
iv. Collect the data.
v. Estimate and evaluate the equation.
vi. Document the results.

Additionally, to produce the robust dynamic models, OLS technique requires the fulfillment of six classical assumptions called classical error term, plus one additional classical assumption called classical normal error term. These seven assumptions are:

i. The regression model is linear in the coefficient, correctly specified and has an additive error term;
ii. The error term has a zero population mean;
iii. All explanatory variables are uncorrelated with the error term;
iv. Observations of the error term are uncorrelated with each other (no serial correlation);
v. The error term has a constant variance (no heteroskedasticity);
vi. No explanatory variable is a perfect linear function of any other explanatory variable(s) (no perfect multicollinearity);
vii. The error term is normally distributed.

If the ARDL models violate one or more of the OLS properties (classical assumptions), they have to be adjusted to comply with the assumptions. Furthermore, the models also have to pass some tests such as: (i) misspecification test (omitted or redundant variables), (ii) serial correlation test, (iii) heteroskedasticity test, (iv) multicollinearity test, and (v) normally distributed error term test.

Finally, Gauss-Markov theorem calls the robust coefficient of the models BLUE (Best, Linear, Unbiased, Estimator) (Gujarati, 2004:79-81). Best means that the coefficient of the variable(s) has the smallest variance possible. Linear properties require equations to be set up in a linear rather than quadratic manner. Unbiased estimator means that the estimated variables correctly estimate the actual variable, also called efficient estimated variables.

4. 7. 4. Autoregressive Integrated Moving Average (ARIMA)

Besides ARDL, the thesis uses Autoregressive Integrated Moving Average (ARIMA) model to: (a) study the future condition of demand and supply of liquidity; (b) estimate the future numbers and; (c) check the resilience of industry against liquidity pressure. ARIMA was firstly developed by Box and Jenkins in 1976.

Unlike structural models such as ARDL, which are composed of some independent variables, ARIMA employs autoregressive (AR) and moving average (MA) plus integration order term. AR(*p*) describes the dependent variable (Y_t) based on its past (lag) value (of order *p*) or the same as the dynamic model. AR is also commonly known as the one that uses lag value of the residual of the regression.

On the other hand, MA(*q*) explains the dependent variable (Y_t) based on past value of the error terms (ε_t) which are the moving average of past error terms of order *q* added into the mean value of Y_t. MA is also commonly known to be the one that occupies lag value of forecast error to improve current forecast. The general equation of ARIMA is:

$$Y_t = \beta_0 + \theta_1 Y_{t-1} + \theta_2 Y_{t-2} + ... + \theta_p Y_{t-p} + \varepsilon_t + \Phi_1 \varepsilon_{t-1} + \Phi_2 \varepsilon_{t-2} + ... + \Phi_q \varepsilon_{t-q} \quad (1)$$

4. 7. 5. Construction of the Robust ARIMA model

The process of modeling with the ARIMA approach follows four steps (Firdaus, 2006:19): (i) identification of variables, (ii) model estimation, (iii) model evaluation, and (iv) model forecasting. In the first step (identification of variable), a series is investigated on whether it has a seasonal pattern or not and whether it is stationary or non-stationary. It also identifies patterns of auto correlation function (ACF) and partial auto correlation functions (PACF), such that:

$$Z_t = \mu + \theta_1 Z_{t-1} + \theta_2 Z_{t-2} + ... + \theta_p Z_{t-p} + \varepsilon_t - \Phi_1 \varepsilon_{t-1} - \Phi_2 \varepsilon_{t-2} - .... - \Phi_q \varepsilon_{t-q} \quad (2)$$

From (2) Z_t is said to be stationary, if the following conditions are met: (a) constant mean for all investigation periods or $E(Z_t) = \mu$ for all t, (b) constant variance or $Var(Z_t) = E[(Z_t - \mu)^2] = \sigma^2_x$ for all t and, (c) constant covariance or $Cov(Z_t, Z_{t-k}) = E[(Z_t - \mu)(Z_{t-k} - \mu)] = \gamma_k$ for all t.

Next, the estimation step will find the most robust estimated model combining AR and MA or both of them. Model evaluation will conduct several diagnostic tests to check the accuracy of the estimated models and the actual ones such as residual test, coefficient of variables, etc. Finally, model forecasting will produce future data of every model under two assumptions: (a) linear forecasting, and (b) selected model with the most efficient variables.

4. 8. LIMITATIONS AND DIFFICULTIES

Despite adopting both quantitative and qualitative methods (triangulation method), some limitations are realized, for example:

i. The Indonesian Islamic banking industry does not have various kinds of short-term liquid instruments. The short-term liquid instruments based on contracts of *Bai al Innah, Tawaruq* (commodity *Murabahah*), *Bai al Arbun, Bai al Dayn*, which are the short-term liquid instruments available in Middle Eastern countries and Malaysia, are not permitted in Indonesia by the National *Sharia* Board (DSN).
ii. The practical concepts to manage liquidity mostly rely on the internal banking management, discretions, and strategies. Some examples of such concepts are balancing the assets and liabilities, reserving some liquidity to fulfill the demand for liquidity from depositors, buying and selling the limited short-term Islamic money market instruments, or purchasing and repurchasing (repo) the Islamic central bank instrument (SBI *Sharia*). The thesis limits its scope of research to this internal banking liquidity risk management without ignoring the possibility of enlarging the scope of research in the future when the market share and the role of Islamic banking industry in Indonesia becomes more significant.
iii. The empirical analyses of this research stand on current conditions where: (i) the market share of Islamic banking industry is still trivial; (ii) the number of Islamic banks (BUS and UUS) are only few compared with the conventional banks; (iii) the Islamic money market is less developed; and (iv) the Islamic banking industry is relatively immune to the local or global economic/financial crisis. When the conditions change in the future, the results and recommendations of the thesis should be improved.
iv. This research engages only Islamic banks, depositors and entrepreneurs. It has not extensively taken into account the roles of the Moslem Scholars in MUI, National *Sharia* Board (DSN), government, academics, formal schools, and informal private training/seminars/conferences and, foreign investors which somewhat contributed to the management of liquidity risk in the Islamic banking industry.

As a result of these limitations, there are at least three difficulties faced by the researcher in carrying out this research:

i. There are limited numbers of time series variables and limited data series available to construct more comprehensive and rigorous models. In some sense, it relates to the limited quantitative method applicable to be used.
ii. Instead of analyzing the liquidity risk management and proposing the ideal liquidity risk management program, which are the main purposes of the research, the research may not be accurate enough to give long-term future estimations of the liquidity conditions of the industry. This is especially so given that the sector is a fast-growing industry with significant improvements in banking regulations, development in Islamic financial markets, and innovations in Islamic banking products. In many cases, those changes depend on the politics and social factors which are beyond the scope of this research.
iii. It is difficult to extend the scope of the empirical analyses to cover entities such as the Moslem Scholars (MUI and DSN), the government, academics, etc. It is mainly because there is no specific team/division/department dealing with liquidity risk management in those entities which could be approached and investigated by the researcher.

4. 9. CLOSING REMARKS

This thesis intends to arrange a comprehensive research of liquidity risk management. The combination of qualitative and quantitative research methodologies is used followed by the combination of qualitative and quantitative research methods to intensively and comprehensively examine the objects of the research. Further, the design of the research is conducted by two research approaches, namely a conceptual approach in the literature review chapters and an empirical research approach in the empirical research chapters. The final output of the thesis is an integrated and comprehensive program to manage liquidity risk in the Islamic banking industry.

However, there are still some limitations in the research which hinder the production of an ideal research output. Nonetheless, the limitations and difficulties

provide an opportunity for an advanced study. Particularly, it becomes more meaningful when the market share of Islamic banks becomes more significant, when there are a lot more Islamic banks operating in the country, when various Islamic banking products launched in the market, and when the Islamic financial markets have been well-developed.

Chapter 5
REVIEWING THE PERFORMANCE OF THE INDONESIAN ISLAMIC BANKING INDUSTRY

5. 1. INTRODUCTION

This chapter applies quantitative and qualitative assessments to analyze the performance of the Islamic banking industry in Indonesia. The former uses secondary data from Bank Indonesia of the period from December 2000 to November 2009 and the latter uses information from various publications about the performance of the Indonesian Islamic banking industry. In fact, one of the important findings is that most of the deposits are concentrated in short-term *Mudarabah* time deposits and liquid deposits (*Wadiah* demand deposits and *Mudarabah* saving deposits).

These concentrations result from the need of depositors to fulfill regular transactions and from their desire for redeemable instruments. Therefore Islamic banks need to adjust their financing strategies by emphasizing the placement of funds into short-term financing contracts and limiting the placement into long-term ones. With these strategies, Islamic banks have maintained the sustainable and positive payment of short-term return on deposits in accordance with managing liquidity.

Nonetheless, there is a potential of liquidity mismatch which is identified from: the liquidity behavior of depositors, the owners of deposits, and the patterns of the demand for liquidity. Hence, despite balancing the liability and asset sides, Islamic banks prepare internal and external liquid instruments to manage the liquidity especially in the short run. In the case of unanticipated liquidity shortage, they have options to use the central bank's intra-day emergency funds and the deposits guarantee institution.

The following sections focus on the analyses of the Indonesian Islamic banking industry by making particular reference to liquidity-related issues. The sections are: (i) the background of the Indonesian Islamic banking industry, (ii) organizational approach to managing liquidity, (iii) the liability side related to liquidity risk management, (iv) the

asset side related to liquidity risk management, (v) liquidity ratios and gap analysis, and (vi) instruments to manage the demand for liquidity.

5. 2. BACKGROUND OF THE INDONESIAN ISLAMIC BANKING INDUSTRY

5. 2. 1. Industrial Performances and Development Programs

The development of the Indonesian Islamic banking industry[8] is conducted under dual banking systems (conventional and Islamic banking systems) in the micro and macro frameworks, namely the architecture of the Indonesian banking (API) and the architecture of the Indonesian financial system (ASKI). In fact, the Islamic banking industry has been growing very well since the establishment of the first Islamic bank in 1992. The awareness of people to employ Islamic banks is spurred by the Council of Indonesian *Sharia* Scholars (MUI) and the Muhammadyah organization who have issued verdicts on the prohibition of interest on December 16th, 2003 and April 3rd, 2010.

Based on Bank Indonesia's Islamic banking statistic report from December 2000 to November 2009 (Table 5.1), there are six Islamic Commercial Banks (BUS), followed by twenty-five Islamic Banking Windows/Units (UUS) and one 138 Islamic Rural Banks (BPRS) integrating 987 offices around the country. The development is further enhanced by a healthy financial intermediary function and prudential banking operations. For example, the Financing to Deposit Ratio (FDR), the Non Performing Financing (NPF), total assets, total financing, and deposits all reveal the progressive development.

Table 5. 1: Selected Islamic Banking Performance Indicators

Banking Indicators	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
BUS*	2	2	2	2	3	3	3	3	5	6
UUS*	3	3	6	8	15	19	20	25	27	25
BPRS*	79	81	83	84	88	92	105	114	131	138
Offices*	146	182	229	337	443	550	567	683	951	987
Asset**	1.79	2.72	4.05	7.86	15.33	20.88	26.72	36.53	49.55	61.35
Financing**	1.27	2.08	3.28	5.53	11.49	15.23	19.53	27.94	38.19	45.72
Deposit**	1.03	1.81	2.92	5.72	11.86	15.58	20.67	25.65	36.85	47.88

* in unit; ** in trillion Rp. *Sources*: Bank Indonesia Monthly Statistical Report (Dec 2000-Nov 2009).

[8] The Islamic banking industry consists of BUS, UUS and BPRS. UUS is a special *Sharia* banking unit in the conventional bank (windows system or dual banking system) while BPRS stands for the Islamic banks operating in suburban / rural areas.

The same Islamic banking statistical report states that the average FDR per month is 107.09%. The range of NPF is between 2%-5%, while the conventional one records 5%-8%; other banking indicators, such as total assets, financing, and deposits grow annually by more than 50%-60% on average. Lately (November 2009), the total assets have reached Rp61.35 trillion with total financing of Rp45.72 trillion, and balancing the total deposits of Rp47.88 trillion.

Despite those achievements, the market share of Islamic banking in the total banking industry is still very small. Until November 2009, the share of total assets has been 2.49% of total banking assets. In fact, there are three ultimate weaknesses of the Islamic banking industry, which are: (a) competitiveness, (b) positioning, and (c) synergy with other Islamic financial institutions (Bank Indonesia, 2006b:18-22).

In particular, there are problems relating to a lack of comprehensive and appropriate framework and instruments, limited market coverage, lack of knowledge and understanding of the public, lack of efficient organizational structure to back up the banking operations, operational inefficiency, domination of the debt base financing, and incapability to comply with the international *Sharia* financial standards.

Related to liquidity risk, some fundamental problems might invite liquidity risk problems, for example: sensitive liquidity behavior of depositors, investment motives of depositors, limited Islamic liquid instruments, unwillingness of depositors to bear the financial losses, and unavailability of Islamic deposits to pay high return during unfavorable macroeconomic conditions (Ismal, 2008a:9-12).

To improve and foster the development of the industry, Bank Indonesia has set up long-term Islamic banking development policies, namely a blueprint of the Indonesian Islamic banking industry in 2002, with a revised version in 2005-2006. The blueprint encloses six initiatives to be implemented in the ten years of the blueprint program (2005-2015). Those are (Bank Indonesia, 2006b:18-22):

i. Increasing the *Sharia* compliance.
ii. Increasing the quality of prudential banking operations.

iii. Increasing the operational efficiency and competitiveness.
iv. Increasing the stability of banking system.
v. Increasing the expertise and quality of human resources.
vi. Optimizing the social roles of Islamic banks in developing the small and medium enterprises (SME).

In addition, in 2008, the banking regulators and stakeholders determined the grand strategies to develop the Islamic banking industry. Particularly, these capture strategies to (Bank Indonesia, 2008b:4): (i) position the industry as the leader among the ASEAN countries in 2010; (ii) create new images of Islamic banks which are inclusive and universal; (iii) accurately map the potential market; (iv) develop the banking products; (v) improve the banking services; and (vi) newly communicate the position of Islamic banks as the "beyond banking".

Finally, keeping in mind that the market share of industry is still trivial, Bank Indonesia in cooperation with all stakeholders has drafted an accelerated program in 2007-2008. The program concentrates on achieving quantitative target growth through short-term policies to boost the market share of the industry. Specifically, it (Bank Indonesia, 2008c:5):

i. pushes the growth of Islamic banking industry from both demand and supply sides;
ii. strengthens the capital of Islamic banks, management and human resources;
iii. optimizes the roles of government (fiscal authority) and Bank Indonesia (monetary authority) as the growth initiators;
iv. involves all stakeholders to actively in charge in the program.

The above background of industrial performances and development programs is crucial to understanding the position and condition of the industry. Indeed, the policies, strategies, and programs to further the development of the industry should be backed up by a robust liquidity risk management program. The analyses of liquidity risk and outputs of this thesis are conducted and proposed to provide such a robust liquidity management program.

5. 2. 2. General Practices of Liquidity Risk Management

Islamic banks adopt internal and external approaches to manage liquidity. Internally, Islamic banks design an organizational structure to manage liquidity and balance the asset and liability sides accordingly. Meanwhile, externally, they maintain good relations (communication, coordination, full information, and credit monitoring) with stakeholders (depositors, regulators, entrepreneurs, other banks). In addition, to fulfill the regular demand for liquidity and solve liquidity pressure, they have several usable liquid instruments which can be employed (see table 5.2).

Table 5. 2: Practices of Liquidity Risk Management in Islamic Banking

Internal Organizational Structures	Relationship with the Depositors
Having special risk management division/departments.	Educating depositors about Islamic banking principles and operations.
Having risk-monitoring committees.	Sustaining the payment on profit/revenue-sharing to maintain depositors' loyalty.
UUS coordinates risk management with the parent company.	Improving the performance, network, etc to maintain depositors' trust.
President Director is one of the most responsible persons in this regard.	Guaranteeing the payment of every fund withdrawal.
Asset Liability Balancing	External Relationship with the Central Bank / Government
Liability Side	Implementing proper risk management as stipulated by Bank Indonesia.
Offering *Mudarabah* time deposit to gain long-term investment funds.	Utilizing Bank Indonesia's Islamic monetary instruments.
Adjusting PLS ratio to make it competitive with interest rate return.	Having reserve requirement as stipulated by Bank Indonesia.
Analyzing type of deposits, tenor, etc for financing purposes.	Using Bank Indonesia's emergency liquidity and joining deposit insurance.
Analyzing type of depositors, withdrawing factor, etc.	Relationship with Business Partners.
Retaining profit and allocation for risk investment reserves.	Cooperation, communication and sharing information.
Asset Side	Maintaining entrepreneurs' sustainable payment on debt/equity-based contracts.
Concentrating financing on short-term debt based financing.	Monitoring the performance of entrepreneurs.
Preferring liquid, profitable, and highly returnable economic sectors.	Selective selection on business partners and determining default policy.
Preferring SME which have low record of NPF.	External Relations with Other Banks.

Financing short-term projects with more funds available in short-term deposits.	Placement of funds directly and indirectly to other Islamic banks.
Financing monitoring and evaluation.	Inter bank borrowing in the Islamic money market.
Cooperation and communication with entrepreneurs.	Borrowing funds from parent company (for Islamic banking windows/units).
Islamic Banking Instruments for Managing Liquidity Risk	
Cash reserves.	
Funds in Bank Indonesia (Positive Bank's Account and SBIS).	
Funds in other Islamic banks.	
Using the Islamic money market (PUAS) instruments.	
Using emergency liquidity facility from Bank Indonesia/government.	

Source: Ismal (2010a:147-154)

5. 3. ORGANIZATIONAL APPROACH TO MANAGING LIQUIDITY

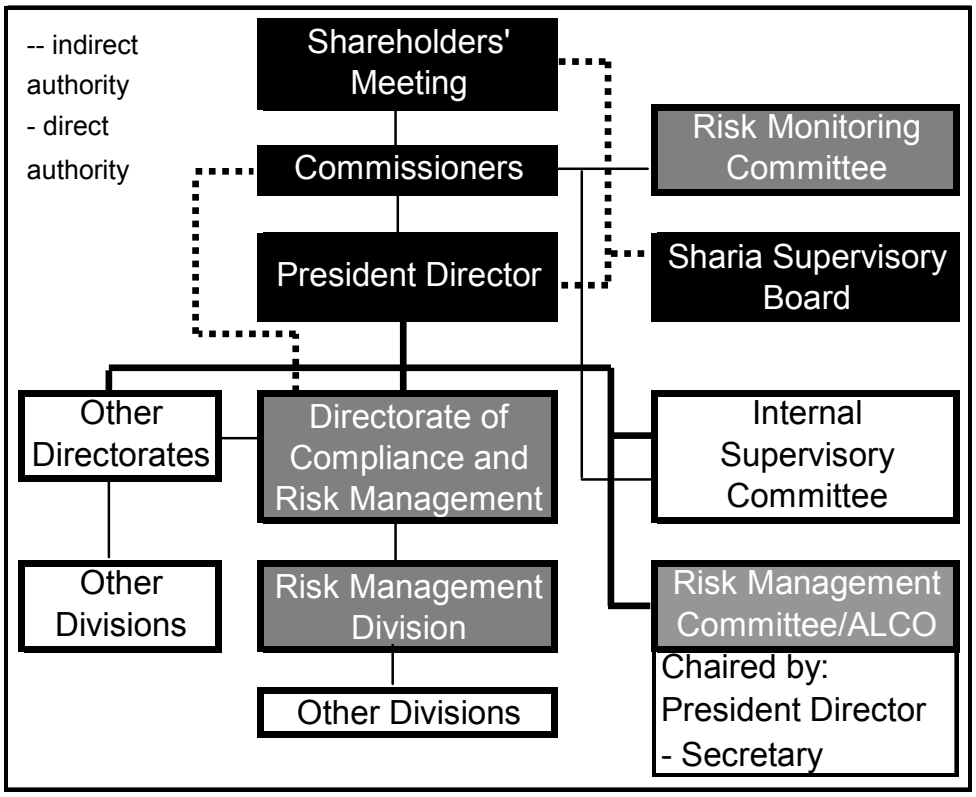
5. 3. 1. Islamic Commercial Banks (BUS)

The general organizational structure of BUS entails three bodies which conduct risk management activities. The first body is the Risk Monitoring Committee, set up by the Board of Commissioners. The second one is the Directorate of Compliance and Risk Management, which has a risk management division implementing the general operation of risk management. Finally is the Asset Liability Management Committee (ALCO), chaired by President Director, functions as the central command of liquidity risk policies for all directorates and is supported by the internal supervisor committee (see figure 5.1).

However, the focus of such a structure is merely on the internal side of the organization to manage liquidity, whilst the current economic and business environments call for cooperation and coordination with external entities such as banking regulators, business partners, depositors, and the public in general.

Therefore, the structure needs to have additional bodies, namely: (a) Business Risk Management Committee to focus on entrepreneurs; (b) Operational Risk Management Committee to comply the banking operations with regulations; and (c) Financial Risk Management Committee to accommodate any improvement in depositors or public. All of additional committee work together with ALCO as has been discussed in Chapter 2 above.

Figure 5. 1: Liquidity Risk Management in BUS



Source: Compilation of various structures of BUS

5. 3. 2. Islamic Banking Units (UUS)

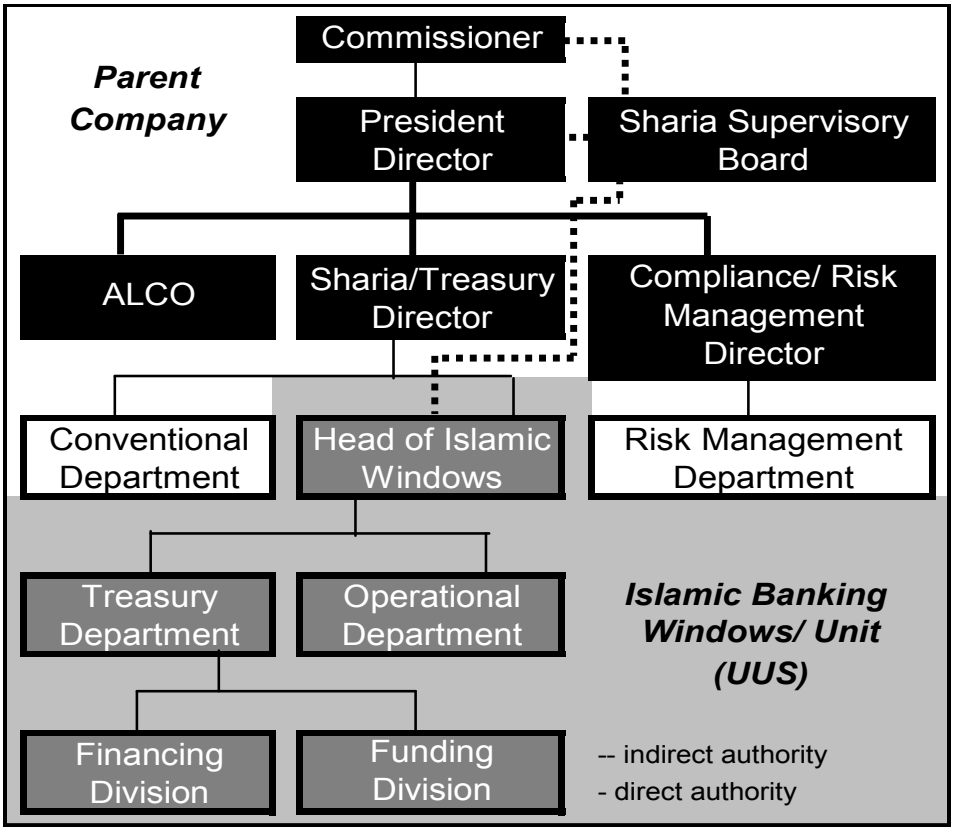
In UUS, the organizational structure is somewhat different. The President Director of the parent company has the highest level of responsibility for managing liquidity. He/she appoints a specific Director to be responsible for the operation of UUS.[9] UUS itself is chaired by the head of UUS who leads operational activities such as treasury activities and business operations. Liquidity risk management is conducted within the activities of both treasury and operations departments. But the central management of risk is in the risk management department in the parent company, supported by an Asset Liability Management Committee (ALCO) (see figure 5.2).

Therefore, liquidity risk management is part of risk management is not managed and tackled by a special internal department/division in UUS. The funding and financing divisions in UUS should be complemented with an internal risk management division to

[9] Such as the *Sharia* Director; in other UUS it is the responsibility of Treasury Director or Small and Medium Enterprises (SME) Director.

cover liquidity risk issues in UUS, considering that its operation has different characteristics and values than those of the holding company.

Figure 5. 2: Liquidity Risk Management in UUS



Source: Compilation of various structures of UUS

Furthermore, the function of ALCO in the parent companies should be optimized to capture issue of liquidity risk management in the subordinate company. As such, in the organizational structure of the parent company, the responsibility of the President Director, *Sharia* Supervisory Board and *Sharia*/Treasury Director to manage liquidity risk in UUS should be supported by risk management and monitoring committees like the ones in BUS.

5. 4. LIQUIDITY RISK MANAGEMENT RELATED TO THE LIABILITY SIDE

5. 4. 1. Sources of Funds and Liquidity Management

There are two categories of the sources of public funds, namely: (a) the public funds in bank deposits and (b) the public funds in non-bank deposits. The former is comprised of *Wadiah* demand deposits, *Mudarabah* saving deposits, and *Mudarabah*

time deposits. In the latter, there are received financing, securities issued by banks, inter-bank liabilities, liabilities to Bank Indonesia (BI), and other payables.

Mudarabah time deposits have various tenors ranging from 1 month to more than 12 months, and any withdrawal outside the maturity date is commonly penalized. Nevertheless, unlike in conventional banks, the penalty is a fixed amount of money and is not connected to the nominal amount of *Mudarabah* time deposits. Furthermore, in relation to liquidity risk management, some banks unfortunately do not organize communication with depositors regarding their liquidation time of the deposits (Ismal, 2010a:147-154).

In a specific case, when a bank does not have enough liquidity to pay a mature or immature time deposit, it often requests extra time to provide enough liquidity, which is quite inconvenient for depositors. But in normal conditions, as liquidity runs never happen in this industry, banks simply use their internal cash reserves which are based on liquidity forecasting (Ismal, 2008b:7-20). Other sources of liquidity, including the emergency funds from Bank Indonesia, are also available in case of a sudden demand for liquidity. All are explained in the later parts of this chapter.

Meanwhile, the public funds invested in non-bank deposits such as received financing, securities issued by banks, inter-bank liability, liability to BI, and other payables are assumed manageable. It is because Islamic banks closely monitor such deposits and know precisely the due dates and withdrawal schedules of these funds.

5. 4. 2. Liquidity Risk Analyses on the Liability Side

This sub-section analyzes the liability side based on Bank Indonesia's Islamic banking statistical report from December 2000 to November 2009. It includes (a) a breakdown of the liability side; (b) an estimation of the short-term potential demand for liquidity; and (c) tracing the economic/business factors affecting the demand for short-term liquidity.

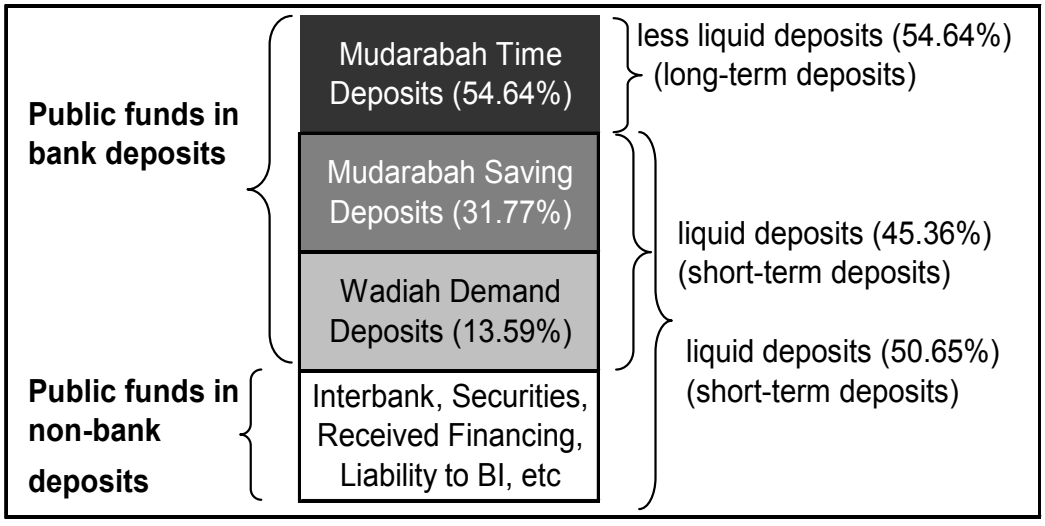
5. 4. 2. 1. Breakdown of the Liability Side

Mudarabah time deposits are the largest type of deposits, accounting for 54.64% of total Islamic bank deposits, followed by *Mudarabah* saving deposits with 31.77% and *Wadiah* demand deposits with 13.59%. Therefore, total liquid deposits (both *Wadiah* demand deposits and *Mudarabah* saving deposits) account for 45.36%, almost the same amount as the less liquid deposits *Mudarabah* time deposits.

It means that only around half of the total deposits can potentially be used for long-term financing. Furthermore, if the public funds in non-bank deposits, which are liquid, are included, the liquid deposits amount to 50.65%, leaving less liquid deposits at 49.35% (see figure 5.3).

As the liquid deposits are allowed to be withdrawn anytime, the demand for execution has to be accurately predicted. In addition, the 54.64% less liquid deposits should also be anticipated because some of them are 1-month deposit tenors with an automatic roll-over (ARO) facility. Considering these figures, there is a potential for liquidity risk problems in the industry and Islamic banks should have a specific risk management program to control it.

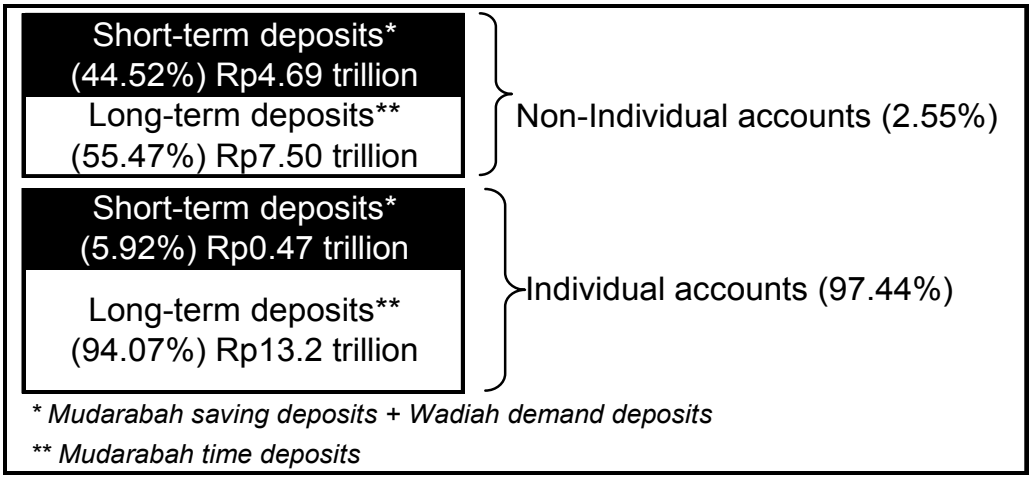
Figure 5. 3: Breakdown of Liabilities Based on Types of Funds



Another analysis is based on types of account owners. On average, 97.44% of the total number of 4.3 million accounts belongs to individuals, with nominal deposits between Rp2 million-Rp5 million and a frequency of depositing money twice per month

(Mars, 2008:20). *Mudarabah* time deposits are found to be the dominant deposits for them with Rp13.2 trillion (94.08% of total accounts), and Bank Muamalat Indonesia is their favorite Islamic bank (Mars, 2008:36). The short-term deposits are recorded at Rp0.47 trillion (5.92% of total numbers of accounts) (see figure 5.4). Indeed, predicting the liquidity behavior of individual depositors is more difficult than that of non-individual depositors.

Figure 5. 4: Breakdown of Liabilities Based on the Owners of Funds



On the other hand, although non-individuals (companies and government) account for 2.55% of the total numbers of account owners, they have an unavoidable nominal value of *Mudarabah* time deposits of Rp7.50 trillion, more than half of that of the total individual deposits. Meanwhile, their short-term deposits are Rp4.69 trillion, much more than those of the individuals; Bank Sharia Mandiri (BSM) is their favorite Islamic bank (Mars, 2008:36). This means that they tend to use Islamic banks for transaction purposes rather than investment purposes.

Therefore, in terms of liquidity pressure, non-individuals drive the short-term demand for liquidity (from *Wadiah* demand deposits and *Mudarabah* saving deposits), and both individuals and non-individuals jointly determine the long-term demand for liquidity (from *Mudarabah* time deposits). Nevertheless, some of the *Mudarabah* time deposits (70.35% as of November 2009) mature in the short-term (the 1-month time deposits). These constitute the potential short-term demand for liquidity as well.

5. 4. 2. 2. Estimation of the Short-Term Potential Demand for Liquidity

Prior investigation on the breakdown of liability becomes a basis for identifying the Islamic banking strategy to manage liquidity. First of all, Islamic banks know that individual depositors seek maximum return on deposits, particularly from *Mudarabah* time deposits. Meanwhile, the need for regular transactions by individuals is low, as revealed by their small portion (5.92%) of short-term deposits.

As such, although their liquidity behavior is more difficult to predict, their short-term demand for liquidity can still be managed if the 1-month time deposits are always rolled over or at least anticipated and well-recorded by banks. In fact, Islamic banks have been successfully convincing individual depositors to roll them over by offering a competitive revenue sharing ratio.

Secondly, for non-individuals, Islamic banks seem their second best investment option after conventional banks and they still prefer interest on deposits from conventional banks to return on deposits from Islamic banks. The minimum number of bank accounts (2.55%) and moderate nominal value of long-term deposits (Rp7.5 trillion) prove this premise. Although the ratio of short-term and long-term deposits is roughly 1:2, more than half of the long-term deposits are indeed 1-month tenor, meaning that their main purpose is truly to meet regular transactions (liquidity).

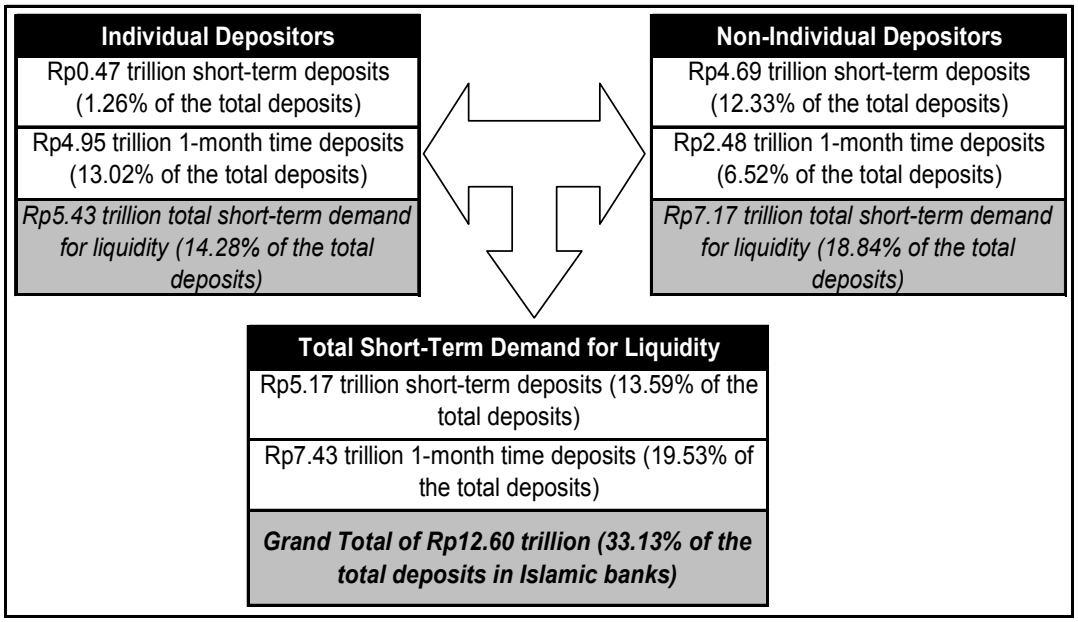
Considering these facts, the short-term demand for liquidity from non-individuals can be high because of their non-profit motive and the high portion of short-term and 1-month long-term deposits. Moreover, some of them are private companies, whose behavior cannot be predicted as easily as that of government institutions[10]. Ideally, widening the range of Islamic banking products should be applied to bind companies with long-term investment and to make liquidity management much easier (Wilson, 2007:5).

Next, the potential demand for short-term liquidity is estimated. Assuming from the historical data series (2000-2009) that 33.05% of the non-individual and 37.29% of

[10] Islamic banks might know the activities of government institutions, for example the Ministry of Religion is active during hajj, idul fitr, etc.

the individual time deposits are 1-month deposits, combined with information from market players, the predictions are as follows (see figure 5.5):

Figure 5. 5: Total Potential of Short-Term Demand for Liquidity



Short-term Demand for Liquidity from Individual Depositors

- Short-term deposits are Rp0.47 trillion (1.26% of total deposits).
- 1-month time deposits are Rp4.95 trillion (13.02% of total deposits).
- Short-term demand for liquidity is Rp5.43 trillion (14.28% of total deposits).

Short-term Demand for Liquidity from Non-Individuals Depositors

- Short-term deposits are Rp4.69 trillion (12.33% of total deposits).
- 1-month time deposits are Rp2.48 trillion (6.52% of total deposits).
- Short-term demand for liquidity is Rp7.17 trillion (18.84% of total deposits).

Grand Total of the Short-Term Demand for Liquidity by Types of Deposits

- Short-term deposits are Rp5.17 trillion (13.59% of total deposits).
- 1-month time deposits are Rp7.43 trillion (19.53% of total deposits).
- Grand total is Rp12.60 trillion (33.13% of total Islamic bank deposits).

5. 4. 2. 3. Tracing the Economic/Business Factors Affecting the Demand for Short-Term Liquidity

After elaborating on some industry facts and predicting the demand for short-term liquidity, it is realized that the Indonesian Islamic banking industry has the potential for

liquidity pressure if it is not handled properly. As long as the industry can offer competitive return on deposits and provide appropriate services and networks, the liquidity distress will not occur. But, if the banks are less competitive, paying low return, and not attractive enough to depositors, the potential of short-term liquidity withdrawals may come to the industry at any time.

The following discussions analyze the behavior and sensitivity of the demand for liquidity (based on secondary data) and whether it can cause severe liquidity risk problems in Islamic banks. First, the analysis of macroeconomic impacts shows whether the short-term deposits are very sensitive with a high interest rate (a response to the interest-based monetary policy against unpleasant economic pressure).

Second, the analysis of the volatility of deposits informs the movement (increasing or decreasing) of deposits' positions along the average position. Positive volatility means the position of deposits tends to go up and the demand for liquidity withdrawals is minimal and *vice versa*.

Third, the analysis of time deposit withdrawals for tenor adjustment examines the switching behavior of depositors for a better return/liquidity. This might cause a difficulty in banks to optimally utilize the funds and manage the maturity dates of every tenor. Finally, the analysis of the potential of rational depositors attempts to know the estimated number and percentage of these depositors to anticipate deposit withdrawals.

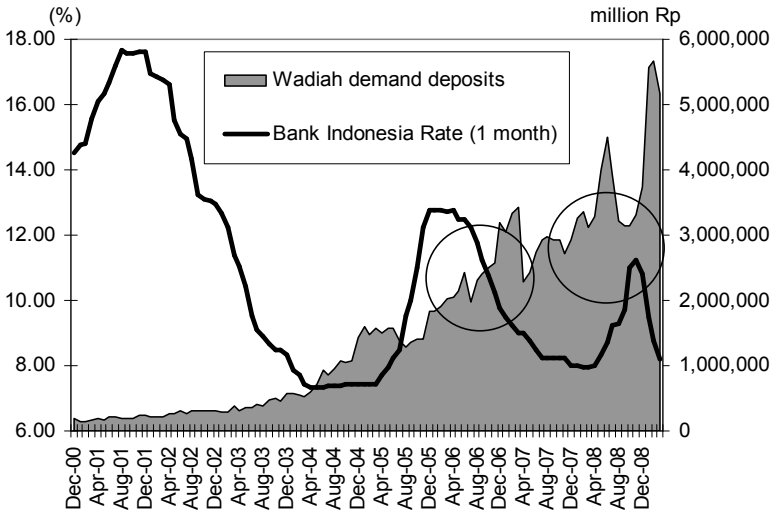
A. Analysis of Macroeconomic Impacts to the Liquidity Behavior

External issues often affect the Indonesian economy. The increase in world oil prices, the huge foreign capital inflows, the problems in the US economy, and the global financial crisis of 2008-2009 are some examples of factors affecting the domestic economy. When tight monetary policy applies in response to such external issues, the Islamic banking industry is more or less affected.

Nonetheless, in reality, among three kinds of deposits, only *Wadiah* demand deposits react to the movement of the interest rate as displayed in figure 5.6. The other deposits seem unaffected and keep growing at the inflating rate of interest rate. But, it is

realized that all types of deposits might be affected if the industry does not improve its performance and meet the expectation of depositors.

Figure 5. 6: Islamic Deposits & BI Rate

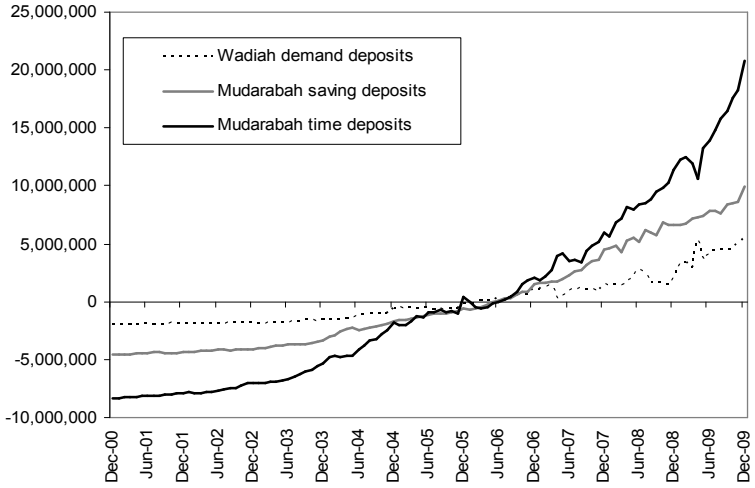


B. Volatility of Deposits

The demand for liquidity can be identified from the volatility of three types of deposits (*Wadiah* demand deposits, *Mudarabah* saving deposits, and *Mudarabah* time deposits). As seen in figure 5.7, there is volatility of deposits. The volatility, which occurred from December 2000 to January 2006, implies a deposit position of less than the average. It occurred during the economic recovery period (2000-2005) following the Asian economic crisis 1997-1998 and during a downturn of the Indonesian economy in 2005-2006 because of the external impact of the world high oil price to domestic inflation.

Nonetheless, after such a period, there was positive volatility, showing the growing trend of the three deposits. As a result, the liquidity turnover is positive (incoming funds are higher than outgoing funds) and liquidity shortage has rarely occurred. This condition allows Islamic banks to minimize short-term liquidity reserves (Ismal, 2010b).

Figure 5. 7: Volatility of Deposits



C. Analysis of Tenor Adjustment in *Mudarabah* Time Deposits

One rationale behind liquidating a time deposit is profit-motivated tenor adjustment. Influenced by factors such as high return offered by shorter tenor, flexibility, liquidity, and uncertainty of the economic condition, depositors prefer placing funds in a 1-month tenor instead of long-term tenors.

In reality, the indication of tenor adjustment from long-term into medium/short-term tenor occurs from more than 12-month tenors into 6-month tenors, followed by 12-month tenors into 3-month tenors. The historical data from December 2000 to November 2009 shows that an average decreasing rate in a tenor of more than 12 months is 54.54% per month, 2.91% for 6-months, 2.77% for 12-months, and 2.30% for 3-months, whilst the 1-month tenor solely goes up 1.26% on average per month.

From the liquidity risk management point of view, Islamic banks have to redirect this tenor adjustment by offering a more attractive and convincing return on longer deposit tenors than on the shorter deposit tenors. Alternatively, Islamic banks could bind potential depositors in specific financing projects through a *Mudarabah muqayyadah* contract.

With this contract, a more promising and higher return sharing can potentially be realized besides an effort to refocus the financing orientation from debt-based into equity-based financing (Ismal, 2009a:10-17). Through these measures, hopefully, the liquidity

withdrawals for tenor adjustment will occur in the opposite direction, from the short-term tenor into the longer-term tenors.

D. Analysis of the Potential of Rational Depositors

Amongst other factors, the existence of rational depositors that indifferently position Islamic banking and conventional banking is one of the most important issues because they can create a displaced commercial risk. One way to detect these depositors is by tracing the owners of *Wadiah* deposits and 1-month *Mudarabah* time deposits. *Wadiah* deposits belong to 246,192 individual accounts and 48,566 non-individuals' accounts while 1-month time deposits holders belong to 70,017 individuals and 41,479 non-individuals.

In total, all of them take over 9.52% of total bank account holders. Because these two deposits are very liquid, the rational depositors can take their funds anytime and place the funds in the conventional banks when interest rate is high (displaced commercial risk).

5. 5. LIQUIDITY RISK MANAGEMENT RELATED TO THE ASSET SIDE

This sub section analyzes the asset side based on Bank Indonesia's Islamic banking statistical report from December 2000 to November 2009. It includes (a) alternatives for the allocation of funds and (b) bank financing to manage liquidity.

5. 5. 1. Alternatives for the Allocation of Funds

Islamic banks advance public funds into four places, namely: (a) direct financing to the real sector, (b) indirect financing to the real sector, (c) placement in the central bank, and (d) internal placement for liquidity reserves. Each of these has their own instruments as explained below:

i. Direct financing to the real sector employs equity-based financing (long-term period), mainly *Mudarabah* and *Musharakah*; debt-based financing (short-term period) such as *Murabahah*, *Istisna*, *Salam*, and *Ijarah* (Leasing); service-based instruments (short-term period) such as *Wakalah*, *Ujrah*, *Kafalah*, *Hiwalah*, *Sharf*; and *Qardh hassan* (benevolent loan).

ii. Indirect financing to the real sector (short-term financing) consists of buying Islamic securities, placement of funds in other banks (inter-bank asset), lending money through the Islamic money market (PUAS), and equity participation.
iii. Placement in Bank Indonesia (BI) consists of: (1) positive bank accounts in BI comprised of reserves requirement and excess reserves and (2) Bank Indonesia *Sharia* Certificates (SBIS)[11].
iv. Internal bank reserves consist of: (a) cash reserves and (b) productive asset write-off reserves (PPAP) as stipulated by Bank Indonesia (central bank).

Preferably, the majority of the funds should go to equity-based financing as they attach directly with the long-term business projects and contribute significantly to the economic activities. Nonetheless, in reality, debt-based financing dominates the bank financing, meaning that Islamic banks still have a limitation to finance the long-term projects such as limited human resources, funds, and prospective projects.

Meanwhile, placement of funds in the central bank reveals the anticipation of Islamic banks against short-term liquidity withdrawals. In line with it, the cash reserves are allocated to fulfill the daily demand for liquidity from depositors.

5. 5. 2. Bank Financing to Manage Liquidity

Most of the fund allocation is in debt-based financing, which is a short-term placement. Until November 2009, such financing accounted for 74% of total financing, whilst long-term placement was only 26%. This is not surprising, as 46% of total deposits are the short-term deposits as mentioned above. Therefore, all of the short-term deposits are fully employed to finance the short-term financing. If the public funds in non-bank deposits are included, all of them are employed for the short-term financing as well.

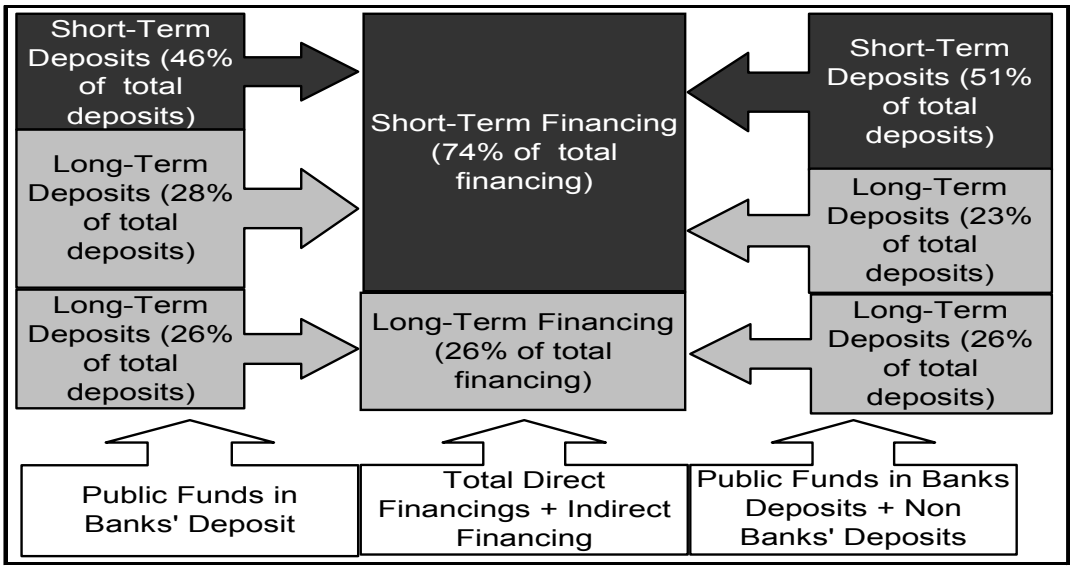
Not only short-term deposits are being fully utilized, but a small part of long-term deposits is also used for this purpose (see figure 5.8). This means that the industry faces the problem of a liquidity gap where the amount of liquid assets is more than the amount of liquidity demanded on the liability side as mentioned in Chapter 2. Because of the high

[11] Formerly called Bank Indonesia *Wadiah* Certificate. It became SBI *Sharia* in March 2008.

demand of short-term financing, the industry records above 100% financing to deposit ratio (FDR) which also represents the presence of a liquidity problem.

From the perspective of liquidity management, this financing strategy is reasonable because it enables Islamic banks to balance liquidity on the liability and asset sides, so that the short-term demand for liquidity is not a big problem so far. Moreover, compared with the long-term financing, this short-term financing strategy provides a well-scheduled (certain) and positive payment of return, which is very essential to maintain the positive expectations and loyalty of depositors.

Figure 5. 8: Financing Activities from a Liquidity Management Perspective

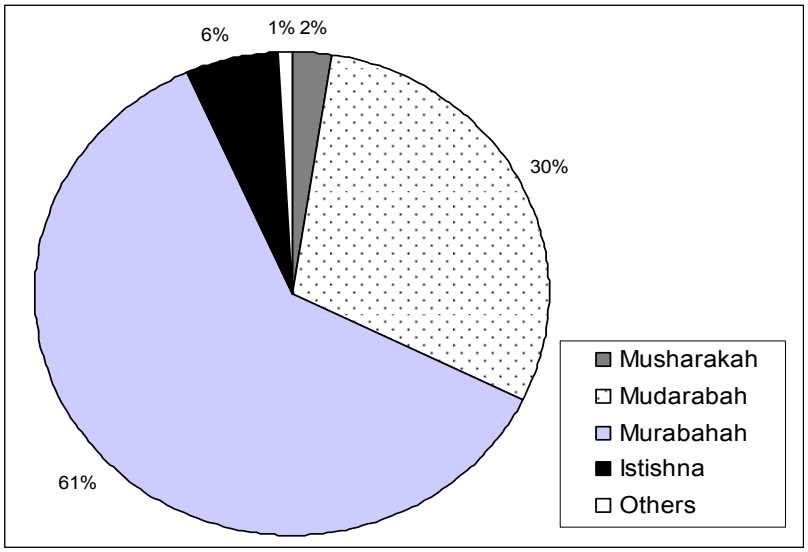


But from the macroeconomic perspective, the advantages of having an Islamic banking system have not yet been optimized. The long-term financing, as a reflection of the investment activities, should indeed be the ultimate orientation of depositors and Islamic banks in order to make a significant impact on and contribution to the economy.

However, exploring this short-term financing strategy in detail, Islamic banks adopt two priority steps of financing. The first step is extending the short-term non-bank deposits to the short-term indirect financing such as placement in Bank Indonesia, placement in other banks, purchasing securities, and equity participation. Surely, this is the right way to secure such funds, gain profit, and anticipate any short-term liquidity requirement from this type of deposit.

The second step is releasing public funds from short-term bank deposits into short-term direct debt-based financing. An average of monthly data from December 2000 to November 2009 records that *Murabahah* accounts for 61% of total financing, the highest among others, followed by *Istisna* at 6%, *Ijarah* and other debt based financing at only 1% (see figure 5.9).

Figure 5. 9: Financing Breakdown



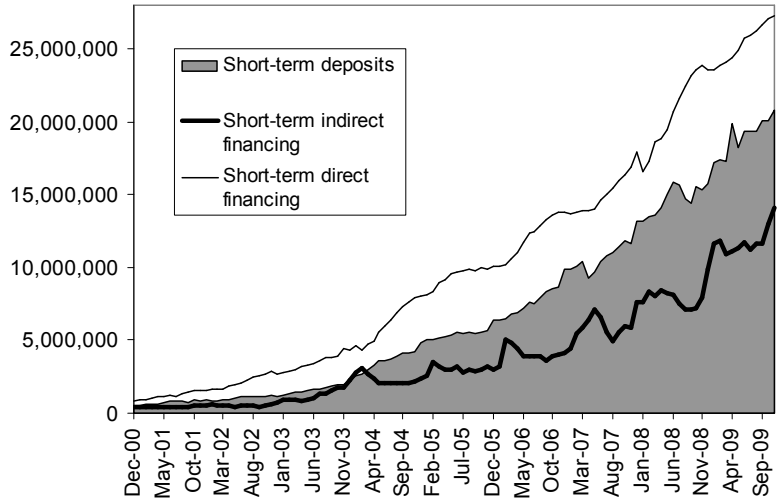
Usually, the demand for short-term financing exceeds the funds available in the short-term deposits, so that it pulls the long-term deposits. As a result, *Mudarabah* financing takes only 30% of total financing or half of the *Murabahah* portion, while *Musharakah* is left behind with only 2% (see figure 5.10).

Furthermore, the more than 100% FDR indicates that some parts of the first step financing goes to the second one as well. This high FDR dominates 62% of total financing, especially from 2000 until 2003. Nonetheless, between 2004 and mid-2005 FDR dropped down to less than 100% because of some unfavorable economic conditions, especially high domestic inflation due to the government adjustment on the domestic oil price. The impact was not only felt by the real sector but also by the financing activities of the Islamic banks.

Meanwhile, Islamic banks employ a polling of fund financing approach which does not require a strict obligation to match the same tenor of instruments on both

liability and asset sides (Ismal, 2010a:147-154). The long-term deposits, for example, should not always be placed to the long-term financing.

Figure 5. 10: Deposits and Financing



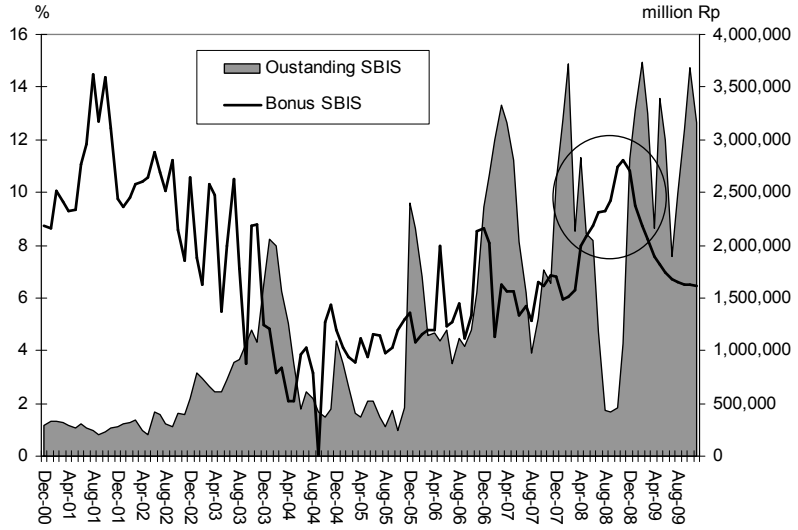
Extending funds into short-term financing is the recent most preferable option expecting for the profitability, certainty, and liquidity. It is also in line with the short-term investment motive of depositors as previously identified. The long-term financing requires a long-term financing commitment, which is very risky and has an asymmetrical nature of risk and dependency on macroeconomic performances which banks can not easily afford (Wilson, 2007:4).

With the short-term placement, which is pro liquidity management and positive regular return, Islamic banks use BI's facility to locate their end of the day idle liquidity. On average, there is 6% placement in SBIS of total deposits. Besides its security, SBIS offers monthly bonuses (fees). In fact, SBIS is actually a liquid instrument for Islamic banks which is available to be repurchased (repo) to BI if banks are in urgent liquidity need. More explanations about SBIS will come in the last part of this chapter.

Unlike the conventional banks, which locate funds in Bank Indonesia Certificates (SBI) for the sake of a high interest rate return, Islamic banks do not position SBIS as their ultimate alternative for funds allocation. It is found that locking money in SBIS does not link with bonuses being promised. Islamic banks mostly rely on the return from short-

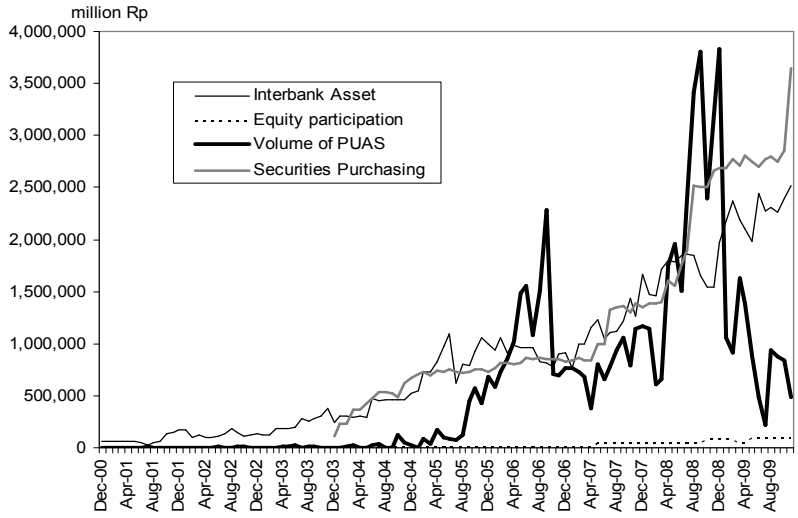
term direct financing rather than bonuses from SBIS. For example, when the bonus goes up, the placement in SBIS does not move up subsequently, as shown in figure 5.11.

Figure 5. 11: SBIS Activities



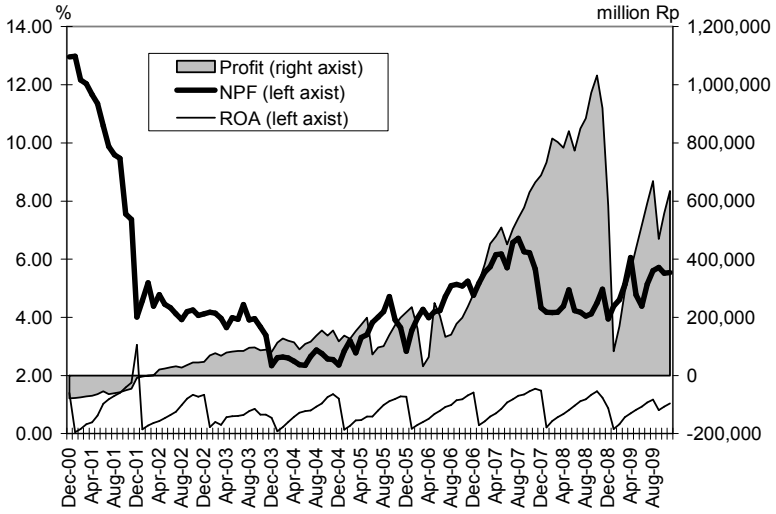
The other indirect financing alternatives such as inter-bank assets, equity participation, securities purchasing, and PUAS do not gain much allocation either. Of the total financing, significant placements are found only in purchasing of Islamic securities (6.1%) and inter-bank placement (4.10%). Nonetheless, for the purpose of managing liquidity, releasing funds into these liquid indirect financing has to some extent increase the liquidity of the industry (see figure 5.12).

Figure 5. 12: Other Indirect Financing



As a result of implementing those financing strategies, the profit of the industry increases over time (see figure 5.13). The total profit has been rising by 81% or Rp0.22 trillion on average per year, together with the persistent positive value of return on asset (ROA). Indeed, the increasing profit enables Islamic banks to persistently pay a competitive return on deposits and maintain the loyalty of depositors.

Figure 5. 13: Profit, ROA and NPF

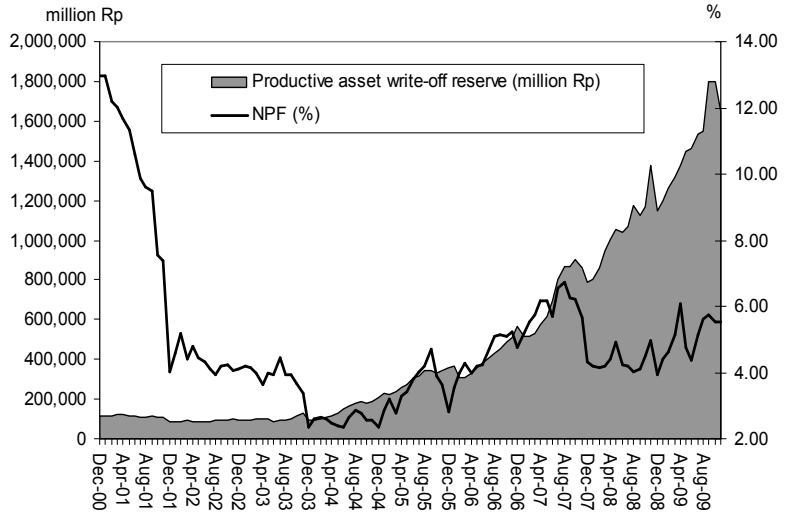


However, the increase in non-performing financing (NPF) often follows the upper trend of profit. NPF was up consistently between January 2004 and mid-2007 by about 5% on average of the total deposits. Precisely, during the world oil price rises and internal economic pressure, NPF of the long-term based financing dragged the total NPF up in 2006 from 2.8% to 4.8%. But after strong efforts from the banking authority and industry's players, it slowly went down and was brought back under control.

In this case, to mitigate business loss and reduce NPF, Islamic banks prepare productive asset write-off reserves (PPAP). PPAP is reserved to protect the banks from future business losses. It accounts for 2% of total assets in the last five years. As drafted in figure 5.14, in line with expansion of financing and increasing trend of NPF, the total amount of PPAP has also increased. Fortunately, this preventive effort has maintained the depositors' trust and has made it possible for Islamic banks to sustain their business operations and minimize liquidity withdrawals.

However, the distribution of funds based on economic sectors shows that most of the deposits are extended into sectors, which are very liquid and operate in a short-term period. Of all financing, 29.24% goes to the commercial services sector, 27.59% to miscellaneous, and 12.51% to the trade sector (see table 5.3). Specifically, the forms of financing of those sectors are working capital financing (51.08%), consumption financing (27.66%), and investment financing (21.26%).

Figure 5. 14: Productive Asset Write-off Reserves (PPAP)



These facts confirm the previous findings that Islamic banks concentrate financing in very liquid and short-term contracts to gain positive and continuous return. Nonetheless, although those economic sectors are profitable and very liquid, in the long run, financing agriculture and forestry, mining, manufacturing, and the construction sectors should be targeted as they would give wider benefit to the economy (Timberg, 2002:3-5). So far, such sectors are captured by only a small allocation of long-term deposits after being used to support the short-term deposits as elaborated before.

Further assessment of the types of financing sectors reveals that 75.44% of financing go to small and medium enterprises (SME) as shown in table 5.3. It is widely known that financing SME have less risk of business losses and operate in the large scale of consumer business transactions[12] with continuous payment of return. Dealing with SME brings benefits to Islamic banks in terms of: (i) low financing risk, (ii) positive and

[12] Such as trade, restaurant, retail business, etc.

continuous return on investment, and (iii) easily matching the tenor of liquidity on the liability side (most of the deposits are in short-term tenors) and asset side (tenors of financing of SME are short-term).

Furthermore, financing SME is one of the six initiatives of the blueprint to develop Islamic banks, mentioned earlier. In this regard, more than just giving financing, Islamic banks stand as business partners for the entrepreneurs of SME and connect SME with other Islamic financial services. Additionally, the banks attempt to transform this voluntary sector to become a well-established industry by fostering and converting the small and medium enterprises into large enterprises.

Table 5. 3: Annual Financing based on Economic Sectors (billion Rp)

Economic Sectors	2004	2005	2006	2007	2008	2009
Agriculture, Forestry.	729	777	690	667	1,039	1,330
Mining.	171	552	594	399	620	1,009
Manufacturing.	652	910	989	1,116	1,463	1,495
Water, Gas, Electricity.	23	31	80	51	195	670
Construction.	818	1,497	1,687	1,915	3,198	3,648
Hotel, Trade, Restaurant.	*1,082*	*1,627*	*2,297*	*3,898*	*4,303*	*5,719*
Transportation, Communication.	789	1,144	1,265	1,363	1,834	3,168
Commercial Services.	*2,385*	*3,928*	*5,003*	*6,829*	*10,451*	*13,369*
Social Services.	779	1,102	1,349	1,653	2,395	2,704
Other	*1,537*	*2,465*	*4,099*	*5,633*	*8,407*	*12,616*
Small Medium Enterprises.	7,661	10,830	12,447	16,757	23,972	34,495
Non Small Medium Enterprises.	1,303	3,204	5,612	6,768	9,872	11,231

Source: Bank Indonesia monthly statistical report

In line with this, the banking regulator supports the Islamic banking programs in developing SME by (Bank Indonesia, 2006a:45):

i. Preparing the blueprint of voluntary sector as a benchmark for stakeholders to deal with the sector.
ii. Adjusting and accommodating the social roles of Islamic banks in its banking regulations.
iii. Improving the legal aspect of voluntary sector such as voluntary sector act, *Zakah* act and, *Waqf* act.
iv. Conducting research on product development suitable for financing SME.
v. Sustainable improvement on managing risk of financing in SME.

vi. Initiating the establishment of a national commission on voluntary sector which functions as the partner of government and central bank to develop SME, mitigate poverty, and increase the public welfare.

5. 6. LIQUIDITY RATIOS AND GAP ANALYSIS

Bank Indonesia stipulates some financial ratios to be maintained by Islamic banks, including liquidity ratios for managing liquidity. The purpose is to value the ability of Islamic banks to maintain the adequate liquidity to anticipate liquidity risk. Based on circular letter number 9/24/DPbS released in October 30th 2007, the essential financial ratios to manage liquidity are: (i) the main liquidity ratio which is the ratio of short-term assets to short-term liabilities or namely Short-Term Mismatch (STM) and (ii) the supporting liquidity ratio which is the ratio of short-term assets, cash, and secondary reserves to short-term liabilities or Short-Term Mismatch Plus (STMP).

5. 6. 1. Analysis of Main Liquidity Ratio (STM)

STM is stipulated by Bank Indonesia to measure the ability of Islamic banks in fulfilling their short-term demand for liquidity. The short-term assets are all assets matured in less than 3 months, which are inter-bank assets, equity participation, and other short-term assets, while the short-term liabilities are all liabilities matured in less than 3 months, which are *Wadiah* demand deposits, *Mudarabah* saving deposits and 1-month *Mudarabah* time deposits.

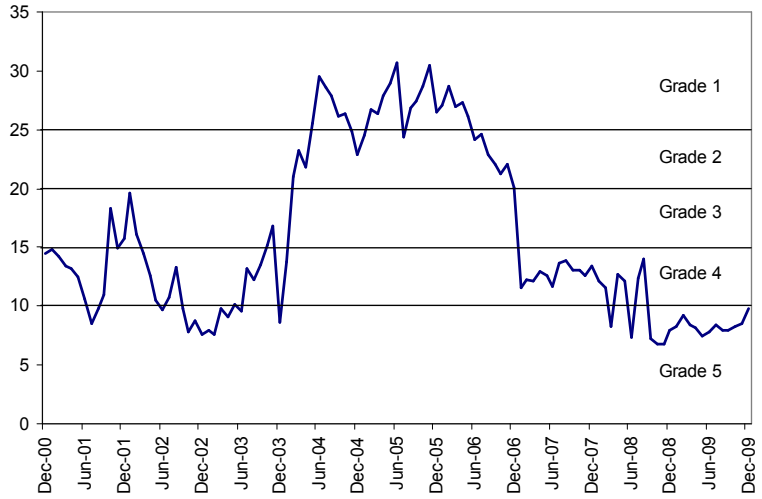
Furthermore, Bank Indonesia determines certain levels of STM ratio implying the grades of the industry. Grade one has an STM ratio beyond 25%, grade two has an STM ratio between 20% and 25%, grade three has an STM ratio between 15% and 20%, grade four has an STM between 10% and 15%, and finally, grade five has an STM ratio below 10% (Appendix of Bank Indonesia, 2007b: 36). For the banking regulator, the higher STM ratio is the better, while for banks, the higher STM ratio means they cannot utilize the funds optimally to finance the long-term projects and gain return/profit.

Figure 5.15 below depicts the STM ratio based on Bank Indonesia's Islamic banking statistical report from December 2000 to November 2009. Interestingly, before January 2004 the industry stood at grades 4 and 3, meaning that they did not locate much

funds in assets which run for less than 3 months. This figure reveals the growing trend of Islamic banking business operations since its establishment in 1991.

Nonetheless, between January 2004 and January 2007 the ratio moved up into grades 2 and 1, implying the anticipation of Islamic banks against short-term demand for liquidity. This was because the country was impacted by the first world oil price shock 2005-2006 causing the government to relieve the domestic fuel subsidies and the economy went down (Ismal, 2006:5-20). Depositors tended to hold cash and all banks (conventional and Islamic) prepared short-term liquidity.

Figure 5. 15: Main Liquidity Ratio



Finally, from January 2007 to the present, the ratio went down to grades 4 and 5. This was after the economy had recovered and Islamic banks restarted expanding their business again. However, the total figures of STM suggest that Islamic banks can optimize their business operations and reserve modest grades of short-term (less than 3 months) liquidity if the economic and business conditions are stable and very supportive. On the other hand, Islamic banks may not be able to do business optimally and have to locate more short-term liquidity when the economic and business conditions are not stable and very supportive.

5. 6. 2. Analysis of Supporting Financial Ratio (STMP)

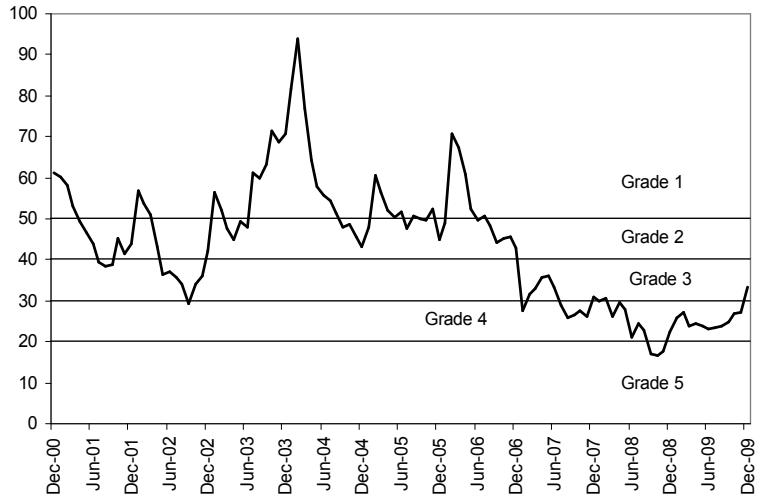
Following the main liquidity ratio (STM), STMP is stipulated by Bank Indonesia to further measure the ability of Islamic banks to fulfill their short-term demand for

liquidity. It consists of short-term assets from STM, cash reserves, secondary reserves (SBIS), and short-term liabilities which are the same as the ones in STM.

There are also some levels of STMP ratio which imply the grades of the industry. Grade one has an STMP ratio beyond 50%, grade two is an STM ratio between 40% and 50%, grade three has an STM ratio between 30% and 40%, grade four has an STM between 20% and 30%, and finally, grade five has an STM ratio below 20% (Appendix of Bank Indonesia, 2007b:37). Compared with STM, STMP points out a higher ratio, as every Islamic bank has cash reserves and secondary reserves.

Thus, in relation to fulfilling the short-term demand for liquidity, the STMP ratio reveals the ability of Islamic banks to provide more short-term liquidity than STM. The components of liquid assets in STMP also support the ones in STM because even though the STM ratio is low, the STMP ratio might be high because of the availability of cash reserves and SBIS in Bank Indonesia. Moreover, Bank Indonesia as a monetary authority can directly influence the ratio of STMP through its Islamic monetary instrument (SBIS) but cannot directly influence component of assets in STM.

Figure 5. 16: Supporting Liquidity Ratio



Referring to the calculation of the STMP ratio within the same period of analysis as the STM ratio, the industry mostly stood in grades 3 and 2 from December 2000 until June 2003, showing that they did not locate high levels of funds in the less than 3 months

assets, cash reserves, and SBIS (see figure 5.16). However, anticipating the downturn of the economy during 2005-2006, the STMP ratio rose earlier than the STM ratio which only rose after June 2003. This high placement of funds in cash reserves and SBIS positioned the industry in grade 1 until December 2004 (one and a half year). From January 2005 until present, the STMP ratio has been standing in grades 2, 3, and 4.

In addition to findings in STM ratio, the STMP ratio reveals that Islamic banks tend to locate more funds in cash reserves and SBIS if the economy is in a downturn. On the other hand, their allocations in cash reserves and SBIS are minimal if the economy is in an upturn. As such, the findings from both STM ratio and STMP ratio highlight the importance of supportive economic and business conditions to support the business operations of Islamic banks. In fact, a slow–down of the economy tends to trigger depositors to hold more cash as preemptive action and causes the banks to locate more short-term liquidity.

5. 6. 3. Liquidity Ratio Evaluation

Following the measurement of the liquidity ratio, Bank Indonesia has determined the performance evaluation of liquidity ratio per grade (Appendix of Bank Indonesia, 2007b:92). Grade one is interpreted as a very strong anticipation of Islamic banks to fulfill the short-term demand for liquidity. Grade two is interpreted as a strong anticipation of Islamic banks to fulfill the short-term demand for liquidity.

Grade three is interpreted as a modest anticipation of Islamic banks to fulfill the short-term demand for liquidity. Grade four is interpreted as a low anticipation of Islamic banks to fulfill the short-term demand for liquidity. Grade five is interpreted as a weak anticipation of Islamic banks to fulfill the short-term demand for liquidity.

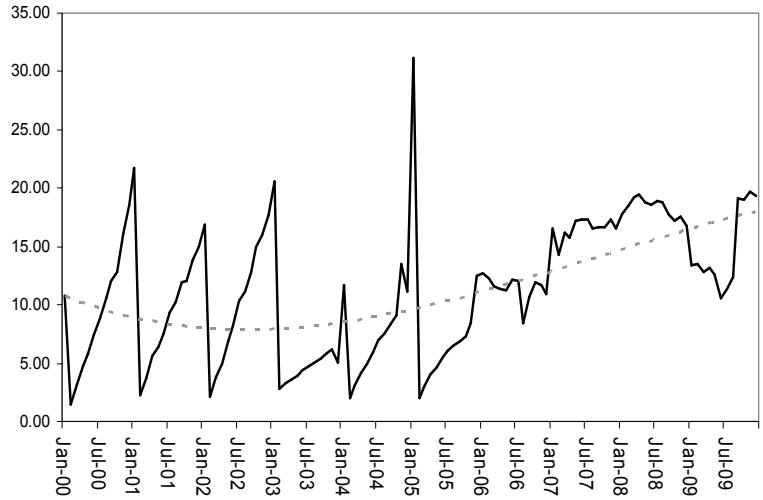
Evaluating both ratios of STM and STMP, it is found that the Islamic banks' anticipation of short-term liquidity withdrawals is very strong and strong (grades 1 and 2) during unpleasant economic conditions. Meanwhile, it becomes a modest and even lower anticipation (grades 3 and 4) of short-term liquidity withdrawals during favorable economic conditions.

5. 6. 4. Gap Analysis

This sub-section uses gap analysis to investigate the performance of return on financing and the payment of return-sharing on deposits. As mentioned in Chapter 2, when the spread between return on financing and return-sharing on deposits is positive, a liquidity risk problem is unlikely to occur. It is because:

i. Islamic banks have shown a robust financing portfolio and good performance.
ii. Depositors receive a continuous and positive payment of return sharing on deposits.
iii. If return sharing on deposits is competitive, more depositors will come.
iv. Unless interest on deposits is very high, rational depositors will remain in the banks.

Figure 5. 17: Gap Analysis



The historical data in figure 5.17 shows that the spread between return on financing and return-sharing on deposits is always positive. In particular, the upward trend (see the dotted grey line) occurred after the Indonesian economy recovered from the impact of the world oil price shock of 2005-2006. The positive spread keeps growing, implying a robust portfolio management of the industry. These findings mean that liquidity risk problem is unlikely to occur in the ongoing banking operation.

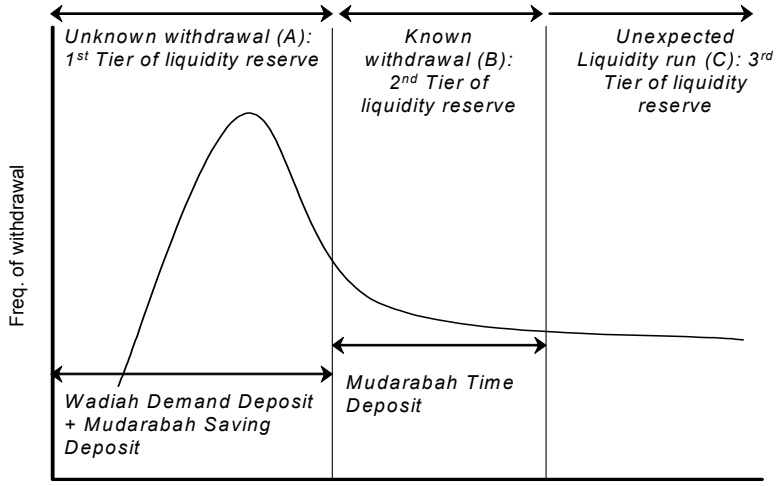
5. 7. INSTRUMENTS TO MANAGE THE DEMAND FOR LIQUIDITY

The potential of short-term liquidity withdrawals has been sorted out through proper allocation of liquidity, financing strategies, and sustainable efforts to balance asset

and liability as analyzed before. Actually, an assessment of liquidity risk management through the liquidity risk management index has been carried out by Ismal (2010a) and the result was indifferent with the findings of this research. He discovered that three Indonesian Islamic banks, capturing almost 80% market share, achieved a "good" grade category of the index[13] (2010a: 147-154).

However, as one way of managing liquidity, three groups of liquid instruments are prepared by Islamic banks to anticipate the regular and irregular demand for liquidity. Such liquid instruments are grouped in this research into the 1st, 2nd and 3rd tier liquid instruments. First of all, any liquidity withdrawal from *Wadiah* demand deposits and *Mudarabah* saving deposits is served by the 1st tier liquid instruments which have: (a) cash reserves, (b) placement of funds in BI, and (c) borrowing from the Islamic money market (PUAS). Then, combining liquid instruments in the 1st tier with the other three instruments creates the 2nd tier liquid instruments to tackle any demand for liquidity from the termination of 1-month *Mudarabah* time deposits.

Figure 5. 18: Short-Term Liquid Instruments



Source: Modification of Khan Tariqullah from Arani, Shahin, 2006

The three liquid instruments accompanying the 1st tier are: (i) withdrawing the inter-bank placement, (ii) repurchasing Bank Indonesia *Sharia* Certificate or SBIS, and (iii) withdrawing the equity participation. Finally, in the case of a liquidity run, the 1st and the 2nd tiers above are coupled with the 3rd tier containing: (a) the central bank intra-day

[13] The liquidity risk management index has four grading categories: excellent, good, satisfactory, and poor.

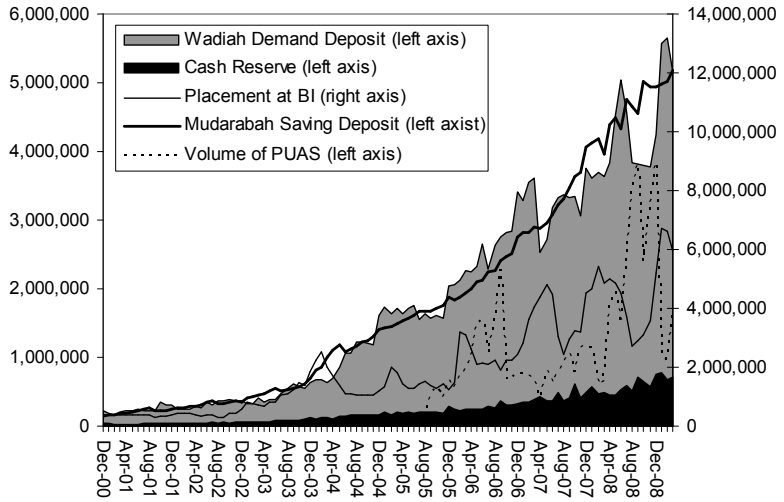
emergency funds (FLI and FPJP), (b) bank's capital, and (c) the Deposit Guarantee Institution (LPS). All are shown in areas A, B, and C in figure 5.18.

5. 7. 1. Liquid Instruments for Withdrawals in Demand and Saving Deposits

The first instrument used by Islamic banks to serve the regular liquidity withdrawals from both *Wadiah* demand deposits and *Mudarabah* saving deposits are cash reserves. On average, Islamic banks reserve 1.83% of their total deposits in this instrument. If the demand exceeds the stock of cash reserves, Islamic banks use the second instrument, namely placement of funds in Bank Indonesia, which consists of reserves requirement and excess reserves. Bank Indonesia does not pay any remuneration on these two accounts as their ultimate function is for settlement of the transactions. In total, Islamic banks locate 17.95% of total deposits into these two liquid instruments.

Further, if the demand for liquidity still exceeds cash reserves and placement of funds in BI, borrowing funds from the Islamic money market (PUAS) by using IMA instrument is the next alternative. This is a tradable instrument and the quickest way of getting instant liquidity although it needs cooperation and good relation among Islamic banks. This instrument accounts for 3.22% of total deposits. As shown in figure 5.19, the 1st tier liquid instruments have backed up the potential liquidity withdrawals from both *Wadiah* demand deposits and *Mudarabah* saving deposits.

Figure 5. 19: The 1st Tier Liquid Instruments

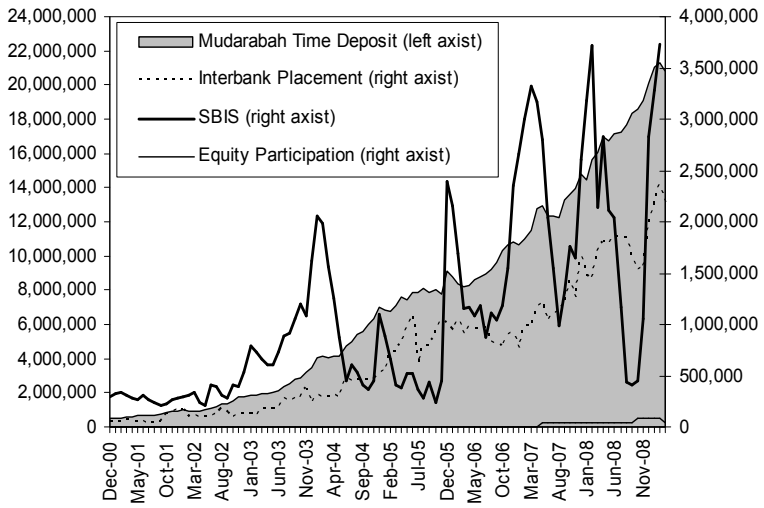


5. 7. 2. Liquid Instruments for Withdrawals in Time Deposits

If the demand for liquidity is added with withdrawals from 1-month *Mudarabah* time deposits, the 2nd tier liquidity reserves are available to provide extra liquidity. Besides instruments in the 1st tier, withdrawing inter-bank placement supplies additional liquidity. This is actually a short-term allocation of Islamic bank funds into other banks and accounts for 5.41% of total deposits on average.

If this is still not enough, Islamic banks may repurchase their funds in SBIS to Bank Indonesia. SBIS is actually functioning as the Islamic monetary instrument which absorbs short-term excess liquidity in the industry. Thus, SBIS gives direct return to banks. Nonetheless, for banks, SBIS functions as a liquid instrument to fill out liquidity needs by repurchasing it to Bank Indonesia. In proportion to total deposits, SBIS only accounts for 6.01%.

Figure 5. 20: The 2nd Tier Liquid Instruments



Finally, equity participation is another supplier of liquidity which can be used to strengthen the function of the 2nd tier of liquid instruments. This instrument accounts for 0.11% of total deposits, but support more supply of liquidity of this tier. In total, the 2nd tier liquid instruments offer liquidity equivalent to 34.53% of total deposits (figure 5.20).

5. 7. 3. Liquid Instruments for Liquidity Run Conditions

When the need for short-term liquidity still surpasses the liquidity reserves of the 1st and 2nd tiers, Islamic banks can use the last option, i.e. the 3rd tier liquid instruments.

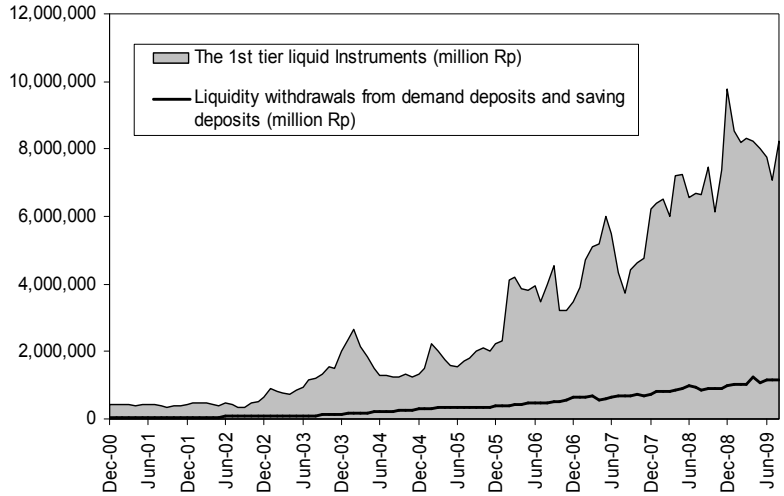
The first two alternatives are Intraday Liquidity Facility (FLI) (Bank Indonesia, 2005b:1-7) and Short-Term Financing Facility for *Sharia* Banks (FPJP) (Bank Indonesia, 2005a:1-5). FLI can be used by Islamic banks which are in liquidity shortages in a daily basis (one day limit) while FPJP is offered to help Islamic banks which still have liquidity shortages beyond 1 day up into 90 days ahead. For this, Bank Indonesia charges fees for every usage of FLI or/and FPJP.

Beyond these two central bank intraday emergency fund instruments, Islamic banks can use their capital, as long as it does not violate the capital adequacy ratio (CAR) requirement[14]. Finally, asking for help from a government institution called Deposit Guarantee Institution (LPS) may guarantee depositors' funds in the banks.

5. 7. 4. Historical Performance of the Short-Term Liquidity Management

The historical performance of the 1st and 2nd tiers to provide the required liquidity to depositors has been quite successful. The total amount of short-term liquid instruments stands above the demand for liquidity (see figures 5.21 and 5.22). Nonetheless, this performance may not possibly apply if:

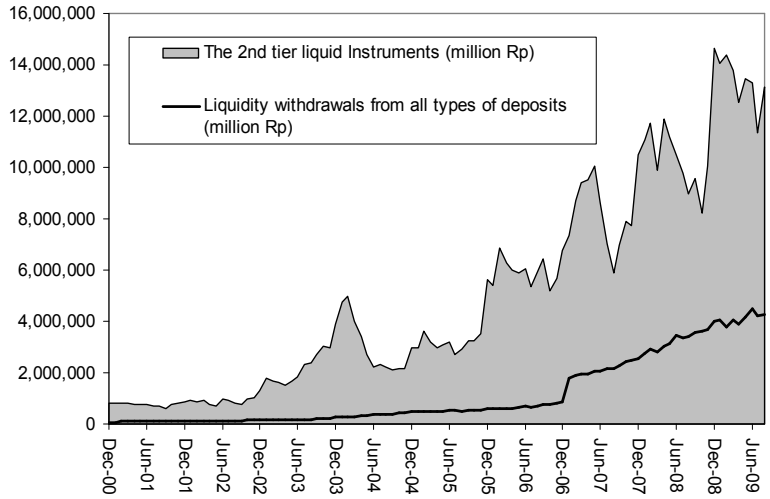
Figure 5. 21: The 1st Tier and Demand for Liquidity



[14] Capital required for *Mudarabah* time deposit located to *Mudarabah* financing is only 1%; *Wadiah* demand deposit and *Mudarabah* saving deposits placed in *Mudarabah* and non-*Mudarabah* financing is ranging from 0%-35% and reaches 150% if they are located in *Musharakah* financing.

i. Economic pressures hit the country, followed by a very tight monetary policy like the one that occurred in 1997/1998. When the interest rate is high, some Islamic banking depositors tend to switch their deposits to the conventional banks for a higher interest rate return.
ii. Islamic banks are proven to be un-Islamic and do not have either proper banking facilities or services. Up to now, the Council of Indonesian *Sharia* Scholars (MUI) has strictly guided the operation of Islamic banking to prevent it from non-compliant activities. Further, there is mutual cooperation between Islamic banking windows (UUS) and their parent banks to arrange office channeling (using the parent bank's networks in all provinces) to reach more depositors.
iii. Islamic banks do not implement short-term financing strategy. Due to the characteristics of deposits and depositors (short-term, continuous, and positive expectation of profit), Islamic banks play safe by advancing most of the funds in the short-term, safe, liquid, and pre-determined financing instruments.

Figure 5. 22: The 2nd Tier and Demand for Liquidity



Continuing this historical performance analysis, in the next chapter, this research assesses the resilience of Islamic banking industry against liquidity pressure by using an econometric approach. Particularly, it uses an estimation of the future performance of Islamic banking industry under certain scenarios and assumptions to check its survival if irregular liquidity withdrawals and liquidity run occurs.

5. 7. 5. Islamic Money Market and Bank Indonesia *Sharia* Certificate (SBIS)

The Islamic money market (PUAS) has formally operated since 2000 when Bank Indonesia firstly issued its regulation number 2/8/PBI/2000 regarding the Islamic money market. The existence of the market was further supported by the verdict of the council of Indonesian *Sharia* Scholars (MUI), number 37/DSN-MUI/X/2002, regarding Islamic money market.

Based on these two guides, market players in the Islamic money market are Islamic banks as both the borrowers and investors, and conventional banks as the investors *per se*. In addition, MUI stipulates certain Islamic contracts as the underlying contracts of Islamic money market instruments. Those are *Mudarabah, Musharakah, Qardh, Wadiah, Sharf*; the trading of instruments can only be carried out once (MUI, 2002:3 and Bank Indonesia, 2000:6).

Currently, there is only one money market instrument traded among banks, namely IMA (Inter-bank *Mudarabah* Agreement), as mentioned before. This instrument can be issued by an Islamic bank under the contract of *Mudarabah* with the maximum period of 90 days (Bank Indonesia, 2000:6). The investors receive profit-sharing from IMA certificates referring to the profit gained in *Mudarabah* time deposit of the issuing bank.

Figure 5. 23: Inter Bank Islamic Money Market Activities

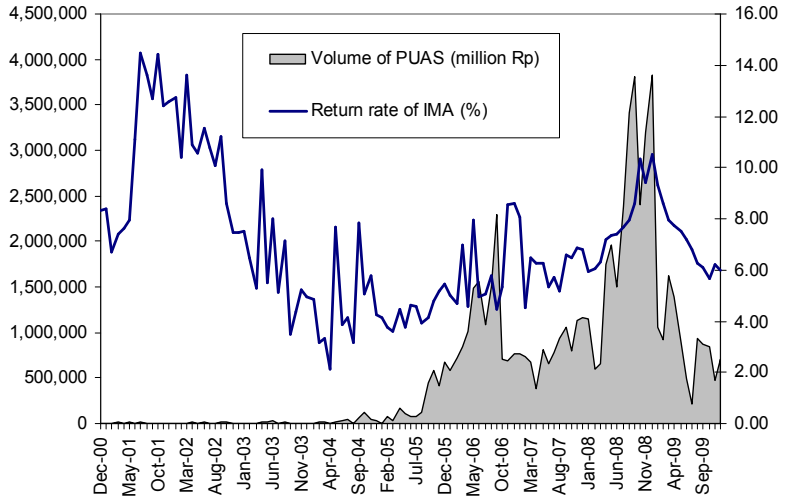


Figure 5.23 illustrates the trading activities in the Islamic money market. Confirming the previous analyses, Islamic banks do not actively buy and sell IMA certificates in the market. Although the market has operated since 2000, the active trading has been arising since January 2006. This takes place because:

i. Market players are still limited. Before 2007, there were only three Islamic banks (BUS) and twenty-five Islamic windows (UUS). Since 2007 there have been six BUS and the same number of UUS. Although conventional banks can invest funds in IMA certificate, their participation is still very limited. Even, there is commonly no trading occurred in one day (Jakarta post, 2010).
ii. The short-term demand for liquidity is relatively manageable. As being investigated in balance sheet analysis and financial ratio analysis, Islamic banks have managed such demand properly.
iii. The short-term suppliers of liquidity such as cash reserves, placement of funds in Bank Indonesia have been enough to fulfill the short-term demand without relying on borrowing from the Islamic money market. In total, Islamic banks only invest 3.22% of total assets in PUAS as mentioned previously.

Actually, besides placing or borrowing funds from the money market, Islamic banks also invest some funds in Bank Indonesia *Sharia* Certificate (SBIS), as stated above. SBIS was initially named as Bank Indonesia *Wadiah* Certificate (SWBI) with *Wadiah* as its underlying contract and regulated in Bank Indonesia Regulation Number 6/7/PBI/2004. Later, SWBI was changed into SBIS with *Joalah* as its underlying contract and regulated in Bank Indonesia Regulation Number 10/11/PBI/2008.

SBIS is issued by the central bank for the tenor of 1 month to 12 months under an open auction mechanism. All Islamic banks (BUS) and Islamic banking windows (UUS) which have at least 80% FDR can join the auction. However, SBIS cannot be sold in the secondary market; instead it can be repurchased (repo) to Bank Indonesia. Referring to figure 5.17 on the historical figure of SBIS, SBIS is more active than PUAS especially if the return of SBIS (*Joalah*) is high.

However, similar as placement of funds in PUAS, Islamic banks only advance 6% of total deposits into SBIS. Two reasons that can explain the small allocation of funds in SBIS are:

i. Islamic banks have released most of the funds to the real sector as seen by the high Financing to Deposit Ratio (FDR).
ii. Locating some funds in SBIS is purely for precautionary motive in particular to anticipate the short-term demand for liquidity. Islamic banks do not count the return of SBIS as the decisive income, as has been stated above.

5. 8. CLOSING REMARKS

The industrial analysis on Indonesian Islamic banking industry has found some interesting facts and problems with regard to liquidity risk management. First of all, the liquid deposits on the liability side are matters bringing the potential of short-term liquidity withdrawals from depositors. As a response, Islamic banks locate most of the funds in short-term financing to manage the short-term demand for liquidity and gain the positive and regular income from short-term debt financing.

But this is not an ideal practice of Islamic banks and does not contribute significantly to the long-term economic development through financing the long-term projects. Some depositors, on the other hand, are very sensitive about the movement of interest rate, position Islamic banks indifferently from conventional banks, and invest funds for the short-term period. Moreover, the management of liquidity in Islamic banks is very sensitive with economic condition as identified in liquidity ratio analysis.

However, to mitigate the regular and irregular demand for liquidity, Islamic banks have prepared 3 tiers namely the 1st, 2nd and 3rd tier liquid instruments. Historically, both the 1st and 2nd tiers liquid instruments have successfully served the demand for liquidity. Borrowing funds from the Islamic money market is also very rare. Nonetheless, the potential of short-term demand for liquidity withdrawals might happen if the economy is in downturn, interest rate is high, or depositors tend to hold more cash in hand. The analysis of this chapter finds the potential liquidity withdrawals of 33% of total Islamic bank deposits.

Chapter 6
ESTIMATING THE LIQUIDITY MANAGEMENT ASPECTS OF THE ISLAMIC BANKING INDUSTRY: ECONOMETRIC ANALYSIS

6. 1. INTRODUCTION

Financial management in banking institutions is carried out to achieve the goal of maximizing the bank's value as defined by its profitability and risk level (Greuning and Iqbal, 2008:64). This chapter develops four quantitative models which are the liability model, the asset model, the liquidity reserves model, and the demand for and supply of liquidity models. The first model captures the liquidity behavior of depositors.

The second one identifies the liquidity behavior and fund management of both the Islamic banks and entrepreneurs. The third one finds factors determining the optimal liquidity reserves in Islamic banks. The final one predicts the future figures and conditions of demand and supply of liquidity and checks the resilience of the Islamic banking industry against irregular demand for liquidity and liquidity runs.

The chapter begins by explaining the theoretical construction of the models. The Islamic models, discussed in this chapter, are derived from the modification and adjustment of conventional models. The Islamic models are then regressed with econometrics tools and generate information in relation to managing liquidity. The last part of the chapter analyzes the future performance of demand and supply of liquidity, including testing the resilience of the Islamic banking industry against liquidity pressure.

6. 2. THEORETICAL CONSTRUCTION OF THE MODELS

6. 2. 1. Model of Conventional Banks Behavior in the Competitive Banking Sector

There are various models of banking behavior in economic literature. Amongst all, there are four alternative references which suit the purpose of this research. These are the models of: Diamond (2007), Diamond and Dybvig (2000), Gatev *et al.* (2005), and

Freixas and Rochet (1999). Diamond (2007) discussed a bank's liquidity condition model where deposits were placed in short-term tenors and assets (bank's credits) were placed in long-term tenors.

He made a simple illustration of two types of investors who might terminate their deposits at times T = 1 and T = 2, of three investment periods (T = 0,1,2). On the other hand, there was a demand for liquidity from entrepreneurs at time T = 1, to be consumed in T = 2. By giving the probability of executing the investment to provide liquidity for both depositors and entrepreneurs, Diamond suggested in his model that a bank could provide more liquid assets by offering demand deposits, while the bank had investments in illiquid assets (Diamond, 2007:193).

Next, Diamond and Dybvig (2000) generated a model which showed that bank deposits could provide allocation of funds which is superior to those of an exchange market. They also explained how banks subject to bank runs can still attract deposits because banks were insurance for depositors to provide short-term liquidity. Their model has three periods of investment, T = 0, T = 1 and T = 2, with a single homogeneous product and the roles of technology. Lastly, the model conveyed three important points, which are:

i. The banks issuing demand deposits could improve on a competitive market by providing better risk-sharing among people who need to consume at different random times;
ii. The demand deposits providing this improvement had an undesirable equilibrium (a bank run) in which all depositors, including those who would prefer to leave their deposits if they were not concerned about the bank failing, panicked and withdrew money immediately.
iii. The bank runs caused real economic problems because even healthy banks could fail, causing the recall of loans and the termination of productive investment.

Then, Gatev *et al.* (2005) studied differences across banks in managing systemic liquidity risk. They regressed two sets of cross-sectional regressions, namely: (a) stock return volatility (as a dependent variable) is explained by loan commitment ratios,

transaction deposit ratios and control variables (as independent variables); and (b) deposit change (as a dependent variable) is explained by loan commitment ratios, transaction deposit ratios, and control variables (as independent variables). They found that loan commitments exposed banks to liquidity risk, whereas transactions deposits insulated them from such risk (Gatev *et al.*, 2005:3).

However, this chapter takes certain ideas of those three references and does not rely on one model explicitly because both Diamond (2007) and Diamond and Dybvig (2000) limit their analyses to certain time periods (for depositors, banks, and entrepreneurs). Both of these works also suggested that a bank could provide more liquid assets by offering demand deposits (Diamond) and proposed risk-sharing among people in demand deposits (Diamond and Dybvig).

This chapter adopts their ideas to balance liquidity on the asset and liability sides through the management of the liquidity of depositors and entrepreneurs. Nonetheless, a model without time period constraint is needed which involves many banks, and which carries the assumption that banks manage liquidity on the asset and liability sides in accordance with their profit maximization motive.

Meanwhile, the chapter also takes the main idea of Gatev *et al.* (2005) to utilize deposits (liability side) properly in order to prevent banks from systemic liquidity risk. Nevertheless, this requires a model that also analyzes the utilization of credits (asset side), concentrates on the balancing of asset and liability sides, temporarily ignores the roles of the stock market, and studies the aggregate data of the industry which is not the assumption of their model.

Amongst all economic literature, for the purposes of this research, the banking behavior models in a competitive banking sector developed by Freixas and Rochet (1999) are the most appropriate ones. These models not only capture the ideas of the earlier literature but also match the requirements and purposes of this chapter. In particular, Freixas and Rochet (1999) focused on a bank's liquidity on the asset and liability sides. They stated four assumptions in the models implying competitive banking deposits, which are: (i) banks are risk neutral, (ii) banks are price takers, (iii) profit maximization

as a motive in balancing liquidity on asset and liability, and (iv) full information. The same assumptions are also used in the Diamond and Dybvig (2000) model.

Initially, the model formulates a bank's profit as the output of total revenues from asset side minus total expenditures (costs) from liability side as follows:

$$\pi = r_L L + rM - r_D D - C(D, L) \tag{1}$$

where π is bank's profit, r_L is interest on loans, L is total outstanding loans, r is the money market rate, r_D is interest on deposits, D is total deposits, and C is total costs representing the bank's technology in managing both deposits and loans. In particular, M is the bank's net money market position and formulated as:

$$M = (1-\alpha)D - L \tag{2}$$

whilst α is compulsory reserves required by the central bank. Then, by combining equations (2) and (1), π can be rewritten as:

$$\pi(D, L) = (r_L - r)L + \left[r(1-\alpha) - r_D\right]D - C(D, L) \tag{3}$$

and maximum profit is the first order condition of (3), such that:

$$\frac{\partial \pi}{\partial L} = (r_L - r) - \frac{\partial C}{\partial L}(D, L) = 0 \text{ and } \frac{\partial \pi}{\partial D} = \left[r(1-\alpha) - r_D\right] - \frac{\partial C}{\partial D}(D, L) = 0 \tag{4}$$

Equations (3) and (4) mean that maximum profit is the condition where the volume of loans and deposits are adjusted in such a way that (r_L-r) and [r(1-α)-r_D] equals marginal costs. For a bank, an increase in r_D will decrease the deposits and an increase in r_L will increase the supply of loans. If there are N different banks (n = 1,…N) with their typical deposits (D^n) and loans (L^n), and total amount of securities (T-Bills) (B) held, the functions of household saving and demand for investment from corporations are formulated in equations (5), (6) and (7) below (Freixas and Rochet, 1999:55):

$$\mathrm{S}(r_D) = B + \sum_{n=1}^{N} D^n(r_L, r_D, r) \qquad \text{(saving of household)} \tag{5}$$

$$\mathrm{I}(r_L) = \sum_{n=1}^{N} L^n(r_L, r_D, r) \qquad \text{(demand for investment from companies)} \tag{6}$$

$$\sum_{n=1}^{N} L^n(r_L, r_D, r) = (1-\alpha)\sum_{n=1}^{N} D^n(r_L, r_D, r) \qquad \text{(inter bank market)} \tag{7}$$

Equation (7) assumes that aggregate position in the inter bank market is zero (M = 0) and r is a controlled variable set by the central bank. As such, by modifying equation (4) with the assumption of constant marginal costs of intermediation ($C_L \equiv \gamma_L$ and $C_D \equiv \gamma_D$) such that $r_L = r + \gamma_L$ and $r_D = r(1- \alpha) - \gamma_D$ and adding them together into equations (5), (6) and (7), the equilibrium equations with the maximum profit and optimum liquidity balance are:

$$S\left[r(1-\alpha) - \gamma_D\right] - \frac{I\left(r+\gamma_L\right)}{1-\alpha} = B \tag{8}$$

$$I\left(r+\gamma_L\right) = \sum_{n=1}^{N} L^n(r_L, r_D, r) = \left(1-\alpha\right)\sum_{n=1}^{N} D^n(r_L, r_D, r) \tag{9}$$

These equations fulfill the expected utility of investors that is also adopted in Diamond (2007:194). Specifically, equation (8) explains that liquidity on the liability side of the bank is determined by a reserves coefficient (α) or by open market operation (B) on the equilibrium levels of r_L and r_D (Freixas and Rochet, 1999:56).

On the other hand, the demand for investment from companies is influenced by the cost of managing deposits and loans besides the money market interest rate. Subsequently, equation (9) is also driven by a set of interest (r_L, r_D and, r), in addition to the cost of managing loans, total deposits and liquidity reserves required by the central bank.

6. 2. 2. Model of Islamic Banks in the Competitive Banking Sector

One way to measure asset liability mismatch is through the cash flow of assets and liabilities besides investigating the present value (Currie and Velandia, 2002:7). Referring to Freixas and Rochet's model of bank behavior, the adjusted (Islamic) model is derived for the case of Islamic banks to investigate the flow of liquidity on the asset and liability sides. However, before constructing the model, some *Sharia* principles must be accommodated by the chosen model to make it *Sharia*-compliant. The principles are:

i. Islamic banks change the term "loan" into "financing" because Islamic banking contracts take the form of trade, investment or service instead of loan.
ii. *Sharia* prohibits any transaction dealing with interest (*Riba*), gambling (*Maysir*), and excessive uncertainty (*Gharar*).
iii. Islamic banks do not use interest rates but use a concept of sharing of any profit and loss of the business. As such, interest on loans (r_L) in the conventional model is changed into return from financing (r_f) because of the employment of profit and loss (PLS) sharing concept between Islamic banks and entrepreneurs. Similarly, interest on deposits (r_D) in the conventional model is turned into profit-sharing ratio (r_β).
iv. Since any return in the form of interest is prohibited, *Sharia* does not allow remuneration for unutilized funds such as reserves requirement in the central bank.

After adopting *Sharia* principles, the Islamic banking models take into account special characteristics of the Indonesian Islamic banking industry, which are:

i. There are two types of financing: (i) operational financing (F), which is comprised of mostly *Murabahah* (61%) and *Mudarabah* (30%); and (ii) non-operational financing (L), which is dominated by *Ijarah* (2%). Because of the domination of *Murabahah* and *Ijarah*, Islamic banks have a pre-determined short-term cash inflow (r_f and r_l) with a minimum probability of bearing loss. These financing are funded by saving and time deposits (79% of the total deposits (D)), which are mostly of short-term tenors as discussed in Chapter 5.
ii. For the purpose of managing liquidity, there are liquidity reserves that are taken from total deposits and are composed of reserve requirements and cash reserves.
iii. Placement of funds in the Islamic money market and SBIS (both in M) is not the ultimate aim of Islamic banks and is excluded from the model.
iv. Deposits of non-residents are very small and not significant enough to be considered in the model.
v. Indonesian Islamic banks apply a revenue-sharing concept (r_β) rather than a PLS concept in deposit contracts. Technically, operational return is shared with depositors in the first stage before banks bear the costs of banking operations (C(D,F)) on its sharing part. However, non-operational return is not shared and instead becomes non-

operational profit for banks (NOP) after deducting the cost of non-operational financing (C(L)), which is usually less than C(D,F). Therefore, depositors do not bear any loss, but instead they get continuous and positive return on their accounts.

As such, the Indonesian Islamic banking behavior model in the competitive banking sector is formulated as:

$$\pi = \left[\left(r_f F + rM\right)\left(1 - r_\beta\right) - C(D,F)\right] + \left[r_l L - C(L)\right] \quad (10)$$

with the 1st [.] as operational profit and the 2nd [.] as non operational profit whilst M is formulated as $M = (1-\alpha)D - \left(F + L\right)$ (11)

By inserting equation (11) into equation (10), π can be rewritten as:

$$\pi = \left[r_f F\left(1 - r_\beta\right) - \left(1 - r_\beta\right)F + r\left(1 - \alpha - r_\beta(1-\alpha)\right)D - L\left(1 - r_\beta\right)\right] - C(D,F) + \left[r_l L - C\left(L\right)\right] \quad (12)$$

and the maximum profit is the first order condition of (12), as written below:

$$\frac{\partial \pi}{\partial F} = r_f\left(1 - r_\beta\right) - \left(1 - r_\beta\right) - \frac{\partial C}{\partial F}(D,F) = 0 \quad (13)$$

$$\frac{\partial \pi}{\partial D} = r\left[\left(1-\alpha\right) - r_\beta\left(1-\alpha\right)\right] - \frac{\partial C}{\partial D}(D,F) = 0 \quad (14)$$

$$\frac{\partial \pi}{\partial L} = r_l - \left(1 - r_\beta\right) - \frac{\partial C}{\partial L}(L) = 0 \quad (15)$$

Equations (13), (14) and (15) explain that maximum profit is realized if Islamic banks can make: (i) operational return (after return-sharing) equal to the marginal cost of financing; (ii) the Islamic money market rate minus the return-sharing rate to depositors equal to the marginal cost of deposits; and (iii) non-operational return minus return sharing rate to bank equal to the marginal cost of financing losses.

Assuming that there are N different Islamic banks (n = 1,…N) with typical deposit (D^n), financing schemes (F^n and L^n) and without any government security[15] being held, the functions of household saving and demand for investment from corporations are written as:

[15] As the *Sukuk* Act was only approved in May 2008, government *Sukuk* is still in the early stage of development.

$$S(r_f) = \sum_{n=1}^{N} D^n(r_f, r_\beta, r) \quad \text{(saving function of household)} \quad (16)$$

$$I(r_\beta, r_l) = \sum_{n=1}^{N} F^n(r_f, r_\beta, r) + \sum_{n=1}^{N} L^n(r_l, r) \quad \text{(investment demanded by companies)} \quad (17)$$

$$\sum_{n=1}^{N} F^n(r_f, r_\beta, r) + \sum_{n=1}^{N} L^n(r_l, r) = (1-\alpha)\sum_{n=1}^{N} D^n(r_f, r_\beta, r) \quad \text{(inter-bank money market)} \quad (18)$$

And, by modifying equations (13), (14) and (15) with the assumption of constant marginal cost of intermediation ($C_F \equiv \gamma_F$, $C_D \equiv \gamma_D$ and $C_L \equiv \gamma_L$) such that:

$$r_f = 1 + \frac{\gamma_F}{(1-r_\beta)} \quad ; \qquad r_\beta = 1 - \frac{\gamma_D}{r((1-\alpha)} \quad ; \quad \text{and } r_l = \gamma_L + (1-r_\beta) \quad (19)$$

and adding them together into equation (16) in conjunction with (17) and (18), the equilibrium equations are formulated as:

$$S\left(1 + \frac{\gamma_F}{(1-r_\beta)}\right) = \sum_{n=1}^{N} D^n(r_f, r_\beta, r) = \frac{\sum_{n=1}^{N} F^n(r_f, r_\beta, r) + \sum_{n=1}^{N} L^n(r_l, r)}{(1-\alpha)} = \frac{I(r_\beta, r_l)}{(1-\alpha)} \quad (20)$$

$$I\left(1 - \frac{\gamma_D}{r(1-\alpha)}; \gamma_L + (1-r_\beta)\right) = \sum_{n=1}^{N} F^n(r_f, r_\beta, r) + \sum_{n=1}^{N} L^n(r_l, r) \quad (21)$$

Model (20) explains that a balanced liquidity on the liability side is a function of cost of financing, revenue-sharing ratio, profit and loss-sharing (PLS), return from operational financing, liquidity reserves, total deposits, PLS return from the money market, and non-operational financing return. Meanwhile, model (21) explains that a balanced liquidity on the asset side is a function of cost of deposits, liquidity reserves, total financing, PLS from operational financing, revenue sharing ratio, PLS return from the money market, and return from non operational financing.

6. 2. 3. Conventional Model of the Liquidity Reserves in Banks

As mentioned earlier, liquidity reserves are comprised of cash reserves, which are basically the bank's discretion, and reserves requirement stipulated by the central bank. Hence, the total available funds for credit can be simplified as total deposits (D) minus total liquidity reserves (R) or D – R. Banks regularly withdraw money from liquidity

reserves based on three purposes: (i) to fulfill the regular demand for liquidity where banks take money as regularly predicted and calculated; (ii) to fulfill the irregular demand for liquidity where, in addition to taking money from liquidity reserves, banks borrow extra funds from the money market or sell short-term marketable securities; and (iii) to avoid liquidity runs.

There are various models of liquidity reserves for banks in the literature on banking available for analysis. Amongst all, there are four alternative references that suit the purposes of this research. These are: Khemraj (2007), Pagratis (2007), Cifuentes *et al.* (2005), and Freixas and Rochet (1999).

Khemraj (2007) investigated the liquidity preference of banks in developing countries and found that banks required a minimum rate of interest in the loan market to compensate for risks, marginal transaction costs, and rate of return on safe foreign assets before they made a loan to the borrowers. If borrowers were unwilling to pay the minimum rate on loans, then banks accumulated excess liquidity. His model applied to the case of oligopoly in the loan market and attached the role of indirect monetary policy to determine the amount of liquidity reserves in banks (Khemraj, 2007:1).

Meanwhile, Pagratis (2007) studied the central bank's prudential liquidity requirement for banks to mitigate liquidity risk. He illustrated the economy with three risk-neutral classes of agents, namely a bank, bank depositors, and a central bank. The bank operates for three periods: T = 0,1,2 with risky loan investment and probability of success/failure. Pagratis suggested that liquidity requirements, along with an appropriate lender of the last resort (LOLR) policy, became welfare-improving if the banking sector is characterized by high-profit opportunities, low leverage, and a relatively volatile deposit base (Pagratis, 2007:136-139).

Another study by Cifuentes *et al.* (2005) explored liquidity risk in a system of interconnected financial institutions when these institutions were subject to regulatory solvency constraints and marked their assets to market. They stated that liquidity reserves were designed to enhance the resilience of the financial system under a broad range of

market conditions. However, at a time of market turbulence the remedial actions prescribed by this regulation might have perverse effects on systemic stability.

Cifuentes *et al.* constructed a model that incorporated two channels of contagion, namely direct balance sheet interconnections among financial institutions, and contagion via changes in asset prices. They found that liquidity requirements could mitigate the spill-over to other market participants generated by the price impact of selling into a falling market.

Moreover, because financial institutions did not recognize the indirect benefits of adequate liquidity holdings on other network members, their liquidity choices would be suboptimal. As a result, liquidity and capital requirements needed to be imposed externally, in relation to a bank's contribution to systemic risk (Cifuentes *et al.*, 2005:1-8).

The same as the model of asset and liability, this chapter only takes into account some ideas of the three works cited above. Khemraj (2007) leaves the important message that banks need a certain level of interest on loans to secure them from lending money to the real sector. Nonetheless, the model finds the condition of unwillingness of the borrowers to pay the minimum rate on loans, which encourages banks to accumulate excess liquidity. This condition does not totally apply in the Indonesian case.

However, Pagratis (2007) addresses the importance of liquidity requirements (liquidity reserves) and the role of the central bank as the lender of last resort to manage liquidity in banks. However, he uses the banks' conditions of high-profit opportunities, low leverage, and a relatively volatile deposit base which are not fully the case in Indonesian banking.

Islamic banks in particular do not have very volatile deposits as studied in industrial analysis (Chapter 5). In addition, he demonstrates the scenarios of three time periods, while the purpose of this research is to find a model that: (a) does not have time period constraint, (b) attaches many banks, and (c) includes the banks' liquidity reserves in line with profit maximization motive.

Meanwhile, Cifuentes *et al.* (2005) stress that liquidity reserves are designed to enhance the resilience of financial system under a broad range of market conditions. Nevertheless, they found that at a time of market turbulence, liquidity reserves might have unfavourable effects on financial stability. All banks in Indonesia are obliged to maintain liquidity reserves but they (especially Islamic banks) have not yet been deeply trapped in conditions of market turbulence.

Amongst all economic literature, this research finds the liquidity reserves model of Freixas and Rochet (1999), which was a modification of Monti (1972) and Klein (1971), to be the most appropriate one. The model not only captures the ideas of the earlier literature but also matches the purposes of this chapter to model liquidity reserves.

Specifically, Freixas and Rochet's model is concerned with the internal side of banks to reserve liquidity in line with their profit maximization motive. Moreover, the model is not restricted to a certain time period, takes the industry case (involves many banks), and temporarily ignores the involvement of financial markets, which closely matches and represents the conditions of Islamic banks in Indonesia.

The model starts from liquidity reserves that are taken from total deposits such that the amount of available deposits for credit is formulated as D – R, as stated above. Then, the net amount of withdrawal under a static framework at the end of the period is the random variable $\tilde{x}$. If the realization x of $\tilde{x}$ is greater than R, the bank faces liquidity shortages and it has to pay a penalty $r_p(x-R)$ that is proportional to the shortages. Assuming deposits are costless and risk neutral, the bank's expected profit ($\pi(R)$) is (Freixas and Rochet, 1999: 228):

$$\pi(R) = r_L(D-R) + rR - r_p E\left[\max(0, \tilde{x} - R)\right] \tag{22}$$

Furthermore, assuming that if the formula of expected costs of liquidity shortages in [.] is a convex function and random variable $\tilde{x}$ has a continuous density function *f(x)*, such shortages are differentiable. Freixas and Rochet then denote C(R) as an expected cost, such that (note: C′(R) and C′′(R) are the 1st and 2nd difference of C(R)):

$$C(R) = r_p \int_R^{+\infty} (x-R) f(x) dx \tag{23}$$

$$C'(R) = -r_p \int_R^{+\infty} f(x)dx = -r_p \,\mathrm{Pr}\,oba\left[\tilde{x} \geq R\right] = 0 \tag{24}$$

$$C''(R) = r_p f(R) \geq 0 \tag{25}$$

Hence, the maximum profit for a bank is achieved when (see appendix A for proof):

$$\pi'(R) = -\left(r_L - r\right) + r_p \,\mathrm{Pr}\,oba\left[\tilde{x} \geq R\right] = 0 \tag{26}$$

and the optimum liquidity reserves (R*) is found in the following relation:

$$\mathrm{Pr}\,oba\left[\tilde{x} \geq R^*\right] = \frac{\left(r_L - r\right)}{r_p} \tag{27}$$

This implies that the optimum liquidity reserves are those for which the marginal opportunity cost of holding reserves equals the expected cost of liquidity shortages, or, simply stated, it equals the ratio of liquidity premium ($r_L - r$) to the penalty interest rate r_p (Freixas and Rochet, 1999: 228-229).

Prisman *et al.* (1986) further improve this model by introducing some randomness in the volume of funds collected or distributed by a bank. Firstly, they start from the demand function of loan as $L = L(r_L)$ and supply function of deposit as $D = D(r_D)$ such that the amount of reserve is simply $R = D(r_D) - L(r_L)$. With those assumptions, the expected profit function of the bank becomes:

$$\pi = r_L L(r_L) - r_D D(r_D) + rR - r_p E\left[\max\left(0, \tilde{x} - R\right)\right] \qquad \text{or (see appendix B for proof),} \tag{28}$$

$$\pi = \left(r_L - r\right)L\left(r_L\right) + \left(r - r_D\right)D(r_D) - r_p E\left[\max\left(0, \tilde{x} - R\right)\right] \tag{29}$$

And, the maximum expected profit with respect to the loan rate is (Freixas and Rochet, 1999: 229-230):

$$\frac{\partial \pi}{\partial r_L} = \left(r_L - r\right)L'\left(r_L\right) + L\left(r_L\right) - r_p \,\mathrm{Pr}\,oba\left[\tilde{x} \geq R\right]L'\left(r_L\right) = 0 \tag{30}$$

and with an elasticity of the demand for loans:

$$\varepsilon_L = -\frac{r_L L'\left(r_L\right)}{L\left(r_L\right)} \tag{31}$$

the optimum reserves (R*) is defined as (see appendix C for proof):

$$\Pr oba\left[\tilde{x} \geq R^{*}\right] = \frac{r_L\left(1 - \frac{1}{\varepsilon_L}\right) - r}{r_p} \tag{32}$$

Equation (32) implies that the optimum reserves are determined by the ratio of the difference between loan interest with respect to its elasticity and the penalty interest rate.

6. 2. 4. Model of the Liquidity Reserves in Islamic Banks

Similar to how the Islamic banking asset and liability models are derived, additional characteristics and regulations in the Indonesian case are inserted and applied to the conventional liquidity reserves model. These are:

i. As part of the liquidity reserves (R), the reserves requirement stipulated by Bank Indonesia (BI) is 5% of total Rupiah deposits. Further, the latest BI banking regulation (number 6/21/2004, article 3) stipulated an extra reserves requirement for Islamic banks that have FDR below 80% but still have a positive reserves requirement account. In fact, as most of them have FDR beyond 80% (even above 100%), so that the model does not take into account this extra reserves requirement.
ii. There is a charge if the reserves requirement falls below the standard. The central bank charges 125% of the daily Islamic money market's indicative return for a reserves requirement that falls below 5% but is still positive.
iii. An additional 150% of that amount is further charged for reserves requirement which lies below 5% and if the balance is negative (Bank Indonesia banking regulation number 6/21/2004 article 14). What is called penalty (r_p) in the following Islamic model captures both charges (125% and an extra 150%).
iv. Bank Indonesia does not pay any remuneration for the reserves requirement (Bank Indonesia banking regulation number 6/21/2004, article 7). Therefore, the Islamic model eliminates r of R as in the conventional model.

Considering these characteristics and regulations, the expected profit allowing for the penalty cost of a lower reserves requirement is much simpler than the conventional one; it is formulated as:

$$\pi = r_f F(r_f)(1 - r_\beta) + r_L L(r_L) - r_p E[\max(0, \tilde{x} - R)] \quad (33)$$

The maximum expected profit is then:

$$\frac{\partial \pi}{\partial r_f} = (1 - r_\beta) F(r_f) - r_p \Pr oba[\tilde{x} \geq R] F'(r_f) = 0 \quad (34)$$

and with an elasticity of the demand for financing of:

$$\varepsilon_f = -\frac{r_f F'(r_f)}{F(r_f)} \quad (35)$$

the optimum liquidity reserves (R*) is defined as (see appendix D for proof):

$$\Pr oba[\tilde{x} \geq R^*] = \frac{(1 - r_\beta)}{r_p}\left(\frac{r_f}{|\varepsilon_f|}\right) \quad (36)$$

Model (36) implies that the optimum liquidity reserves are determined by the bank's return over penalty rate ratio and the rate of return of financing over financing elasticity ratio. Thus, some variables that have to be considered for econometric modeling are the rate of return of financing, the elasticity of financing, the penalty rate of incompliance reserves requirement, the bank's return from operational financing, the realization of the return sharing paid by Islamic banks to depositors, and total Islamic bank financing.

6. 3. ECONOMETRICS ANALYSIS

Based on the theoretical construction of the asset model, liability model, and liquidity reserves model, a dynamic model (Autoregressive Distributed Lag – ARDL model) is employed. ARDL is beneficial for: (i) explaining the liquidity behavior of depositors and banks; (ii) identifying what factors and conditions determine asset-liability balance; (iii) analyzing factors determining optimum liquidity reserves; and (iv) finding what critical messages are to be taken into account to control and manage liquidity on the asset and liability sides and to optimize the liquidity reserves position.

The econometrics analysis begins with defining variable and model specification, then constructing and testing the models to fulfill the requirement of classical normal

error term and Best (minimum variance), Linier, and Unbiased Estimator (BLUE) of the Gauss-Markov theory, and then interpreting the results of the models.

6. 3. 1. Definition of Variables and Model Specification

All time series data in the models use Bank Indonesia's (BI) monthly data from December 2000 to September 2008. As the bank's policy with regard to asset liability management and liquidity reserves is for the short to medium-term (Molle, 2008:1), and because the complete data compilation in Bank Indonesia started in December 2000, the models in this chapter are considered for the short-term analysis.

6. 3. 1. 1. Liability Model

This model represents the liquidity behavior of depositors. In this model, the dependent variable is total Islamic deposits (SD), which is comprised of *Wadiah* saving deposits and *Mudarabah* time deposits. The independent variables, on the other hand, are tested and selected referring to equation (20). These are:

i. Total return-sharing paid by Islamic banks to depositors (RPA). It stands as one of the depositors' investment decisions to add/withdraw liquidity to/from Islamic banks.
ii. Total incomes from operational financing (DFR). For depositors, this is an indicator of banking performance in doing business and in optimizing portfolio financing.
iii. Total cost of banking operations (CO) that covers all types of costs related to banking activities. Depositors consider this to evaluate the cost efficiency of the industry, and an efficient CO is one of the performance indicators of robust Islamic banks.
iv. Bank Indonesia Certificate Rate (SBI). This is used as a comparison against the Islamic return on deposits. If the former is higher than the latter, rational depositors might potentially convert from Islamic to conventional banks, causing liquidity risk to Islamic banks (displaced commercial risk) and *vice versa*.
v. Apart from those, the lag of total Islamic deposits (SD) also explains the dependent variable. This lag variable represents the depositors' self-assessment of their prior investment decision with Islamic banks and influences liquidity behavior of depositors as well.

As such, a liability model is written in equation (37) and is followed by a complete list of variables and their historical statistics listed in table 6.1.

$$\Delta(SD_t) = c + \beta_1\Delta(RPA_{t-2}) + \beta_2\Delta(DFR_{t-5}) + \beta_3(CO_{t-6}) + \beta_4\Delta(SD_{t-12}) - \beta_5\Delta(SBI_{t-6}) + \varepsilon \quad (37)$$

Table 6. 1: Statistical Summary of Variables of the Asset and Liability Models

Variables	Mean	Median	Std Dev
Islamic Deposits (SD)**	9,516,425	8,284,236	7,651,059
Return-sharing paid by Islamic banks to all depositors (RPA)**	378,994	225,045	368,079
Incomes from operational financing (DFR)**	862,380	462,660	879,959
Profit from non-operational financing (NOP)**	246,767	101,618	286,458
Bank Indonesia Certificate (SBI) Rate*	11.08	9.87	3.39
Costs of Banking Operations (CO)**	582,543	385,451	565,065
Investments in operational financing (PDF)**	10,996,677	9,469,946	8,583,169

* in percentage per year, ** in million Rupiah.

The central bank's Islamic monetary policy instruments, in particular the SBIS rate, are not taken into account in the liability model. SBIS is not included because: (a) it is established at the discretion of the central bank and (b) it does not directly express the liquidity behavior of depositors.

6. 3. 1. 2. Asset Model

The asset model represents the Islamic banks' liquidity behavior in managing liquidity with entrepreneurs. The dependent variable is the total investments in operational financing (PDF), which consists of debt-based and equity-based financing. The independent variables are tested and selected referring to equation (21). These are:

i. Total return-sharing paid by Islamic banks to depositors (RPA). Islamic banks count this variable in their financing portfolio decision to sustain the existing depositors and attract new candidates. Under a dual banking system, paying a competitive and attractive Islamic return is suggested to make Islamic banks competitive (Ismal, 2010a:12-13).
ii. Total incomes from operational financing (DFR). Undoubtedly, DFR is the most important variable to measure the robustness of a bank's portfolio financing.

iii. Total profit from non operational financing (NOP). This is the additional incomes for banks in addition to incomes from operational return. To support and reach an optimum financing performance, this variable cannot be ignored by Islamic banks.
iv. Total costs of banking operations (CO). From the bank's perspective, CO determines the amount of banks' profit and how well Islamic banks manage the CO.
v. Akin to the liability model, the lags of total investments in operational financing (PDF) influence the dependent variable as well. These variables make sense since the output of the previous portfolio financing is one of the important factors in deciding the next portfolio financing.

Finally, the equation of the asset model is written as follows, while a complete list of variables and their historical statistics are included in table 6.1.

$$\Delta(PDF_t) = c + \beta_1\Delta(RPA_{t-11}) + \beta_2\Delta(DFR_{t-10}) + \beta_3(CO_{t-6}) + \beta_4\Delta(PDF_{t-1}) + \beta_5\Delta(PDF_{t-2}) + \beta_6\Delta(NOP) + \varepsilon \quad (38)$$

Because the model measures variables in their aggregate level, operational income (DFR) does not distinguish among types of financing that contribute to DFR. In the same way, return-sharing paid by Islamic banks to depositors (RPA) does not distinguish between account holders.

Furthermore, due to the characteristics of the Indonesian Islamic banking industry, Islamic banks' cash inflow from the business sector can be assumed to be continuous and pre-determined (under certainty conditions) because of the domination of debt-based financing, as was explained in the previous chapter. However, the nominal return on deposits is not fixed but instead is always positive and continuous. Meanwhile, after Islamic banks share the revenue with their depositors, their profit can be positive or negative depending on the costs of banking operations.

However, macroeconomic variables such as GDP, inflation rate, exchange rate, and base money are all assumed to be embodied in financing variables and are not being treated in a special manner. One reason for this is because the market share of the Islamic banking industry is 2.5% (less than 5%) of the total banking industry so that including those macroeconomic variables in the model is not really noteworthy.

6. 3. 1. 3. Liquidity Reserves Model

The liquidity reserves model shows an optimum position of liquidity reserves as well as the variables that construct such optimum and balanced liquidity. The dependent variable is the total liquidity reserves (R) and the independent variables are tested and selected referring to equation (36). They are:

i. Total investments in all financing (PF). This variable is part of elasticity of financing in equation (36) and influences the optimum liquidity reserves to be managed.
ii. Total profit from operational financing (OP). This variable is the main contributor of total return from financing and one indicator of how robust the bank's portfolio financing is and how attractive and competitive its revenue-sharing to depositors will be. The liquidity behaviors of depositors and Islamic banks (to inject or take money) subscribe to the performance of this variable as well.
iii. Percentage of revenue-sharing over deposits (RSD). This is represented (r_β) in equation (36) and acts as one deterministic variable of the depositors' decision to invest money in Islamic banks.
iv. The lag of total liquidity reserves. This lag variable is one of the considerations for banks in deciding the current and future liquidity reserves position. It includes the penalty rate (r_p) if the reserves requirement falls below the level required by the central bank and the opportunity cost of holding liquidity reserves.

The liquidity reserves model is as follows; it is followed by a complete list of variables and their historical statistics shown in table 6.2.

$$\Delta R_t = c - \beta_1\Delta(OP_{t-3}) + \beta_2\Delta(PF_{t-2}) - \beta_3(RSD) + \beta_4\Delta(R_{t-12}) + \varepsilon \quad (39)$$

Table 6. 2: Statistical Summary of Variables of the Liquidity Reserves Model

Variables	Mean	Median	Std Deviation
Profit from operational financing (OP)**	825,576	496,401	774,681
Investments in all financing (PF)**	13,673,828	11,350,808	10,595,069
Revenue-sharing over deposits (RSD)*	4.03	3.56	2.21
Liquidity Reserves (R)**	653,115	573,813	475,261

* in percentage per year, ** in million Rupiah.

The historical data shows that total investments in all financing (PF) face an increasing trend and because of the domination of debt-based financing, the profit from

operational financing (OP) is growing and is a higher percentage of revenue-sharing over deposit (RSD) offered to depositors. Nevertheless, in the current business and economic climate, it is very challenging for Islamic banks in general to arrange a robust level of liquidity reserves in line with their financing activities and to provide well-demanded liquidity to depositors.

6. 3. 2. Construction of the Asset, Liability and Liquidity Reserves Models

A. Stationary Test

Because ARDL is modeled with OLS, a unit root test is conducted to check the stationary of every variable. The basic idea of stationary can be explained by taking a simple AR (Autoregressive) (1) process, which is:

$$Y_t = a_0 + a_1 Y_{t-1} + \varepsilon_t \tag{40}$$

where Y_{t-1} is a lag independent variable which might contain a constant and trend, a is a constant, and ε is assumed to be a white noise (Enders, 1995: 70). If $|a_1| \geq 1$, Y_t is a non stationary series, meaning it has a trend, it does not have constant mean, and the variance is time variant. Hence, the hypothesis of stationary can be evaluated by testing whether the absolute value of a_1 is strictly less than one.

Two common tests used in this stage are Augmented Dickey-Fuller (ADF) and Phillip and Perron (PP). ADF re-estimates (40) by subtracting Y_{t-1} (Lutkepohl and Kratzig, 2004:54) such that:

$$\Delta Y_t = \alpha Y_{t-1} + \sum_{j=1}^{p-1} a_j \Delta Y_{t-j} + \varepsilon_t \tag{41}$$

where α = -a, and the null and alternative hypothesis are H_0: α = 0 and H_1: α < 0; with $t_\alpha <$ α/(se(α)). The basic idea of ADF is to correct high order serial correlation by adding lagged difference terms in the right hand side of the equation. Meanwhile, Phillips and Perron (PP) use nonparametric statistical methods to solve the serial correlation in the error terms without adding lagged difference terms (Gujarati, 2004: 818).

Table 6.3 below delivers the results of ADF and PP tests on variables of liability, asset, and liquidity reserves models. The stationary test reveals that SD, PDF, and R (dependent variables) are not stationary in level but integrated in order 1 (1st difference).

Meanwhile, RPA, DFR, NOP, OP, PF and SBI (independent variables) are also stationary (1% statistical significance) in order 1 (1st difference) except CO and RSD which have been stationary in level or I(0). Thus, the three models afterwards integrate all variables in order 1 (1st difference), except CO and RSD, to find the robust asset, liability, and liquidity reserves models.

Table 6. 3: Stationary Test of Asset, Liability and Liquidity Reserves Variables

Variable Name	Augmented Dickey-Fuller		Phillip and Perron	
	Level	1st Difference	Level	1st Difference
SD	-4.333	-8.848***	5.216	-8.947***
RPA	-3.135**	-11.514***	-3.152**	-12.511***
DFR	-2.918**	-10.389***	-2.847*	-13.824***
CO	-4.490***		-4.323***	
SBI	-1.5133	-4.0432***	-1.1988	-3.9050***
NOP	2.6570*	-10.0658***	-2.5584	-13.8509***
PDF	2.565	-2.322	4.402	-5.332***
OP	-2.461	-10.542***	-2.388	-11.992***
PF	6.064	-6.682***	6.355	-6.734***
RSD	-4.0511***		-4.0511***	
R	5.85	0.059	5.87	-11.276***

Note: *,**,*** refers to stastical significance of 10%, 5% and 1%

B. Correlation and Causality Tests

To asses the strength of the linear relation between dependent and independent variables and their causality direction, the correlation coefficient and granger causality tests are used. The correlation coefficient formula is:

$$r_{1,2} = \frac{\sum[(X_{1i} - \overline{X}_1)(X_{2i} - \overline{X_2})]}{\sqrt{\sum(X_{1i} - \overline{X_1})^2 \sum(X_{2i} - \overline{X_2})^2}} \tag{42}$$

with r value ranges between $-1 \leq r \leq 1$. If two variables have a perfect positive linear correlation, r = 1. If they have a perfect negative linear correlation, r = -1 and, if there is no linear correlation, r = 0.

Basically, correlation coefficient detects the correlation of two variables without explaining causality or direction of the correlation (if it exists). The correlation coefficient test for variables of liability and asset models is given by table 6.4.

Table 6. 4: Coefficient of Correlation of Variables of the Asset and Liability Models

Variable Name	Value of Coefficient of Correlation				
	RPA	DFR	CO	SBI	NOP
SD	0.6960	0.7486	0.6547	-0.5904	
PDF	0.7284	0.7763	0.6788		0.7996

Coefficient of correlation shows that SD has more than a 50% indication of a perfect positive linear correlation with RPA, DFR and CO, and a negative linear correlation with SBI. SD and RPA depicts the correlation coefficient of 0.69, SD and DFR notes 0.74, SD and CO records 0.65, whilst SD and SBI shows -0.59.

Like SD, PDF has the same indication even with a higher magnitude than SD. PDF and RPA have a correlation coefficient of 0.74, PDF and DFR notes 0.74, PDF and CO records 0.67, and PDF and NOP are the strongest amongst others with 0.79. These results indicate that all of these variables have a stronger correlation than the other variables considered in equations (20) and (21). As such, the values of SD and PDF associate with the values of RPA, DFR, CO and SBI (for SD) and RPA, DFR, CO, and NOP (for PDF).

The results of the coefficient of correlation test are further examined by the granger causality test. The granger causality detects how the dependent variable (Y_t) can be explained by its past value (Y_{t-n}) and lag value of independent variables (X_{t-n}). Mathematically, the granger causality function is (Gujarati, 2004: 697):

$$Y_t = \sum_{i=1}^{n} \alpha_i X_{t-i} + \sum_{j=1}^{n} \beta_j Y_{t-j} + u_{1t} \quad \text{and} \quad X_t = \sum_{i=1}^{n} \lambda_i X_{t-i} + \sum_{j=1}^{n} \delta_j Y_{t-j} + u_{2t} \tag{43}$$

Table 6. 5: Granger Causality Test of Variables of the Asset and Liability Models

Null Hypothesis	F-Stat	P-value	Conclusion
RPA does not Granger Cause D(SD)	9.4232	0.0028	Not Accepted
DFR does not Granger Cause D(SD)	10.0581	0.0021	Not Accepted
CO does not Granger Cause D(SD)	23.0428	0.0000	Not Accepted
SBI does not Granger Cause D(SD)	13.7086	0.0003	Not Accepted
RPA does not Granger Cause PDF	8.8568	0.0037	Not Accepted
NOP does not Granger Cause PDF	11.0188	0.0013	Not Accepted
DFR does not Granger Cause PDF	7.7144	0.0067	Not Accepted
CO does not Granger Cause PDF	4.4769	0.0372	Not Accepted

Y_t is said to be granger caused by X_t if the latter explains the former as well as the lag of the former and *vice versa*. Granger causality in table 6.5 suggests that RPA, DFR, CO, SBI explain SD whilst RPA, DFR, CO and NOP (from the perspective of banks) cooperatively explain PDF. These outcomes underlie the decision to choose SD and PDF as dependent variables and are explained by RPA, DFR, CO, SBI (for SD) and RPA, DFR, CO, NOP (for PDF).

Further, the assessment for liquidity reserves variables is shown in tables 6.6 and 6.7 below. The coefficient of correlation shows that R has more than a 50% indication of a perfect positive linear correlation with both OP and PF and a modest correlation with RSD. R and OP denote coefficient of correlation of 0.74, R and RSD records 0.18, while R and PF are the strongest among others with 0.99. These are evidence that these four variables have strong correlation compared to other variables considered in equation (36) and hence the value of R associates with the values of OP, RSD and PF.

Table 6. 6: Coefficient of Correlation of Variables of the Liquidity Reserves Model

Variable Name	Coefficient of Correlation		
	OP	PF	RSD
R	0.738	0.9981	0.1829

The granger causality test strengthens such findings. As shown in table 6.7, the granger causality indicates that R is explained by its independent variables (OP, PF and RSD) with the strongest influence from PF followed by OP and RSD, respectively.

Table 6. 7: Granger Causality Test of Variables of the Liquidity Reserves Model

Null Hypothesis	F-Stat	P-value	Conclusion
OP does not Granger Cause D(R)	23.0317	6.7E-6	Not Accepted
PF does not Granger Cause D(R)	35.6202	5.4E-8	Not Accepted
RSD does not Granger Cause D(R)	9.1028	0.0033	Not Accepted

These findings mean that the decision to locate R as a dependent variable is explained by OP, PF, RSD and the lags of R as independent variables is very reasonable and statistically significant. The subsequent section explain the results of the ARDL regression between SD, PDF, R and their independent variables including the significant lag period of every independent variable.

C. Estimations of Liability, Asset and Liquidity Reserves Models

The estimated models of liability, asset, and liquidity reserves fit the requirement of classical normal error terms such as the autocorrelation test, the heteroskedasticity test, and the multicolinearity test (including Ramsey Reset test for correctly specified equation). The coefficient of individual and overall variables has also been robust with Gauss-Markov requirement of BLUE.

First of all, the liability model reveals that marginal Islamic deposits (ΔSD_t) are jointly explained by (see table 6.8):

i. Marginal return-sharing paid by Islamic banks to depositors in the lag 2 periods (ΔRPA_{t-2});
ii. Marginal incomes from operational financing in the lag 5 periods (ΔDFR_{t-5});
iii. Marginal SBI rate in the lag 6 periods (ΔSBI_{t-6});
iv. Cost of banking operations in the lag 6 periods (CO_{t-6}) and;
v. Marginal Islamic deposits in the lag 12 periods (ΔSD_{t-12}).

Table 6. 8: Estimated Liability Model

Dependent Variable: D(SD)		
Independent Variable	Coefficient	t-statistic
Constant	-2315.9	-0.0352
D(RPA(-2))	0.3128	2.4681
D(DFR(-5))	0.1949	3.3934
D(SBI(-6))	-0.2653	-3.2773
CO(-6)	0.2864	3.8209
D(SD(-12))	0.5076	3.1504
Diagnostic Analysis	Value	P-value
R-squared	0.3921	
Residual Sum of Square	8.30E+12	
Akaike Info Criterion	28.3967	
F-Statistics	9.1614	0.0000
Jarque Bera	2.3720	0.3054
LM test	0.4089	0.6659
ARCH LM test	1.6952	0.1969
Ramsey RESET	0.6673	0.4167

Since 19.53% of total deposits are 1-month time deposits (see Cchapter 5), depositors tend to consider the previous 2 periods of return-sharing paid by Islamic banks

when deciding their next deposit placements. They also evaluate semiannually the performance of Islamic banks in managing the funds, as reflected in the incomes from operational financing and the cost of banking operations.

Next, the SBI rate in the previous semester is part of depositors' consideration because the signal of monetary policy tends to change semiannually; it is a benchmark rate in the banking industry. Finally, how much the depositors benefited from placing funds in Islamic deposits for a year also guide their further placement of funds in Islamic banks. Secondly, the asset model shows that all of the following factors cooperatively explain the marginal investment in operational financing (ΔPDF_t) (see table 6.9):

i. Marginal return-sharing paid by Islamic banks to depositors in the lag 11 periods (ΔRPA_{t-11});
ii. Marginal incomes from operational financing in the lag 10 periods (ΔDFR_{t-10});
iii. Cost of banking operations in the lag of 6 periods (CO_{t-6});
iv. Marginal profit from non operational financing (ΔNOP) and;
v. Marginal investment in operational financing in the lag 1 and 2 periods (ΔPDF_{t-1} and ΔPDF_{t-2}).

Table 6. 9: Estimated Asset Model

Dependent Variable: D(PDF)		
Independent Variable	Coefficient	t-statistic
Constant	40100.35	1.3398
D(RPA(-11))	0.3791	3.8413
D(DFR(-10))	0.1126	2.1434
CO(-6)	0.1648	3.2298
D(NOP)	0.1096	5.1099
D(PDF(-1))	0.3166	3.6793
D(PDF(-2))	0.3138	4.0625
Diagnostic Analysis	Value	P-value
R-squared	0.6764	
Residual Sum of Square	3.56E+12	
Akaike Info Criterion	27.5608	
F-Statistics	24.7405	0.0000
Jarque Bera	2.0763	0.3541
LM test	1.5314	0.2234
ARCH LM test	0.0017	0.9669
Ramsey RESET	0.2057	0.6515

For Islamic banks, the previous 11 periods of return-sharing paid by Islamic banks to depositors deliver two pieces of information: (i) the robustness of their previous portfolio financing policies, and (ii) the benchmark for paying at least the same return to depositors in the next payment period.

These two messages underpin how much the bank's next marginal financing will be. The previous 10 periods of incomes from operational financing also play a role in the banks' financing decision because both *Murabahah* and *Mudarabah* financing are arranged in short-term tenors.

Specifically, Chapter 5 explained that 75.44% of financing go to small and medium enterprises (SME), i.e. short-term retail financing. Moreover, most of it goes to the liquid and short-term financing of economic sectors such as commercial services, miscellaneous, and trade (see Chapter 5).

Next, the previous semester of the costs of banking operations acts as a basis for Islamic banks to evaluate cost efficiency to gain a better (higher) profit. Then Islamic banks take into account the profit from non-operational financing. It is considered in the current basis because the return from *Ijarah* directly belongs to Islamic banks and is not shared with depositors. Together with operational financing, this return determines the respective bank's profit. Finally, how much investments in operational financing in the last 1 and 2 periods guide the next financing policy of banks.

Table 6. 10: Estimated Liquidity Reserves Model

Dependent Variable: D(R)		
Independent Variable	Coefficient	t-statistic
Constant	13182.39	2.5588
D(OP(-3))	-0.00146	-3.0008
D(PF(-2))	0.0100	2.0032
RSD(-9)	-0.2212	-2.2014
D(R(-12))	0.8568	8.0721
Diagnostic Analysis	Value	P-value
R-squared	0.5242	
Residual Sum of Square	2.95E+10	
Akaike Info Criterion	22.7330	
F-Statistics	21.9357	0.0000
Jarque Bera	0.7315	0.6936

LM test	2.6846	0.1057
ARCH LM test	2.2985	0.1182
Ramsey RESET	1.4110	0.2388

Finally, the liquidity reserves model expresses that all of the following mutually determine the marginal liquidity reserves (ΔR_t): (i) marginal profit from operational financing in the lag 3 periods (ΔOP_{t-3}), (ii) marginal investments in all financing in the lag 2 periods (ΔPF_{t-2}), (iii) percentage revenue sharing over deposits (RSD_{t-9}) in the lag 9 periods, and (iv) marginal liquidity reserves in the last 12 periods (see table 6.10).

Further, the model finds a positive direction between the current marginal liquidity reserves with the last 2 periods of marginal investment in all financing and the previous year's marginal liquidity reserves. Meanwhile, there is a negative direction between the current marginal liquidity reserves with the last 3 periods of marginal profit from operational financing and the last 9 periods of percentage revenue-sharing over deposit.

Those imply that the optimum liquidity reserves go in the same direction as both the total investments in all financing and the annual record of liquidity reserves. When Islamic banks released a higher investment in the previous two periods, they have to prepare extra liquidity reserves to anticipate liquidity withdrawals from depositors.

The same is true for the previous year's position of liquidity reserves: if it was high, meaning there is a potential of liquidity withdrawals from depositors, they have to currently locate extra liquidity. One main reason for this is the yearly demand for liquidity from business activities as indicated by annual patterns of currency in circulation (Ismal, 2009b:11).

However, Islamic banks have to hold extra liquidity reserves in the opposite direction with profit from operational financing. This is because, if Islamic banks face any business loss leading to lower profit from operational financing and percentage revenue-sharing over deposits, they have to prepare some additional liquidity reserves to anticipate liquidity withdrawals from return oriented (rational) depositors. Such

depositors have two accounts (Islamic bank and conventional bank accounts) and will switch their deposits to the one that pays higher return (explained in chapters 3 and 5).

6. 4. INTERPRETATIONS OF THE MODELS

6. 4. 1. Liability Model

The liability side as a source of funds for Islamic banks has specific liquidity behavior that demonstrates the behavior of depositors towards investing funds in Islamic banks. Firstly, the most important factor for depositors is the SBI rate. It is the benchmark return for depositors in comparison with the one offered by Islamic banks (Ismal, 2008b:4). Hence, in order to be competitive and to convince depositors to put in more funds, revenue-sharing should be set competitively and match the expected return of depositors (SBI rate).

Secondly, after SBI rate, the amount of benefit gained by depositors from depositing money in Islamic deposits influences their decision process. It connotes not only monetary benefits (revenue, bonus, etc.) but also non-monetary benefits such as banking services, facilities, networks, customer satisfaction, etc. The satisfaction of depositors plays a key role in directing their further placement of funds.

Thirdly, the amount of return-sharing paid by Islamic banks to depositors in a short-term period is also a factor determining the liquidity behavior of depositors. The higher the Islamic bank's profit, the better the depositors' perception of a particular institution; this will lead to more funds from depositors being injected (Chapra, 1985:110). Because the interest of depositors still focuses on 1-month *Mudarabah* time deposits, as discussed in Chapter 5, with the expectation of a short-term return, revenue-sharing paid by banks in the last 1-2 month(s) period is very crucial.

This behavior is caused by: (a) the transaction motive (non-investment motive) of depositing money in Islamic banks, (b) fragile economic conditions that may potentially require depositors to withdraw some cash, and (c) some big corporations still relying on conventional banks for long-term placement of deposits.

Fourthly, the costs of banking operations are essential for depositors. Through the multiplier effect, it effects the decision of depositors. A high FDR tends to lead to more cost of banking operations. Depositors perceive it as more return-sharing to be potentially paid out so that they add more deposits.

The last influential factor is incomes from operational financing of Islamic banks. Compared with the former variables, depositors consider this variable less important. Nonetheless, if they hear/know from the media or other sources that their Islamic banks earn high incomes from operational financing, they will be happy to place more funds and *vice versa.*

6. 4. 2. Asset Model

Following the liquidity behavior of depositors, the liquidity behavior of Islamic banks is discussed in the following. First of all, one of the purposes of Islamic banks in managing liquidity is to optimize profit from non-operational financing. This is because this variable is not only the source of incomes which is not shared with depositors but also an adjustable rate that can be implemented to *Ijarah* contracts responding to volatile economic conditions. If it tends to be more prospective, higher marginal financing will be advanced by the banks.

The second factor is return sharing paid by Islamic banks to depositors. The importance of this factor is related to the attractiveness, competitiveness and ability of Islamic banks to match the expectations of depositors.

The third variable is the general results of the previous decisions of the banks' investments in operational financing. This factor evaluates the success or failure of the last financing policy and what needs to be improved in the next financing decision. Hence, it captures setting up robust portfolio financing adjustable to current economics/business conditions.

The fourth important factor is valuing the performance of business partners and the prospects of projects being financed. Selecting business partners, analyzing business proposals, and building good cooperation with business partners will result in sustainable

and higher profit. The previous record and prospects of future business underlie the next financing decisions of Islamic banks.

This factor actually links with cost of banking operations, the fifth variable. If financing is expansive, the costs of might also increase accordingly. However, if such an expansion produces return as expected, Islamic banks might no doubt release more financing because banks might create more revenue by increasing cost (Hassan, 2003:4). Indeed, achieving more revenue with additional cost of operations is a consequence of Islamic banks to be competitive and attractive and to fulfill the expectations of depositors.

6. 4. 3. Liquidity Reserves Model

The liquidity reserves model delivers some important messages with respect to the factors that determine an optimum position of liquidity reserves. First of all, liquidity reserves mainly depend on return-sharing paid by Islamic banks to depositors. Because of the depositors' expectation of receiving a continuous and competitive Islamic return on deposits (discussed in Chapter 5), once a lower rate of return-sharing is paid than before, Islamic banks might need to prepare extra liquidity reserves to anticipate the displaced commercial risk. Secondly, the previous position of liquidity reserves contains the regular pattern of the demand for liquidity by the business sector.

The third message relates to the prior investment in operational financing. If it goes up, liquidity reserves are also up, anticipating either regular or irregular liquidity withdrawals. One critical reason is that the expansion of operational financing is caused by an increasing trend of deposits, which requires Islamic banks to reserve higher positions of liquidity than before (Ismal, 2010a:2).

The fourth message concerns the profit from operational financing. The dependency of the current liquidity reserves position on this factor mimics the dependency of liquidity reserves on return-sharing paid by Islamic banks to depositors. Once profit from operational financing falls, it suggests that Islamic banks should prepare extra liquidity reserves since the payment of return-sharing to depositors might fall, and disappointed depositors might switch their deposits to conventional banks.

6. 5. OUTPUTS OF THE MODELS IN RELATION TO LIQUIDITY RISK

The three models discussed above convey important findings related to liquidity behavior as well as the potential of liquidity risk to be anticipated in managing liquidity risk. These are:

i. The liquidity behavior of depositors is mostly influenced by current economic/business conditions. Unpleasant economic conditions with a trend of rising interest rate (SBI rate) tend to persuade them to switch deposits from Islamic into conventional banks. Having economic stability is extremely critical to mitigating this intention.
ii. The depositors' decision to inject or withdraw money depends on the performance of Islamic banks conducting a robust portfolio financing. They hope to get a positive, sustainable, and competitive return. Meanwhile, the financing contracts cannot guarantee such expectations due to the nature of *Sharia* contracts. Although, fortunately, equity- and debt-financing are found so far to be very resilient during unpleasant economic conditions with a low probability of loss (Ismal, 2009a:5-8).
iii. Depositors and Islamic banks apply different performance evaluation periods. Depositors evaluate Islamic banks based on the payment of short-term (lag 2 periods) revenue-sharing on deposits. In contrast, Islamic banks release financing in consideration of (longer) historical revenue-sharing payments (lag 11 periods) to depositors. If the expected return of depositors is suddenly high, it might not be accommodated subsequently by the banks. Payment of a well-calculated and well-determined revenue-sharing ratio should be implemented in this case to avoid withdrawal risk and bankruptcy (Ismal, 2008b:10-12).
iv. Under the same circumstances, depositors look at the performance of banks' business partners (through incomes from operational financing) in the last 5 periods, but Islamic banks value their business partners' performance in a longer time frame (lag 10 periods) when setting up their financing policy. This might invite a different business return perspective, which could lead to liquidity mismatch between the asset and liability sides. With any degree of maturity mismatch, banks will be vulnerable to changes in liquidity preferences (Rajan and Bird, 2001: 9).

v. It is imperative for Islamic banks to set an optimum level of liquidity reserves. Hence, they have to improve consistently the performance of the asset side (portfolio financing management) and fully understand the liquidity behavior of depositors.

6. 6. RESILIENCE OF THE INDUSTRY AGAINST LIQUIDITY PRESSURE

The resilience of the Islamic banking industry is observed from three analyses: (i) the position of the available short-term supply of liquidity to meet the short-term demand for it, (ii) the ability of the suppliers of liquidity to meet sudden demand for liquidity, and (iii) the critical level of liquidity withdrawals from depositors that could cause the industry to fail to meet its obligations. The first analysis has been carried out towards the end of Chapter 5; this section continues with the second and third analyses.

After identifying sources of short-term demand and supply of liquidity and analyzing the historical performance of the industry in managing demand and supply of liquidity in Chapter 5, this part directly predicts the short-term future performance of liquidity management and investigates the resiliency of the industry against liquidity pressure.

For this purpose, the Autoregressive Integrated Moving Average (ARIMA) is used to: (i) model the historical Islamic banking data from December 2000 to August 2009, (ii) generate the estimated numbers from September 2009 to December 2011, and (iii) assess the future performance and the resiliency of the industry under certain scenarios of irregular liquidity withdrawals and liquidity runs.

6. 6. 1. Autoregressive Integrated Moving Average (ARIMA) Process

The ARIMA process described in this section involves nine variables and are sorted into two groups of variables: (i) liquidity demanders, namely *Wadiah* demand deposits (WD), *Mudarabah* saving deposits (MS) and 1-month *Mudarabah* time deposits (MT1), and (ii) liquidity suppliers, namely cash reserves (CR), placement of funds in BI (PB), inter-bank placements (IP), Bank Indonesia Sharia Certificates (SB), equity participation (EP), and borrowing funds from the Islamic money market (PS).

Lastly, the group of liquidity suppliers will be regrouped as the 1st tier and the 2nd tier liquid instruments to serve the demand for liquidity from *Wadiah* demand deposits and *Mudarabah* saving deposits (the 1st tier) and *Mudarabah* time deposits (the 2nd tier).

A. Identification of Variables

First of all, statistical summaries of variables of liquidity demanders and suppliers are given by tables 6.11 and 6.12, respectively. The two tables indicate the increasing trend of all variables which means that all of them are non-stationary in level. Thus, every variable of liquidity demanders (WD, MS, and MT1) and suppliers (CR, PB, IP, EP, PS, and SB) needs to be tested for stationary.

Table 6. 11: Statistical Summary of Variables of Liquidity Demanders (million Rp)

Variable	Mean	Median	Std Deviation
Wadiah Demand Deposits (WD)	1,692,825	1,403,000	141,947
Mudarabah Saving Deposits (MS)	4,705,904	3,545,000	4,154,258
Mudarabah Time Deposits (MT1)	8,783,393	7,259,519	7,822,117

Table 6. 12: Statistical Summary of Variables of Liquidity Suppliers (million Rp)

Variable	Mean	Median	Std Deviation
Cash Reserve (CR)	256,042	183,344	222,778
Placement of Funds in BI (PB)	2,190,674	1,454,641	1,835,653
Inter Bank Placement (IP)	795,092	734,125	678,324
Equity Participation (EP)	16,920	5,660	24,353
Islamic Money Market (PS)	578,256	84,000	847,278
BI *Sharia* Certificate (SB)	1,207,924	882,000	993,585

Tables 6.13 and 6.14 below provide the results for the ADF and PP tests (105 frequencies of data) which include an intercept and use 12 lags based on Schwarz info criterion. Both tables reveal that all variables of liquidity suppliers and demanders are stationary (1% statistical significance) in the 1st difference (integrated in order 1).

Therefore, the estimated ARIMA models will integrate all variables with order *p* for AR and order *q* for MA or *(p,d,q)*. The next identification process is checking the pattern of AR and MA through a correlogram test for behavior patterns of ACF and PACF. There are at least three patterns commonly found in the ARIMA model, which are:

i. A correlogram test that produces zero value in all periods of auto correlation function (ACF = 0) namely the white noise ACF function;
ii. A correlogram test that shows a cut off ACF pattern (usually) between the first period of auto correlation function and the second or third one and;
iii. A correlogram test which shows a decreasing pattern of ACF from the beginning of the period until the end of the period, namely a dying down pattern.

Table 6. 13: Stationary Test of Variables of Liquidity Demanders

Variable	Augmented Dickey-Fuller		Phillip and Perron	
	Level	1st Difference	Level	1st Difference
WD	0.0282	-15.2957***	0.3817	-22.1848***
MS	5.6345	-3.5843***	5.1519	-10.9070
MT1	3.4664	-14.5310***	4.1683	-14.8723***

Note: ***,**,* refer to statistical significance of 1%, 5% and 10%

Table 6. 14: Stationary Test of Variables of Liquidity Suppliers

Variable	Augmented Dickey-Fuller		Phillip and Perron	
	Level	1st Difference	Level	1st Difference
CR	2.8039*	-16.9189***	0.7722	-21.6681***
PB	-1.0213	-7.2559***	-0.2546	-6.8677***
IP	0.5743	-12.8870***	1.8091	-14.6011***
EP	-0.4352	-9.4668***	0.5506	-11.4327***
PS	-1.5714	-12.2915***	-2.7211*	-12.0391***
SB	-2.4629	-9.2767***	-2.6883*	-9.6712***

Note: ***,**,* refer to statistical significance of 1%, 5% and 10%

In modeling ARIMA, when ACF shows a dying down pattern and PACF indicates a cut off pattern, the pure auto regressive (AR) model should be employed with the formula of:

$$Z_t = \delta + \theta_1 Z_{t-1} + \theta_2 Z_{t-2} + ... + \varepsilon_t \quad (44)$$

where Z_t and Z_{t-q} are the current and prior values of the stationary series, δ and θ are the values of parameters (constant and coefficient values), and ε_t is the residual with expected value of zero.

However, when ACF shows a cut off pattern while PACF is dying down, the pure moving average (MA) model should be employed with the formula of:

$$Z_t = \mu + \varepsilon_t - \Phi_1 \varepsilon_{t-1} - \Phi_2 \varepsilon_{t-2} - .... - \Phi_q \varepsilon_{t-q} \quad (45)$$

where Z_t is the current value of stationary series, ε_t and ε_{t-q} are a white noise residual and historical residual, μ and Φ_1 are values of a constant and coefficient of variables.

Finally, when both ACF and PACF depict a dying down pattern, a combination of AR and MA is used with the formula written in equation (2) in Chapter 4. In fact, the computation of ACF and PACF finds dying down patterns of all variables involved (see table 6.15), then the combination of AR and MA is confirmed.

B. Estimation of the Models

The estimation of the nine models (all variables of liquidity demanders and liquidity suppliers) has fitted the ARIMA regression requirements. In addition, every estimated model below is presented with the values of coefficients, t-statistics (in brackets), r-squared and LM test.

Table 6. 15: Correlogram of ACF and PACF

Period	EP		CR		PB		IP		SB		PS		WD		MS		MT1	
	ACF	PACF	ACF	PACF	ACF	PACF	ACF	PACF	ACF	PACF	ACF	PACF	ACF	PACF	ACF	PACF	ACF	PACF
1	-0.015	-0.015	-0.474	-0.474	0.311	0.311	-0.244	-0.244	0.072	0.072	-0.135	-0.135	-0.397	-0.397	-0.053	-0.053	-0.353	-0.353
2	-0.281	-0.281	-0.231	-0.587	-0.04	-0.152	0.027	-0.034	0.006	0.001	-0.43	-0.456	0.031	-0.15	0.027	0.024	0.005	-0.136
3	-0.01	-0.021	0.57	0.232	-0.161	-0.112	-0.168	-0.18	-0.047	-0.048	0.289	0.184	-0.061	-0.129	0.398	0.402	0.14	0.109
4	-0.005	-0.092	-0.375	-0.019	-0.112	-0.03	-0.119	-0.224	-0.149	-0.143	0.228	0.14	-0.018	-0.113	0.065	0.131	-0.161	-0.08
5	-0.255	-0.292	-0.13	-0.161	-0.325	-0.345	0.052	-0.056	-0.19	-0.174	-0.155	0.116	-0.051	-0.142	0.084	0.087	0.199	0.146
6	-0.004	-0.064	0.408	-0.014	-0.3	-0.159	0.102	0.066	-0.206	-0.198	-0.191	-0.158	0.032	-0.079	0.273	0.149	0.116	0.253
7	0.258	0.108	-0.296	-0.026	-0.094	-0.037	-0.08	-0.109	-0.225	-0.251	-0.024	-0.253	0.028	-0.015	0.006	-0.035	0.037	0.264
8	-0.009	-0.046	-0.026	0.02	-0.012	-0.161	0.177	0.131	-0.038	-0.103	0.155	-0.032	-0.102	-0.141	0.211	0.162	-0.075	0
9	-0.008	0.078	0.324	0.138	-0.055	-0.17	-0.14	-0.026	-0.098	-0.236	-0.171	-0.189	-0.001	-0.15	0.178	0.065	0.168	0.174
10	-0.011	-0.074	-0.376	-0.158	-0.014	-0.147	0.139	0.126	0.01	-0.188	-0.172	-0.04	0.085	-0.009	-0.015	-0.035	-0.145	-0.076
11	-0.006	0.019	0.164	0.091	0.192	0.023	-0.118	-0.032	0.207	-0.015	0.124	-0.033	0.081	0.121	0.235	0.098	0.187	0.098
12	-0.007	0.086	0.209	0.152	0.402	0.266	0.053	0.055	0.279	0.099	0.1	0.085	0.015	0.134	0.12	0.009	-0.006	-0.067
13	-0.007	-0.005	-0.27	0.258	0.207	-0.011	-0.051	-0.014	0.233	0.115	-0.101	0.026	-0.157	-0.109	0.134	0.168	-0.014	0.012
14	-0.01	-0.009	0.098	0.038	0.074	0.072	0.031	0.006	0.023	-0.057	-0.078	-0.071	-0.031	-0.166	0.125	-0.023	0.093	-0.02
15	-0.007	-0.014	0.177	0.104	-0.036	0.012	0.103	0.146	-0.039	-0.048	0.07	-0.106	0.093	0.035	0.134	0.062	-0.127	-0.099
16	-0.004	-0.037	-0.238	0.123	-0.091	0.015	-0.043	-0.031	0.036	0.11	0.093	-0.079	0.041	0.125	0.038	-0.091	0.138	-0.007
17	0.223	0.308	0.062	0.071	-0.434	-0.273	-0.083	-0.059	-0.145	0.007	-0.081	-0.047	-0.028	0.024	0.144	-0.004	-0.063	-0.061
18	-0.007	-0.009	0.13	0.006	-0.241	0.101	0.112	0.089	-0.26	-0.127	-0.115	-0.101	0.07	0.077	0.092	0.024	-0.007	-0.115
19	-0.007	0.139	-0.158	0.069	0.002	0.052	-0.233	-0.162	-0.227	-0.173	0.079	-0.031	-0.049	0.087	-0.03	-0.156	-0.015	-0.114
20	-0.006	0.047	0.038	-0.043	0.097	-0.003	0.108	-0.082	-0.043	0.008	0.002	-0.125	-0.025	0.059	0.036	-0.111	0.104	0.077
21	-0.007	0.052	0.023	-0.145	-0.03	-0.054	-0.051	-0.05	-0.075	-0.095	-0.08	-0.031	0.001	-0.036	0.155	0.027	-0.061	0.033
22	-0.239	-0.127	0.07	0.204	0.123	0.082	0.075	0.014	0.092	0.018	-0.061	-0.139	0.008	-0.082	0.007	0.023	0.027	0.052
23	-0.002	0.021	-0.133	-0.1	0.11	-0.165	0.074	0.02	0.088	-0.1	0.076	-0.007	0.005	0.04	-0.03	-0.068	-0.067	-0.088
24	0.242	0.066	0.141	0.08	0.142	0.082	-0.103	-0.088	0.245	0.005	0.124	0.087	-0.133	-0.053	0.076	-0.085	-0.041	0.013
25	-0.008	0.012	-0.024	-0.103	0.026	-0.075	0.075	0.114	0.112	-0.079	-0.137	-0.088	0.173	0.115	-0.02	-0.068	0.168	0.107
26	-0.008	0.022	-0.085	0.006	0.097	0.056	0.038	0.1	0.081	-0.015	-0.032	-0.013	0.014	0.109	-0.001	-0.068	-0.087	0.082
27	-0.008	-0.072	0.099	-0.075	0.059	0.035	-0.107	-0.017	-0.117	-0.242	0.342	0.186	-0.069	-0.082	0.052	0.039	0.105	0.121
28	-0.003	-0.009	-0.033	-0.042	-0.025	0.051	0.085	0.039	0.031	-0.084	-0.087	-0.065	0.086	0.046	-0.013	0.003	-0.136	-0.029
29	-0.004	0.142	-0.06	-0.065	-0.155	0.134	-0.175	-0.077	-0.014	0.023	-0.16	0.013	-0.078	0.003	-0.007	-0.028	-0.093	-0.165
30	0.018	0.002	0.114	0.024	-0.131	0.037	0.085	-0.022	-0.046	0.133	0.113	-0.124	0.047	0.059	0.102	0.094	0.137	-0.006
31	-0.025	-0.034	-0.035	-0.014	-0.062	-0.004	0.071	0.09	-0.139	0.024	0.084	-0.024	-0.027	0.068	0.001	0.112	-0.039	-0.053
32	0.018	-0.014	-0.12	0.02	-0.102	-0.128	-0.012	-0.003	-0.134	-0.126	-0.065	-0.001	0.051	0.089	-0.068	-0.029	-0.004	-0.097
33	-0.004	-0.055	0.188	-0.068	-0.064	0.029	-0.053	-0.147	-0.07	-0.102	-0.011	0.19	-0.124	-0.076	0.059	0.006	0.008	-0.089
34	-0.004	0.032	-0.091	0.008	0.169	0.064	0.072	0.155	-0.071	-0.138	-0.069	-0.024	0.069	-0.019	0.02	0.031	-0.015	0.043
35	-0.004	-0.017	-0.05	0.048	0.115	-0.046	-0.079	-0.013	0.046	-0.073	0.045	-0.024	-0.059	-0.093	-0.053	-0.002	-0.013	0.135
36	-0.004	-0.143	0.107	-0.08	0.015	-0.018	-0.04	-0.22	0.234	0.03	0.027	-0.005	0.036	-0.076	-0.02	-0.036	0.029	0.003

$$\Delta CR_t=\mu + \theta_1 CR_{t-1} + \theta_2 CR_{t-3} + \theta_3 CR_{t-4} + \varepsilon_t - \Phi_1 \varepsilon_{t-2} - \Phi_2 \varepsilon_{t-3} - \Phi_3 \varepsilon_{t-5} - \Phi_4 \varepsilon_{t-9} \quad (46)$$

11243 -0.729 0.891 0.544 -0.656 -0.689 0.366 0.232

[2.949] [7.207] [11.079] [4.653] [-6.719] [-6.457] [2.849] [3.756]

R-squared 0.5612 AIC 24.019 LM test 0.8278

$$\Delta EP_t = \mu + \theta_1 EP_{t-7} + \varepsilon_t - \Phi_1\varepsilon_{t-2} - \Phi_2\varepsilon_{t-5} \quad (47)$$

1011.3 0.664 -0.216 -0.503

[1.549] [5.120] [-2.158] [-5.397]

R-squared 0.283 AIC 20.452 LM test 0.6317

$$\Delta PB_t = \mu + \theta_1 PB_{t-3} + \varepsilon_t - \Phi_1\varepsilon_{t-1} - \Phi_2\varepsilon_{t-5} - \Phi_3\varepsilon_{t-6} \quad (48)$$

57886 -0.257 0.248 -0.393 -0.374

[3.455] [-2.515] [2.599] [-4.072] [-3.767]

R-squared 0.242 AIC 28.643 LM test 0.111

$$\Delta IP_t = \mu + \theta_1 IP_{t-1} + \theta_2 IP_{t-3} + \theta_3 IP_{t-4} + \varepsilon_t - \Phi_1\varepsilon_{t-1} - \Phi_2\varepsilon_{t-3} - \Phi_3\varepsilon_{t-4} \quad (49)$$

24196 0.396 0.565 -0.706 -0.739 -0.682 0.916

[3.082] [4.921] [5.653] [-8259] [-20.917] [-14.435] [22.371]

R-squared 0.147 AIC 26.257 LM test 0.3361

$$\Delta PS_t = \mu + \theta_1 PS_{t-1} + \theta_2 PS_{t-2} + \varepsilon_t - \Phi_1\varepsilon_{t-3} - \Phi_2\varepsilon_{t-4} \quad (50)$$

3029 -0.170 -0.334 0.453 0.298

[0.070] [-1.715] [-3.308] [4.664] [3.060]

R-squared 0.308 AIC 28.563 LM test 0.8758

$$\Delta SB_t = \mu + \theta_1 SB_{t-6} + \varepsilon_t - \Phi_1\varepsilon_{t-6} - \Phi_2\varepsilon_{t-7} \quad (51)$$

46693.44 -1.139 1.035 -0.082

[1.434] [-22.381] [15.832] [-1.835]

R-squared 0.234 AIC 28.854 LM test 0.1220

$$\Delta WD_t = \mu + \theta_1 WD_{t-1} + \theta_2 WD_{t-2} + \varepsilon_t - \Phi_1\varepsilon_{t-2} - \Phi_2\varepsilon_{t-3} - \Phi_3\varepsilon_{t-5} \quad (52)$$

42129.81 -0.521 -0.818 0.665 -0.497 -0.354

[3.736] [-5.568] [-4.518] [3.807] [-3.438] [-3.210]

R-squared 0.204 AIC 28.237 LM test 0.148

$$\Delta MS_t = \mu + \theta_1 MS_{t-3} + \varepsilon_t - \Phi_1 \varepsilon_{t-3} - \Phi_2 \varepsilon_{t-8} \quad (53)$$

192047 0.929 -0.684 0.287

[1.162] [11.900] [7.347] [3.877]

R-squared 0.273 AIC 27.016 LM test 0.3177

$$\Delta MT1_t = \mu + \theta_1 MT1_{t-1} + \theta_2 MT1_{t-3} + \theta_3 MT1_{t-4} + \varepsilon_t - \Phi_1 \varepsilon_{t-1} - \Phi_2 \varepsilon_{t-3} \quad (54)$$

161711 -0.334 0.953 0.309 -0.060 -1.245

[1.186] [-3.445] [13.866] [2.665] [-3.049] [-50.980]

R-squared 0.3824 AIC 29.0983 LM test 0.1761

Every equation has found the robust past (lag) value(s) of dependent variable (Y_t) or AR(*p*) and the error terms (ε_t) or MA(*q*) that explain the dependent variable. Further, these models are utilized to produce estimated numbers to assess the future performance of the demand and supply of liquidity and the resiliency of the industry.

C. Forecasting of the Models

The nine ARIMA models generate estimated values (in series) from September 2009 to December 2011. The decision to choose this extended time period arose because of two reasons. Firstly, the accuracy of the model is believed to be stronger in the short term rather than the long term.

Secondly, using it for more than three years ahead can lead to a biased forecast because of the dynamic progress of this industry. In the near future, new Islamic banks and Islamic banking units might join the industry and new banking regulations might come into effect to strengthen and support the development of Islamic banks. Moreover, the issuance of *sukuk* might give another stimulus to this industry.

The first scenario to be anticipated by Islamic banks is the regular liquidity withdrawals, which is the current management of liquidity. The second one is the irregular liquidity withdrawals, where the demand for liquidity rises above the former scenario. This scenario is possible when depositors want to hold more cash due to

unstable economic conditions. The last scenario is the liquidity run when Islamic banks lose the trust of depositors, or when bank rush and bank crisis occur.

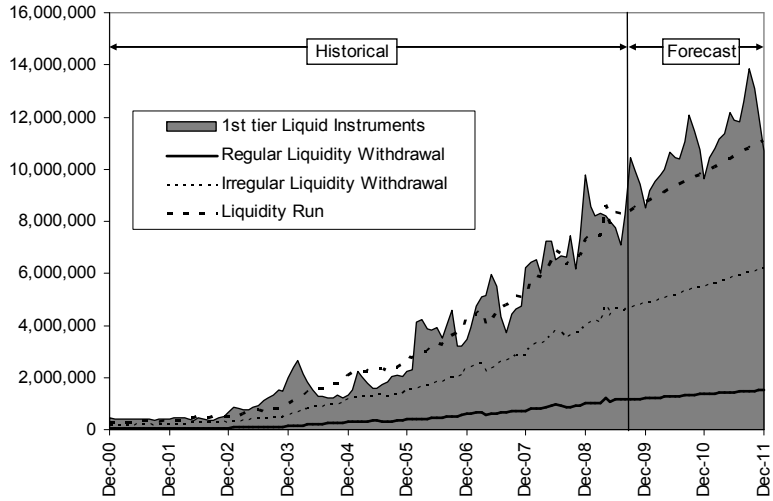
6. 6. 2. Resiliency of the 1st Tier Liquid Instruments

In order to examine the resiliency of the 1st tier liquid instruments, three scenarios of liquidity withdrawals from both *Wadiah* demand deposits and *Mudarabah* saving deposits are determined. The first scenario is the regular liquidity withdrawals, where the future demand for liquidity is computed based on the historical patterns of liquidity withdrawals.

The average monthly liquidity withdrawals of *Wadiah* demand deposits and *Mudarabah* saving deposits are found to be 8.85% and 5.39% of each monthly balance. Based on this regular pattern and the output of ARIMA forecasting of liquidity demanders and suppliers, the resiliency of the 1st tier liquid instruments against regular liquidity withdrawals is drawn in the thick line in figure 6. 1.

The second scenario is the irregular liquidity withdrawal. It is assumed when liquidity withdrawals from both accounts increase up to a quarter (25%) of each monthly balance. As such, the resiliency of the 1st tier liquid instruments against irregular liquidity withdrawal is drawn in the thin dotted line in figure 6.1.

Figure 6. 1: Resiliency of the 1st Tier Liquid Instruments



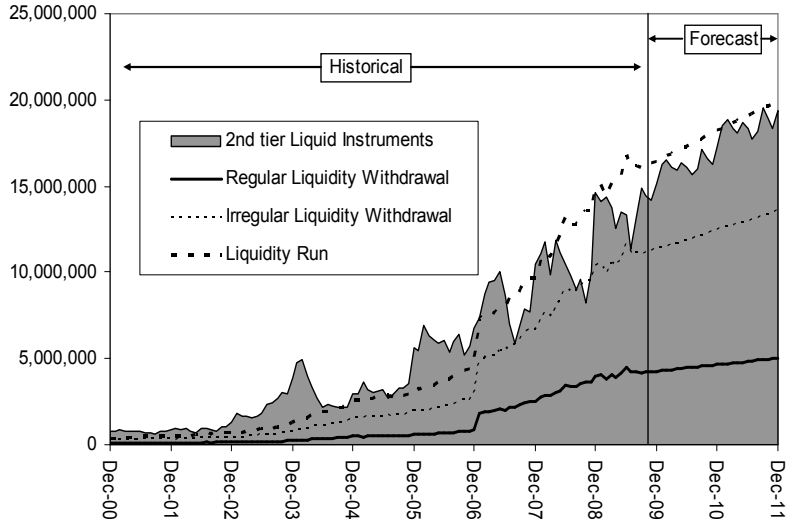
The last scenario is the liquidity run with the assumption that 45% of each monthly balance is gone. A severe scenario of a liquidity run (i.e. more than 45%) is not considered because the 45% assumption should have given a strong signal to take emergency actions to avoid a further worsening of the scenario. The resiliency of the 1st tier liquid instruments against a liquidity run is drawn in the thick dotted line in figure 6.1.

6. 6. 3. Resiliency of the 2nd Tier Liquid Instruments

The existence of the 2nd tier should strengthen the supply of liquidity to handle the additional demand for liquidity from 1-month *Mudarabah* time deposits in addition to the two previous accounts. The first scenario is regular liquidity withdrawal. Historical data shows that the average monthly liquidity terminations of 1-month *Mudarabah* time deposits are 11.84% of each monthly balance. This fact together with ARIMA's output test the ability of the 2nd tier to settle down such a scenario. The thick line in figure 6.2 depicts the result of this scenario.

The second scenario is the irregular liquidity withdrawal. It is when the terminations of 1-month *Mudarabah* time deposits reach 25% of each monthly balance. This assumption and the supply of liquidity from the 2nd tier liquid instruments are illustrated in the thin dotted line in figure 6.2.

Figure 6. 2: Resiliency of the 2nd Tier Liquid Instruments



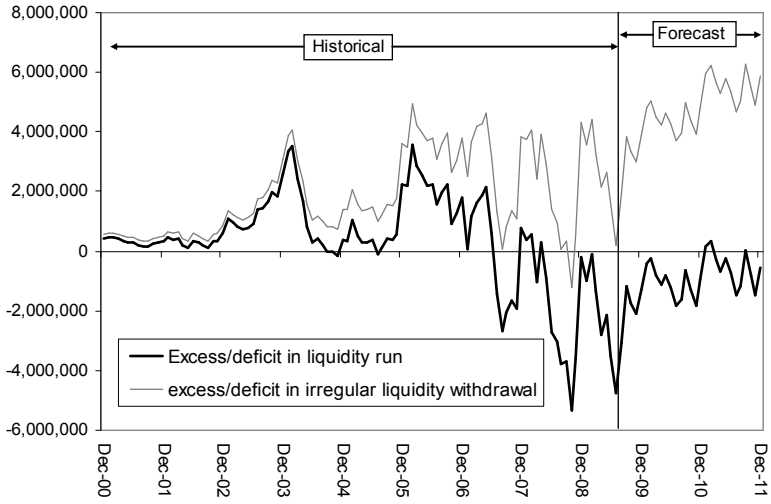
Finally, the harshest condition occurs in the third scenario, i.e. when the liquidity run occurs. This is if the terminations of 1-month *Mudarabah* time deposits occur at 30% of each monthly balance and is explained by the thick dotted line in figure 6.2.

6. 6. 4. Findings from the Resilience Analysis of the Industry

The analysis on resilience of Islamic banking industry delivers some important findings with regard to managing liquidity risk:

i. Although historically the industry performs well in managing liquidity, liquidity mismatch may occur in the future. In the case of irregular liquidity withdrawals, the 2nd tier faced a liquidity mismatch in the last quarter of 2008 as seen in the grey line in figure 6.3.
ii. Unfortunately, both the 1st and 2nd tiers failed to mitigate liquidity run conditions. The 1st tier liquid instruments cannot continuously serve the depositors' demand for liquidity, as was evident between May 2004 and February 2006, from October 2006 to February 2007, and from July to December 2007 (see figure 6.4). The 2nd tier, on the other hand, began to lose its function from July 2007 to the projection of December 2011 (see figure 6.3).

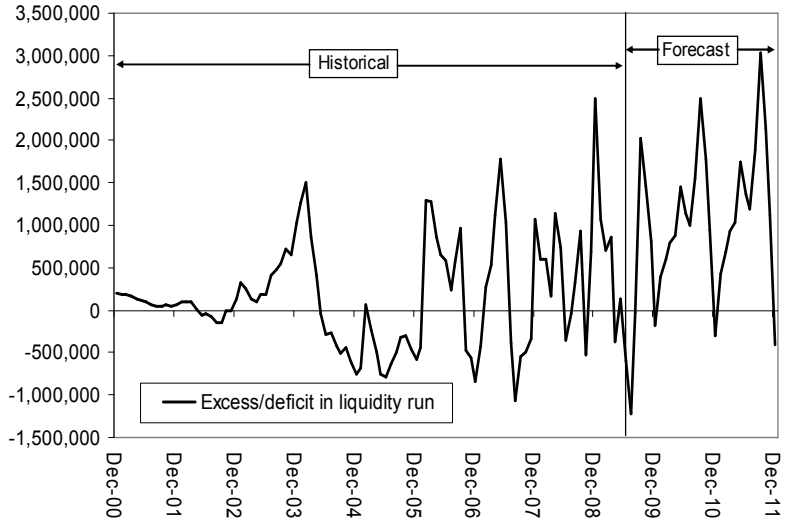
Figure 6. 3: Performance of the 2nd Tier Liquid Instruments



iii. Specifically, based on the liquidity run scenarios, the 1st tier fails to handle a liquidity run when deposit withdrawals reach 45% of total deposits and the 2nd tier fails to

survive in a liquidity run when the withdrawals reach 30% of total deposits. It does not have to be 50% deposit withdrawals to end the function of these two tiers.

Figure 6. 4: Performance of the 1st Tier Liquid Instruments



iv. The percentage assumption of a liquidity run delivers the important message that the failure of Islamic banks to manage liquidity may begin with this percentage of liquidity withdrawals. There are a number of things that all market players and banking regulators can do to maintain the sound condition of the Islamic banking industry and prevent liquidity runs. These include: (i) intensifying the education of depositors and the public by involving the government, banking regulators, and Islamic scholars, (ii) improving the structure of liquidity on the asset and liability sides, and (iii) optimizing bank financing in order to be able to gain and pay competitive return to depositors and stakeholders.

v. While there is another tier (the 3rd tier) available to solve the liquidity problem, the use of this tier brings many negative consequences, such as (i) a negative perception in the market and among depositors that may potentially impact the whole banking system, (ii) a negative image of the quality of liquidity management of a needy Islamic bank, and (iii) sanctions from banking regulators.

6. 7. CLOSING REMARKS

Conventional banking models of liability, asset, and liquidity reserves inspire the construction of the Islamic ones. With regard to liquidity management, liability and asset

models address the significant role of variables: return sharing to depositors, SBI rate, incomes from operational financing, cost of banking operation, and profit from non operational financing.

Meanwhile, the optimum liquidity reserves recommend banks to consider variables of return-sharing to the depositors, profit from operational financing, and total investment in all financing. In the end, the three models highlight some important messages related to managing liquidity risk that have to be anticipated and followed up by Islamic banks, regulators, and all stakeholders.

However, the analysis of the resilience of the Islamic banking industry finds that there is a potential of liquidity mismatch in the future, particularly if the conditions of irregular demand for liquidity and liquidity runs occur. The 2nd tier liquid instruments do not work well to provide liquidity if a certain level of irregular demand for liquidity is reached. Then, both of the 1st and 2nd tier liquid instruments do not work if a certain level of liquidity run hits the industry. Meanwhile, relying on the 3rd tier liquid instruments is possible but there are some negative consequences to using this tier.

Chapter 7
SEARCHING THE LIQUIDITY MANAGEMENT ISSUES THROUGH LIQUIDITY BEHAVIOR OF DEPOSITORS AND ISLAMIC BANKERS

7. 1. INTRODUCTION

Following the discussion of the industry's performance and the quantitative analyses, this chapter presents the results of empirical surveys to both Islamic banking depositors and Islamic bankers. By using an online questionnaire hosted by the survey website provider, www.surveymonkey.com, the surveys were conducted from January to March 2009. 408 depositors and 17 Islamic bankers (Directors, General Managers, Head of Risk Management Division) participated in the survey.

All (six) Islamic commercial banks (BUS) and eleven Islamic banking units/windows (UUS) were represented, and this corresponds to 97% of all Islamic banking institutions. Every individual and Islamic banker had the same chance to be selected since there was no pre-determined category of respondent (simple random sampling).

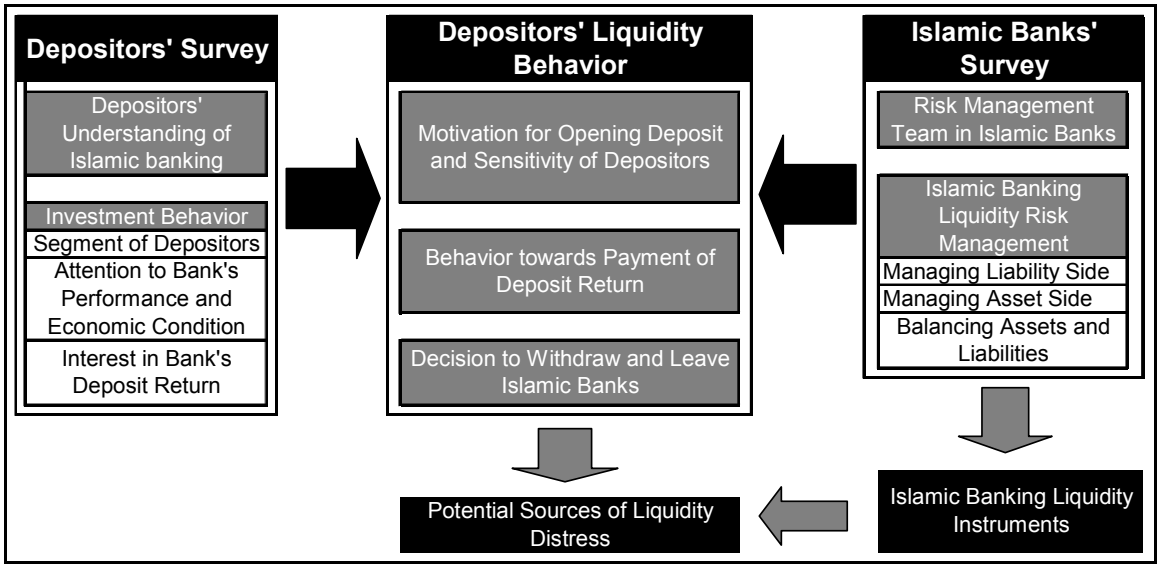
The individual respondents had a good educational background: 58.5% held bachelor degrees, 36.5% postgraduate degrees (Master and PhD), and only 4.9% graduated from senior high school only. Because almost all of them are well-educated individuals, who are working in private or government sectors, they can be assumed to be very familiar with banks and have good financial skills to manage their financial portfolio.

Based on location, the respondents come from big islands such as Java, Sumatera, and Kalimantan, as well as from the capital city Jakarta; these areas correspond to the locations of most of Islamic banking depositors. Hence, this survey of depositors is

expected to imply the real condition and provide representative information regarding their liquidity behavior.

This chapter consists of two parts. The first part shall explain the findings from the survey of Islamic banking depositors, which include: (i) level of understanding; (ii) investment behavior of depositors such as segmentation of depositors, attention to bank's performance and economic conditions, and interest on banks' deposits; and (iii) liquidity behavior of depositors such as the motivation for opening deposits and sensitivity of depositors, behavior towards payment of deposit return, and the decision to withdraw deposits or even leave Islamic banks (see figure 7.1).

Figure 7. 1: Framework of the Survey Analysis



The second part delivers the outputs of Islamic banking survey such as: (i) the structure of organization; the management of liquidity based on the liquidity behavior of depositors; (ii) the potential sources of liquidity problem; and (iii) the Islamic liquidity instruments. Lastly, certain parts of both surveys clarify and strengthen the outputs of Chapters 5 and 6 and the percentage given in bracket is of the total respondents in the surveys.

7. 2. DEPOSITORS' UNDERSTANDING OF ISLAMIC BANKING

Depositors' understanding of Islamic banking is analyzed from their understanding/usage of the: (i) Islamic deposit contracts, (ii) Islamic banking operations

and *Sharia* principles, and (iii) Islamic financing schemes. Fortunately, the depositors' understanding regarding the concept of *Mudarabah* time deposits and saving deposits is relatively high (77.7%). It means that depositors understand the Islamic deposit contracts which are underlying their accounts, including the modes of deposit contract, payment of return, tenor of deposits, and conditions for terminating the deposits contracts.

However, the percentage indicating a full understanding of Islamic banking operations and *Sharia* principles amounted to 58.8% and is therefore lower than that indicating an understanding of deposit contracts. Although it is the fastest growing financial industry in the country (around 50%-60% annually, see Chapter 5), the market share of Islamic banks is still only 2.5% of the total banking industry; this means that its existence and role are not yet optimal or generally known by the public.

Consequently, one reason that only 27.7% of respondents use Islamic financing schemes is because their main understanding about Islamic banks is still on the liability side (*Wadiah* or *Mudarabah* deposits). It does not have at least equal understanding with the operations of Islamic banks on the asset side (Islamic financing modes).

7. 3. INVESTMENT BEHAVIOR OF DEPOSITORS

Under the conditions of limited and minimum attachment of the Islamic financing schemes, depositors have an investment behavior which serves as a basis for determining their liquidity behavior. This survey traces such behavior by analyzing the segmentation of depositors, attention of depositors to Islamic banking performance and economic conditions, and their concern with the return paid by Islamic banks.

7. 3. 1. Segmentation of Depositors

Based on the responses of all depositors, this research classifies them into three different segments namely: (1) *Sharia*-driven, (2) profit–driven, and (3) transaction-driven (see table 7.1). The *Sharia*-driven segment is group of people who become depositors of Islamic banks based on their belief in *Sharia* principles and values, and they will never become depositors of conventional banks. Compared with the other two segments, this segment is quite dominant and is further sub-classified into those who: (i) do not seek profit (non-profit) and (ii) are profit-motivated.

The first sub-segment opens *Mudarabah* time and *Mudarabah* saving deposits for the sake of developing Islamic projects (82.8% and 56.8%). They do not do anything with their accounts even though the interest rate goes up (81.6%) but will certainly close the accounts if the Islamic bank is found not to be *Sharia*-compliant (71%).

A correlation test between two variables, using Pearson chi square[16] and phi value (effect size)[17] shows that: (i) opening *Mudarabah* time deposits to support Islamic projects and (ii) not doing anything when the interest rate goes up, have a moderate[18] correlation (χ^2 = 40.520; asym sig = 0.000; phi value = 0.315) (see table 7.2).

Not doing anything when the interest rate goes up and closing the account if BUS/UUS is not *Sharia*-compliant also have a moderate correlation (χ^2 = 42.728; asym sig = 0.000; phi value = 0.324). All imply a degree of loyalty of the *Sharia*-driven segment who do not seek profit.

Table 7. 1: Segmentation of Depositors

Sharia Driven: Non-Profit	Freq	Mode	%
Opening time deposits to support Islamic projects.	338	1st	82.84
Not doing anything when interest rate goes up.	333	A	81.62
Closing the account if BUS/UUS is not *Sharia* compliance.	290	A	71.08
Opening saving deposits to develop Islamic projects.	232	1st	56.86
Sharia Driven: Profit-Motivated	Freq	Mode	%
Opening time deposits for a higher return.	259	1st	63.48
Relocating tenor of time deposits for a better return.	247	P	60.54
Adding more funds relies on return paid in the last 1-2 months.	226	1st	55.39
Switching deposits to other BUS/UUS for a better return.	194	LP	47.55
Adding more funds if bank offers higher return-sharing ratio.	168	5th	41.18
Asking for higher revenue-sharing if interest goes up.	107	N	26.23

[16] The independency test of 2 variables, the formula is, $\chi^2 = \sum \frac{(f_0 - f_e)^2}{f_e}$, f_0 = frequency, f_e = expected frequency. Degree of freedom formula is df = (r-1)(c-1), r and c are number of row and column in contingency table and expected frequency is, $f_e = \frac{\sum_r f_0 \sum_c f_0}{n}$, n = number of observation (Salvatore and Reagle, 2002:90).

[17] To measure how strong is the correlation, simply formulated as $\sqrt{\frac{chisquare}{n}}$ (Muijs, 2004: 194).

[18] Phi value < 0.1 is considered weak; 0.1 < phi value < 0.3 is modest; 0.3 < phi value < 0.5 is moderate; 0.5 < phi value < 0.8 is strong and; phi value > 0.8 is very strong (Muijs, 2004: 126).

Opening saving deposits due to routine payment of return.	110	4th	26.96
Profit-Driven	Freq	Mode	%
Adding more funds considers SBI rate.	101	5th	24.75
Closing the account if return sharing is less than expected.	92	N	22.55
Closing the account if return sharing is lower than interest rate.	44	D	10.78
Liquidating time deposits & switching into conventional ones.	26	NP	6.37
Switching deposits to conventional if interest rate goes up.	21	D	5.15
Transaction-Driven	Freq	Mode	%
Liquidating time deposits for the regular transaction.	349	TMP	85.54
Having double bank's account.	308	Y	75.49
Opening saving deposits with instant withdrawals.	224	2nd	54.90
Opening saving deposits which can be withdrawn on daily basis.	176	2nd	43.14

F = frequency, which composed of respondents who choose options of: 1st + 2nd ranks; priority; consideration; agree; yes; the most preferable + preferable. M = mode, which composed of respondents who choose options of: the most preferred (TMP); preferred (P); less preferred (LP); not preferred (NP); yes (Y); agree (A); disagree (D); neutral (N).

Meanwhile, the second sub-segment finds the most profitable Islamic investment portfolio by: (a) relocating tenor of *Mudarabah* time deposits for a better return (60.5%), (b) adding more funds relies on the return paid in the last 1-2 months (55.4%), (c) switching deposits to other BUS/UUS for a better return (47.5%), (d) adding more funds if the bank offers higher return-sharing ratio (41.2%), and (e) asking for a higher revenue-sharing if interest goes up (26.2%). Their motivation of opening *Mudarabah* time deposits is to gain higher return (63.5%), and their motivation for opening *Mudarabah* saving account is to receive a routine return payment (26.9%).

Table 7. 2: Correlation Analysis between Two Variables

Correlation Between Two Variables	$\chi 2$	DoF	Asym sig (2 sides)	n	Phi value	Result
Opening time deposits to support Islamic projects; and Not doing anything when interest rate goes up.	40.520	10	0.000	408	0.315	Moderate
Not do anything when interest rate goes up; and Closing the account if BUS/UUS is not *Sharia*-compliant.	42.728	4	0.000	408	0.324	Moderate
Opening time deposits for a higher return; and Asking for higher revenue-sharing if interest rate goes up.	37.774	10	0.000	408	0.304	Moderate
Adding more funds relies on the	135.350	16	0.000	408	0.576	Strong

return paid in the last 1-2 months; and Adding more fund if bank offers higher return-sharing ratio.						
Relocating tenor of time deposits for a better return; and Asking for higher revenue-sharing if interest rate goes up.	15.085	6	0.020	408	0.192	Modest
Adding more funds considers SBI rate; and Closing the account if return-sharing is lower than interest rate.	36.513	8	0.000	408	0.299	Modest
Closing the account if return sharing is less than expected; and Liquidating time deposits and switching it into conventional one.	14.350	6	0.026	408	0.188	Modest
Adding more funds considers SBI rate; and Switching deposits to conventional if interest rate goes up.	19.015	8	0.015	408	0.216	Modest
Switching deposits to conventional if interest rate goes up; and Liquidating time deposits and switch to conventional ones.	86.549	6	0.000	408	0.461	Moderate
Closing the account if return sharing is lower than interest rate; and Liquidating time deposits and switch to conventional ones.	53.795	6	0.000	408	0.363	Moderate
Having double bank's accounts; and Opening *Mudarabah* saving deposit with instant withdrawals.	14.545	4	0.006	408	0.189	Modest

A correlation test proves the argument further by showing that:

i. Opening *Mudarabah* time deposits for a higher return, and asking for higher revenue-sharing if interest rate goes up have a moderate correlation.
ii. Adding more funds depends on the return paid in the last 1-2 months, and adding more funds if the bank offers a higher return-sharing ratio have strong correlation.
iii. Relocating the tenor of *Mudarabah* time deposits for a better return, and asking for higher revenue-sharing if interest rate goes up have a modest correlation.

However, the profit-driven segment is group of people who position Islamic banks indifferently from conventional banks. They decide to add more funds based on the

level of the SBI rate (24.7%) and will even close the Islamic accounts if return-sharing is lower than expected (22.5%) or lower than interest rate (10.8%).

This is because they frequently compare deposit return from Islamic and conventional banks and choose the highest return between them. If the interest on deposit is more promising and profitable than Islamic return on deposits or if the interest rate tends to go up (5.1%), they will switch to conventional banks (6.4%). For depositors of this segment, interest is not fully prohibited in Islam.

Further, a correlation test in this segment shows that (see table 7.2):

i. Adding more funds considers SBI rate, and closing the account if return-sharing is lower than interest rate have a modest correlation.
ii. Closing the account if return-sharing is less than expected, and liquidating time deposits and switching to conventional ones has a modest correlation.
iii. Adding more funds considers SBI rate, and switching deposits to conventional accounts if interest rate goes up, have a modest correlation.
iv. Switching deposits to conventional banks if interest rate goes up, and liquidating time deposits and switching to conventional ones have a moderate correlation.
v. Closing the accounts if return-sharing is lower than interest rate, and liquidating time deposits and switching into conventional ones have a moderate correlation.

These facts prove that the profit-driven segment seeks the highest profit between the two banking systems.

The last segment (transaction–driven) is a group of people who deal with the banks for transaction purposes. They are depositors who will liquidate *Mudarabah* time deposits to fulfill regular transaction needs (85.7%) and who hold two liquid (demand and saving) accounts from Islamic and conventional banks without any intention to switch between them for profit (75.5%). Besides maintaining a modest amount of demand deposits in Islamic banks, they open *Mudarabah* saving deposits for instant withdrawals (54.9%) or for day to day withdrawals (43.1%).

Another market study on Islamic banking depositors by Mars suggests that the frequency of liquidity withdrawals is twice per month (Mars, 2008:44). A correlation test in this segment finds a modest correlation between: (i) having two bank accounts; and (ii) opening *Mudarabah* saving deposits with instant withdrawals. These findings and information prove the existence of the transaction-driven segment.

7. 3. 2. Attention to Banks' Performance and Economic Conditions

The attention of depositors towards the performance of Islamic banks is measured through their awareness of the banks' activities and achievements. Whilst, the depositors' concern over economic conditions is seen from their behavior to hold cash and demand deposits accounts. Interestingly, becoming Islamic banking depositors does not require frequent monitoring of the performance of the banks. Only 56.1% of depositors do intensive monitoring on their banking activities; the remainder just passively deposit money and wait for the payment of return-sharing on deposits.

Such behavior reconfirms the understanding of depositors of the liability side as investigated before. As such, 51.9% of respondents pay strong attention to how much profit is earned by BUS/UUS from their business, and 26.7% are concerned about business costs borne by BUS/UUS. The existence of these two variables approves their positions as explanatory variables in the econometrics model in Chapter 6.

With regard to the notice against economic condition, this survey found that 66.9% of all depositors will close their Islamic accounts if the economic conditions require them to hold cash. This finding is further approved by the position of *Wadiah* demand deposits which imply the perception of depositors with regard to the current economic conditions.

In particular, *Wadiah* demand deposits are counted 21% of total deposits reflecting the potential demand for instant liquidity from depositors. How much money is placed by depositors in demand deposit accounts is also another anchor to trace the economic factors that affect the demand for short-term liquidity (see Chapter 5).

However, in favorable economic conditions, there will be a low demand for instant liquidity and depositors deposit money with the intention that such funds will be used to support projects of the Moslem *Ummah* (82.8%). These two messages highlight the importance of maintaining economic conditions to retain the confidence of depositors and to be able to use their funds.

7. 3. 3. Concern of Depositors with the Return on Deposits

Rearranging and modifying the answers of depositors provides another important piece of information regarding the concern of depositors with the return on deposits, no matter which segment they belong to. In this regard, this survey specifies two groups of depositors: (1) depositors who are concerned with the return on deposits paid by banks (Islamic and/or conventional bank); and (2) depositors who are not concerned with the return on deposits paid by Islamic banks (see table 7.3).

The former, in the eye of liquidity risk management, might potentially disrupt a balanced asset-liability because they maximize return in their own Islamic banks by any of: (i) opening time deposits for a higher return (63.5%), (ii) relocating tenor of time deposits for a better return (61%), (iii) adding more funds based on the return in the last 1-2 months (55.4%), (iv) adding more funds if the Islamic bank offers higher return-sharing (41.2%), (v) asking for a higher percentage of revenue-sharing if the interest rate rises (28.4%), and (vi) adding more funds considers SBI rate (24.7%).

Table 7. 3: Concern of Depositors with the Return on Deposits

Very Concern with the Return on Deposits	Freq	Mode	%
Opening time deposits for a higher return.	259	1st	63.48
Relocating tenor of time deposits for a better return.	249	P	61.03
Adding more funds based on return in the last 1-2 months.	226	1st	55.39
Switching to other BUS/UUS for a better deposit return.	193	LP	47.30
Adding more funds if bank offers higher return-sharing.	168	5th	41.18
Closing the account if the return paid is lower than other BUS/UUS.	119	N	29.17
Asking for higher revenue-sharing if interest goes up.	116	N	28.43
Adding more funds considers SBI rate.	101	5th	24.75
Closing the account if return-sharing is less than expected.	98	N	24.02
Closing the account if return-sharing is lower than interest rate.	47	D	11.52
Switching deposits to conventional bank if interest rate goes up.	19	D	4.66

Not Concern with the Return on Deposits	Freq	Mode	%
Opening saving deposits in order to be eligible for the bank's facilities.	74	5th	18.14
Opening time deposits in order to be eligible for the bank's facilities.	92	3rd	22.55
Closing the account if BUS/UUS does not have proper facilities and network.	206	A	50.49

F = frequency, which composed of respondents who choose options of: 1st + 2nd rank; priority; consideration; agree; yes; the most preferable + preferable. M = mode, which composed of respondents who choose options of; preferred (P); less preferred (LP); agree (A); disagree (D); neutral (N).

The latter maximize return beyond their Islamic banks by: (a) switching to other BUS/UUS for a better deposit return (47.3%); (b) closing the account if the return paid is lower than the return of other BUS/UUS (29.2%); (c) closing the account if the return-sharing is less than expected (24%); (d) closing the account if return-sharing is lower than interest rate (11.5%); and (e) switching deposits to conventional banks if the interest rate rises (4.6%).

The group of depositors who maximize return in their own Islamic banks might disturb the portfolio financing of banks because of asset-liability mismatches (fluctuating amount of deposits, moving the deposit tenor, etc.), whereas the ones who go beyond their Islamic banks might raise liquidity problems because of liquidity withdrawals, liquidity gap, etc. Actually, concern with the deposit return is not entirely prohibited in Islam but it must be accompanied by a solid understanding of the consequences of investment of money in Islamic schemes, *Sharia* principles, and Islamic banking operations.

The conventional way of thinking (e.g. positioning Islamic banks and conventional banks indifferently, ignoring (still arguing) the prohibition of *Riba*, and expecting regular and positive deposit return without willingness to be aware of Islamic banking operations) might all endanger the liquidity management and interrupt portfolio financing management of Islamic banks.

Meanwhile, the latter (depositors who are not concerned with return on deposits) are identified as those who tend to enjoy the facilities of Islamic banks such as the

payment system, network, and financing scheme rather than asking for deposit return *per se*. For them, the return is not the ultimate reason for becoming Islamic banking depositors. In conclusion, related to the liquidity risk management, these discoveries suggest that maintaining attractive/competitive return on deposits and providing well-established bank facilities are critical factors to control these two types of depositors and avoid liquidity withdrawals.

7. 4. LIQUIDITY BEHAVIOR OF DEPOSITORS

In addition to analyzing the investment behavior of depositors as shown in the previous section, a discussion of liquidity behavior comes next as one of the central elements to manage liquidity risk. Understanding liquidity behavior will help Islamic banks to design robust liquidity management of the liability side and proceed into the asset side for an optimal portfolio management. This section examines such behavior through:

i. Motivation of depositors to open deposits and sensitivity of depositors.
ii. Satisfaction of depositors with the bank's payment of deposit return.
iii. Withdrawal decision and behavior of depositors.

7. 4. 1. Motivation to Open Deposits and Sensitivity of Depositors

The survey traces depositors' motivations for opening *Mudarabah* saving and time deposits by rating scores. Every respondent is asked to give a priority scale for each question. The highest weight is given to the 1st priority and the lowest weight is given to the last one. The score is computed as total respondents who choose a certain answer times weight divided by total respondents.

In *Mudarabah* time deposits, the rating score presents the best three priorities of depositors to open *Mudarabah* time deposits related to timing, which are (see table 7.4):

i. Opening *Mudarabah* time deposits to be taken (terminated) in 1 month (1st priority).
ii. Opening *Mudarabah* time deposits to be taken (terminated) in 3-6 months (2nd priority).
iii. Opening *Mudarabah* time deposits to be taken (terminated) in one year (3rd priority).

Table 7. 4: Motivation to Open Deposits

Types of Motivation to Open *Mudarabah* Time Deposits		
Timing of Terminating Time Deposits	Rating Scores	Final result
Opening time deposits to be taken in 1 month.	1.55	1st Priority
Opening time deposits to be taken in 3-6 months.	1.47	2nd Priority
Opening time deposits to be taken in 1 year.	1.47	3rd Priority
Non-Timing Aspects	Rating Scores	Final result
Opening time deposits to support Islamic projects.	2.55	1st Priority
Opening time deposits for higher return.	2.27	2nd Priority
Opening time deposits in order to be eligible for bank's facilities.	1.45	3rd Priority
Types of Motivation to Open *Mudarabah* Saving Deposits.	Rating Score	Final result
Opening saving deposits to develop *Ummah* projects.	3.50	1st Priority
Opening saving deposits with instant withdrawals.	3.48	2nd Priority
Opening saving deposits which can be withdrawn on a daily basis.	3.09	3rd Priority
Opening saving deposits due to routine payment of return.	2.70	4th Priority
Opening saving deposits in order to be eligible for bank's facilities.	2.23	5th Priority

Yet the revenue-sharing of 1-month *Mudarabah* time deposits is usually the lowest of all tenors, but very competitive with 1-month interest rate of time deposits in conventional banks. As such, the analysis in Chapter 5 shows that 19.53% of *Mudarabah* time deposits are a 1-month deposit tenor and this tenor is preferable because of its liquidity and competitiveness. For the non-timing aspect, the motivations to open *Mudarabah* time deposits are:

i. Opening time deposits to support the Islamic projects (*ummah*) (1st priority).
ii. Opening time deposits for a higher return (2nd priority).
iii. Opening time deposits to be eligible for bank's facilities (3rd priority).

Mars has also suggested that *Sharia* motivation is by far the most common motivation (86.8%) when depositors open *Mudarabah* time deposits (Mars, 2008:30).

However, *Mudarabah* saving deposits suggest 5 priorities as listed below:

i. Opening saving deposits to develop *Ummah* projects (1st priority).
ii. Opening saving deposits with instant withdrawals (not daily) (2nd priority).

iii. Opening saving deposits which can be withdrawn on a daily basis (3rd priority).
iv. Opening saving deposits due to routine payment of return (4th priority).
v. Opening saving deposits to be eligible for bank's facilities (5th priority).

The ranking information above addresses some important points which reconfirm the previous analyses. First, there are three ultimate motivations of depositors in opening Islamic accounts (*Mudarabah* saving and time deposits):

i. Religious motive (to support Islamic investment/projects).
ii. Profit motive.
iii. Transaction motive.

All of them come together in the people's mindset when they decide to become Islamic banking depositors. This is indeed in contrast to their motivations to be conventional banking depositors, where they might only emphasize the profit and transaction motives only without any religious motivation.

Second, maintaining those three motivations would be one of the key success factors to manage liquidity because religious (*Sharia*-driven) depositors with a strong understanding of *Sharia* principles and those with the conventional way of thinking appear together in the Indonesian Islamic banking industry.

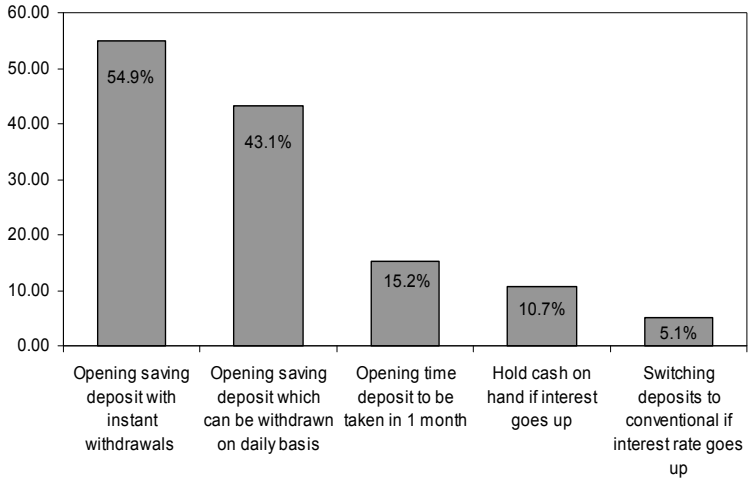
Third, depositors in general regard Islamic banks not as their main place of depositing money. Therefore, professionalism is required to operate the Islamic banks in order to be able to offer not only religious credibility (*Sharia*-compliant banks) but also pay competitive return and provide standard banking facilities.

The next analysis looks at the sensitivity of depositors by rearranging and regrouping the previous information to set up sensitivity conditions/reasons and the opportunity for Islamic banks to mitigate these. The first is finding conditions/reasons that cause depositors to take their funds out from the Islamic banks.

The second is the opportunity for Islamic banks to use such sensitiveness to control the liquidity withdrawals. For the former, the top three reasons are (figure 7.2):

i. Opening saving deposits with instant withdrawals (54.9%).
ii. Opening saving deposits which can be withdrawn on a daily basis (43.1%).
iii. Opening time deposits for only 1-month placement (15.2%).

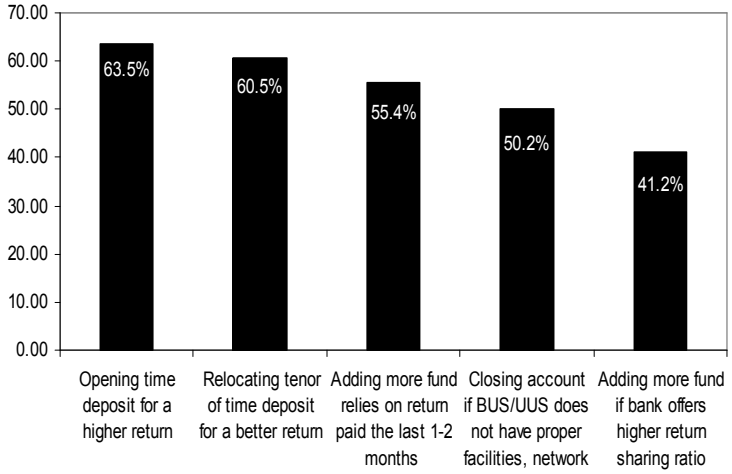
Figure 7. 2: Conditions/Reasons to Withdraw Funds



These reasons clearly explain that the sensitivity of depositors with regard to withdrawing money relates to transaction purposes. However, in fact, these sensitivities provide opportunities for Islamic banks to control any liquidity withdrawal. The latter identifies at least three opportunities for the Islamic banks to control and manage liquidity (see figure 7.3). The first way Islamic banks may control liquidity withdrawals is to convince depositors to use the Islamic banks not only for transactions but also for investment (medium to long-term tenure) purposes.

Hence, the depositors have to be assured to put new funds in the long-term tenor of *Mudarabah* time deposits or relocating their placement from the short-term into long-term *Mudarabah* time deposits. It is indeed possible since the main reason of depositors to open *Mudarabah* time deposits is to gain a high return (63.5%) and they wish to relocate the tenor of placement as long as the return is promising (61%).

Figure 7. 3: Opportunities for Banks to Prevent Liquidity Withdrawals



The second means to control liquidity withdrawals is improving the performance of the Islamic banks in order to be able to pay competitive return. This is because the depositors' decision to add more funds into Islamic banks is based on how much return they received in the last short-term period (1-2 months) (55.4%) or how high the return-sharing ratio is (41.2%).

The third means is providing proper banking facilities which can deter liquidity withdrawals (50.2%). However, the significance of the return paid in the last 1-2 months has strengthened and proven the reason to choose this variable in the economic model in Chapter 6.

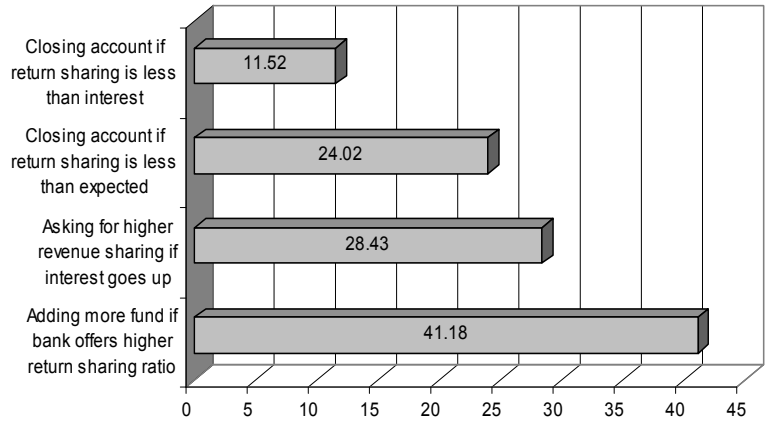
7. 4. 2. Behavior towards Payment of Deposit Return

What causes depositors to take their funds out from Islamic banks may be traced from their behavior towards the payment of deposit return and interest rate. The survey finds that depositors will increase their saving if Islamic banks offer a higher return-sharing ratio (41.1%) or will accept a higher return-sharing proposal when the interest rate tends to go up (28.4%).

Likewise, they may close the account if the deposit return paid by the banks is less than expected (24%) or less than the prevailing interest rate (11.5%) (see figure 7.4). With respect to the interest rate, one of the considerations of depositors to add more funds

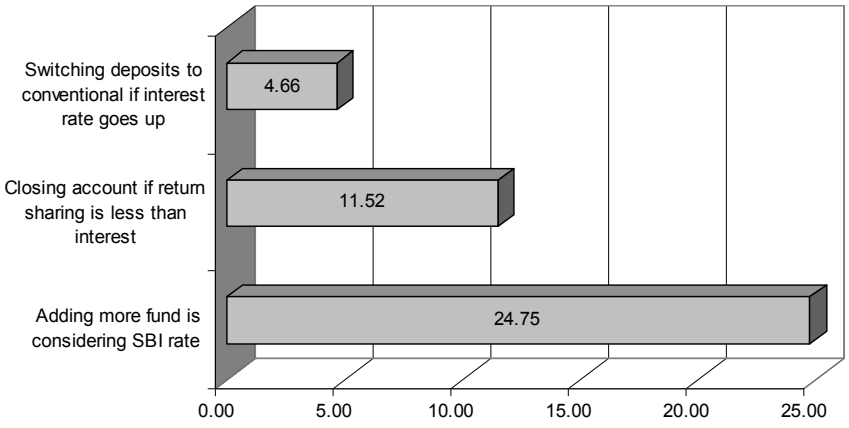
(besides deposit return) is the central bank's interest rate (SBI rate) as declared by 24.7% of all respondents (see figure 7.5).

Figure 7. 4: Behavior towards Deposit Return



The influence of the interest rate, for a small group of respondents, would even encourage them to switch their deposits from Islamic banks to conventional banks if interest rate is more profitable (11.5%) or quit from Islamic banks permanently if return-sharing is lower than interest rate. Taking into account the strategic influence of interest, SBI rate is also employed in the liability model in Chapter 6.

Figure 7. 5: Behavior towards Interest Rate



Therefore, these two figures reconfirm the last findings about the importance of improving and managing robust banking performance in order to produce optimal return. With professionalism and proper financing management, Islamic banks would hopefully be able to pay a competitive return as well as maintain the loyalty of depositors.

7. 4. 3. Withdrawing Decision and Exit from Islamic Banks

This sub-section specifies the reasons that drive depositors to terminate the *Mudarabah* time deposits, how they do it (in terms of notifying Islamic banks), and to what other extent they want to leave Islamic banks. Based on the rating score of the lists of depositors' reasons to terminate time deposits in table 7.5, again, liquidating time deposits for the purpose of regular transaction needs stands as the 1st choice (the most preferable and preferable), followed by relocating the tenor of time deposits for a better return as the 2nd choice, switching time deposits to conventional deposits (3rd choice), and finally switching time deposits to other BUS/UUS for a better return is less preferred and not preferred (4th choice).

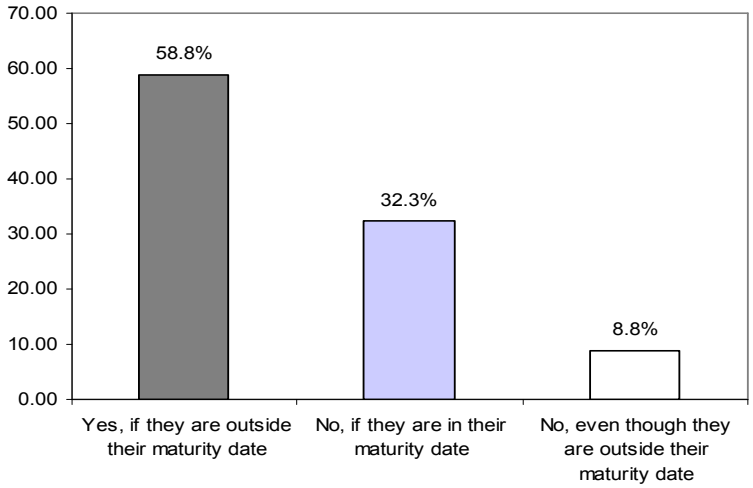
Table 7. 5: Depositors Reasons to Terminate Time Deposits

Reasons to Terminate *Mudarabah* Time Deposits	Rating Score	Final Result
Liquidate time deposits for regular transaction.	3.55	1st Priority
Relocating tenor of time deposits for a better return.	2.66	2nd Priority
Liquidate time deposits and switch into conventional deposits.	1.24	3rd Priority
Switching deposits to other BUS/UUS for a better return.	2.53	4th Priority

Further, 58.8% of the depositors tend to give prior notice to Islamic banks if they terminate time deposits outside their maturity date and a smaller group (32.3%) states that they do not notify the banks if time deposits fall in their maturity date. Lastly, the smallest group of depositors (8.8%) will not notify the banks even though they terminate time deposits outside their maturity date as described in figure 7.6.

These realities express the willingness and openness of the majority of depositors when executing the time deposits. Thus, this information should get Islamic banks to realize that establishing good communication with depositors regarding their liquidity withdrawals is more than possible.

Figure 7. 6: Notification of Termination



After terminating the time deposits, the existence of some conditions might possibly cause depositors to leave Islamic banks. Amongst all, the top five conditions are: (1) if BUS/UUS is not *Sharia*-compliant (71%); (2) if the economic condition requires depositors to hold cash on hand (66.7%); (3) if BUS/UUS faces losses and needs emergency liquidity (65.7%); (4) if the bank has ever delayed fulfilling a withdrawal request (64.2%); and (5) if the bank does not have a proper network and facilities (50.5%) (see table 7.6).

Table 7. 6: Conditions to Leave Islamic Banks

Conditions to Leave Islamic Banks	Freq	Mode	%
If BUS/UUS is not *Sharia*-compliant.	290	A	71.08
If the economic condition requires me to hold cash on hand.	272	A	66.67
If BUS/UUS faces losses and needs emergency liquidity.	268	A	65.69
If the bank ever delays my withdrawal request.	262	A	64.22
If the bank does not have proper network, facilities, etc.	206	A	50.49
If the return-sharing is less than other BUS/UUS.	119	N	29.17
If the return-sharing is less than expected.	92	N	22.55
If the return-sharing is lower than interest rate.	44	D	10.78

F = frequency, which composed of respondents who choose options of: 1st + 2nd rank; priority; consideration; agree; yes; the most preferable + preferable. M = mode, which composed of respondents who choose option of: agree (A); disagree (D) and; neutral (N).

Moreover, a correlation test on the variables suggests that leaving Islamic banks has a relation with both transaction motive and profit motive. The results of three correlation tests on two variables below approve such premise:

i. Opening saving deposits to develop Islamic projects; and leaving Islamic bank if the economic condition requires depositors to hold cash on hand, have a modest correlation and imply the transaction motive.
ii. Opening time deposits for a higher return; and leaving Islamic bank if the return sharing is less than other BUS/UUS, have a modest correlation imply that leaving Islamic bank connotes with the profit motive.
iii. Opening time deposits for a higher return; and leaving Islamic bank if the return sharing is less than expected, have a modest correlation and reconfirm the profit motive as well (see table 7.7).

Table 7. 7: Correlation of Two Variables

Correlation between Depositor's Variables	Pearson's Chi square	DoF	Asym sig (2 sides)	n	Phi value	Result
If economic condition requires me to hold cash on hand; and Opening saving deposits to develop Islamic projects.	14.255	8	0.075	408	0.187	Modest
If the return sharing is less than other BUS/UUS; and Opening time deposits for a higher return.	16.837	10	0.078	408	0.203	Modest
If the return sharing is less than expected; and Opening time deposits for a higher return.	21.556	10	0.018	408	0.230	Modest

The combination of these four analyses suggests Islamic banks to anticipate any execution of time deposits due to transaction needs and profit motive. One solution to mitigate such occurrences would be to build better communication with depositors, who have high amount of deposits, regarding their withdrawal schedules. It should be working as they are proven to be communicative. Other solutions are:

i. Ensuring *Sharia*-compliance in all banking operations;

ii. Doing business appropriately to minimize losses and avoid requesting Bank Indonesia emergency liquidity;
iii. Improving the payment system to control withdrawing request; and
iv. Improving Islamic banks networks and facilities.

All of those efforts will deter depositors from leaving the banks.

7. 5. RISK MANAGEMENT COMMITTEE IN ISLAMIC BANKS

Following the survey of depositors, this part considers Islamic banking issues. First of all, the existence of a risk management committee (ALCO) in the internal organization of a BUS/UUS indicates its strong effort in managing liquidity risk. In fact, the Islamic Banking Act (Article 39), approved in July 16th, 2008, has formally obligated every BUS/UUS to manage risk. Hence, almost all (14 banks, 82%) of Islamic banks have a risk management committee (ALCO) in their internal organization with a Director/Manager assigned to lead this committee.

However, particularly in UUS, the parent company coordinates the decisions on liquidity management, as indicated by 10 UUS (90%). Nevertheless, more than 72% of UUS (8 out of 11 UUS) do not totally depend on parent company direction to formulate such decisions.

These realities imply that the liquidity risk management policies have been followed by the majority of BUS/UUS, with one person leading (i.e. being responsible for) the risk management team. However, as UUS is part of its parent company's business organization, its dependency on parent company's general guidance cannot be ignored. Nonetheless, as the embryo of Islamic banks, it has shown proactive action by having a risk management team to handle various issues of liquidity risk in its business operations.

7. 6. ISLAMIC BANKING LIQUIDITY RISK MANAGEMENT

After identifying the risk management team, the next issue is to examine liquidity risk management in Islamic banking. Referring to the flow of analysis in Chapter 5, Islamic banks (BUS and UUS) arrange liquidity management in three areas: (i) the

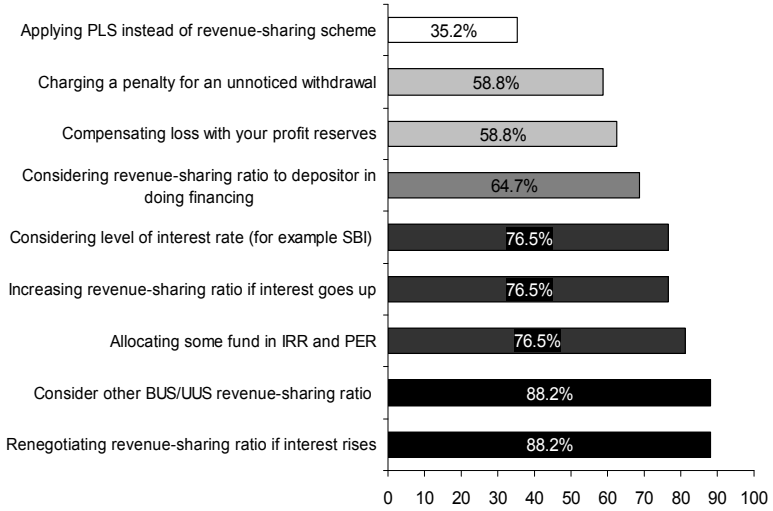
liability side, (ii) the asset side, and (iii) balancing both assets and liabilities. On the liability side, Islamic banks try to prevent liquidity outflow by considering the liquidity behavior of depositors as analyzed in the earlier part and in Chapter 6.

On the other hand, the asset side captures Islamic banking financing strategies and actions to protect financing from default and optimize profit. Ideally, in managing funds, Islamic banks should also consider depositors' investment and liquidity behavior, such as their expected return and liquidity withdrawals for transaction needs, as highlighted above. Lastly, balancing assets and liabilities involves all of the banks' policies and strategies to manage the routine demand for liquidity and prevent liquidity distress.

7. 6. 1. Managing Liquidity on the Liability Side

Islamic banks in practice apply two approaches to manage liquidity on the liability side, which are: (i) managing liquidity reserves during normal conditions, and (ii) managing extra liquidity reserves during special conditions such as in an increasing trend of interest rate or unnoticed liquidity withdrawals, both of which are located on the asset side. Based on results of the survey (see figure 7.7), in normal conditions Islamic banks take into account some factors when setting the revenue-sharing ratio with depositors, such as: (i) revenue-sharing of other BUS/UUS (15 banks, 88.2%); and (ii) level of interest rate (SBI rate) (13 banks, 76.5%).

Figure 7. 7: Managing Liquidity on the Liability Side (%)



Meanwhile, when releasing funds to the entrepreneurs, 11 banks (64.7%) consider their revenue-sharing ratio with depositors. The other banks (13 banks, 76.5%) take into account the profit reserves from financing in the forms of Profit Equalization Reserve (PER) and Investment Risk Reserves (IRR).

The purpose of PER and IRR is to match the expected return of depositors, especially for those who are from the *Sharia*-driven segment with profit motivation and from the profit-driven segment. The revenue-sharing ratio to depositors stands as one of the independent variables to explain Islamic bank financing in the econometrics model explained in Chapter 6.

Finally, six banks (35.2%) prefer the application of profit and loss sharing (PLS) to revenue-sharing in the time deposit contracts because theoretically PLS allows Islamic banks to share the financing loss with depositors. However, to maintain the sustainability of funds on the liability side, 10 banks (58.8%) charge a penalty for any withdrawal without prior notice.

Although the rate is fixed and does not depend on the nominal value of the deposits, this application is believed to be a reliable means of sustaining the availability of funds on the liability side (Ismal, 2010a:8). Further, a correlation test finds that the bank's compensating for losses with profit reserves has a modest correlation ($\chi^2 = 31.260$; asym sig = 0.002; phi value = 0.277) with the willingness of depositors to add more funds based of the payment of return in the last 1-2 months.

On the other hand, during special conditions, Islamic banks raise the revenue-sharing ratio to depositors (13 banks, 76.5%) and in fact more banks even agree to renegotiate the revenue-sharing ratio with depositors (15 banks, 88.2%) (see figure 7.7). This is the other effort of Islamic banks foreseeing the liquidity behavior of depositors where some of rational (return oriented) depositors like to compare interest and Islamic deposit return.

Nevertheless, unlike adjusting the interest rate in the conventional banks, Islamic banks are limited in how much they can widen the spread of revenue-sharing. In

particular, it is related to the costs that they have to cover. In the case of losses, Islamic banks tend to sacrifice their profit reserves to bear business losses, as mentioned by 10 Islamic bankers (58.8%) representing 10 BUS/UUS.

7. 6. 2. Managing Liquidity on the Asset Side

After implementing some efforts to maintain and manage liquidity on the liability side, Islamic banks also carry out some approaches on the asset side. Initially, they have financing strategies for equity financing as well as debt financing. The rating score of the set of questions asking from the most preferable until not preferable strategy enlightens that

i. financing of the previously well-performed projects,
ii. requiring collateral or *Kafalah* (third party guarantee) or both,
iii. financing entrepreneurs who are depositors of the banks and matching the tenor and amount of funds on the asset and liability,

stand in the 1st, 2nd and 3rd ranks of their equity financing strategies as seen in table 7.8.

In terms of numbers, 16 banks (94%) refer to the historical performance of projects to be financed, 16 banks (94%) require collateral, and 14 banks (82.3%) prefer financing entrepreneurs who are also their own depositors.

Table 7. 8: Equity Financing Strategies

Equity Financing Strategies	Rating Scores	Final Result
Preferring proposal of the previously well-performed projects.	3.56	1st Priority
Requiring collateral or *Kafalah* (third party guarantee).	3.38	2nd Priority
Preferring entrepreneurs who are your depositors.	3.19	3rd Priority
Matching the tenor and amount of funds on the asset and liability sides.	3.19	3rd Priority
Preferring short-term investment project financing.	3.06	4th Priority
Welcoming with new project proposals	2.69	5th Priority
Selling bank's ownership in project if it is in default/loss.	2.69	5th Priority

In debt financing, as seen in table 7.9, requiring collateral (*Kafalah*), preferring entrepreneurs who are the depositors of banks and preferring short-term debt financing contracts, are the best three of nine Islamic banking financing strategies. In terms of

numbers, 16 banks (94%) ask for collateral, 14 banks (82.3%) prefer financing entrepreneurs who are also their own depositors, and 12 banks (70.5%) sell the assets if entrepreneurs are in default.

Table 7. 9: Debt Financing Strategies

Debt Financing Strategies	Rating Scores	Final Result
Requiring collateral or *Kafalah* (third party guarantee).	3.50	1st Priority
Preferring entrepreneurs who are your depositors.	3.31	2nd Priority
Preferring short-term debt financing contracts.	3.19	3rd Priority
Welcoming more than 1 year up to 3 years trade/leasing proposal.	3.00	4th Priority
Selling the collateral of the assets (projects) if entrepreneur is in default.	2.94	5th Priority
Giving extra time to business partner for a late payment.	2.81	6th Priority
Compensating loss with your profit reserves.	2.75	7th Priority
Changing leasing rate to adjust with current economic condition.	2.69	8th Priority
Charging penalty for a late payment of debt financing.	2.56	9th Priority

These debt and equity financing strategies show that Islamic banks are very cautious in utilizing funds and dealing with the business sector. To some extent, it is good to prevent Islamic banks from financing mismanagement and defaults, and securing them from the obligation to produce regular, positive, and competitive return as expected by depositors.

But on the other hand, such strategies restrict the banks from expanding business and searching for new and more profitable projects (albeit long-term tenure), as they are now facing the growing trend that deposits must be properly and professionally managed (Ismal, 2008b:2-15 and Bank Indonesia, 2008b:2-20).

Despite imposing some financing strategies, Islamic banks have some proactive strategies focusing precisely on actions to manage the flow of liquidity and avoid financing losses on the asset side. Table 7.10 shows such proactive strategies.

Table 7. 10: Proactive Strategies to Prevent Financing Failures/Losses

Strategies	Freq	Mode	%
Monitors the business partner regularly.	16	A	94.12
Next financing decision refers to the previous financing	16	A	94.12

decision.			
Considers cost of financing especially in the last 6 months.	13	A	76.47
Terminating the project if it is not profitable.	13	A	76.47
Using shareholder capital to finance long-term equity financing.	11	A	64.71
Slowing financing, locating more funds in SBI *Sharia* if interest rises.	3	LP	17.65

F = frequency, which composed of respondents who choose options of: 1st + 2nd rank; priority; consideration; agree; yes; the most preferable + preferable. M = mode, which composed of respondents who choose options of: less preferred (LP) and; agree (A).

Based on the output in table 7.10, all Islamic banks:

i. monitor the business and entrepreneurs (business partners) regularly;
ii. decide next financing decision by referring to the previous one;
iii. consider cost of financing, especially in the last 6 months.

The significance of the first two variables is confirmed by the econometric models in Chapter 6.

Those proactive strategies seem reasonable to be implemented by Islamic banks concerning that the intentions of depositors to open Islamic accounts, their liquidity behavior and high frequency of withdrawals for transaction purposes. Nonetheless, if they can redirect such liquidity behavior and convince them to engage in long-term project financing, such proactive strategies can be improved further and Islamic banks would be able to operate various long-term financing contracts.

Taking into account Islamic banking strategies to manage cash flow on the asset side, the next assessment intends to find out the financing orientation and the eagerness of banks to expand financing. The results are listed in table 7.11.

Highlighting the earlier outputs, 15 Islamic banks (88.2%) clearly confirm that their financing orientation is for short-term and they use short-term funds to finance short-term projects or assets. Besides emphasizing the short-term tenure, 13 banks (76.4%) buy government *Sukuk* (SBSN) which is safe, profitable, and tradable if they need short-term liquidity.

Table 7. 11: Financing Orientation and Expansion

Islamic Banking Financing Orientations	Freq	Mode	%
Preferring short-term investment project financing.	15	P	88.24
Financing short-term projects with short-term funds.	15	A	88.24
Preferring short-term debt financing contracts.	14	P	82.35
Buying government *Sukuk* (SBSN).	13	A	76.47
Using shareholder capital for long-term equity financing.	11	A	64.71
Locating short-term deposits in money market and SBIS.	11	A	64.71
Preferring liquidity of the projects rather than being profit oriented.	10	A	58.82
Islamic Banking Willingness to Expand Financing	Freq	Mode	%
Welcoming 1-3 years trade/leasing proposal.	14	P	82.35
Conducting joint venture financing with other Islamic banks.	13	A	76.47
Welcoming with new project proposals.	10	P	58.82

F = frequency, which composed of respondents who choose options of: 1st + 2nd rank; priority; consideration; agree; yes; the most preferable + preferable. M = mode, which composed of respondents who choose options of: preferred (P) and; agree (A).

Conversely, the survey indicates the willingness of Islamic banks to expand the tenure of financing into the long-term one as acknowledged by 14 Islamic banks (82.3%) that are welcome for the 1-3 years trade financing proposals. Even, thirteen banks (76.5%) have established joint venture financing for specific projects and admitted proposals for new projects (10 banks, 58.8%).

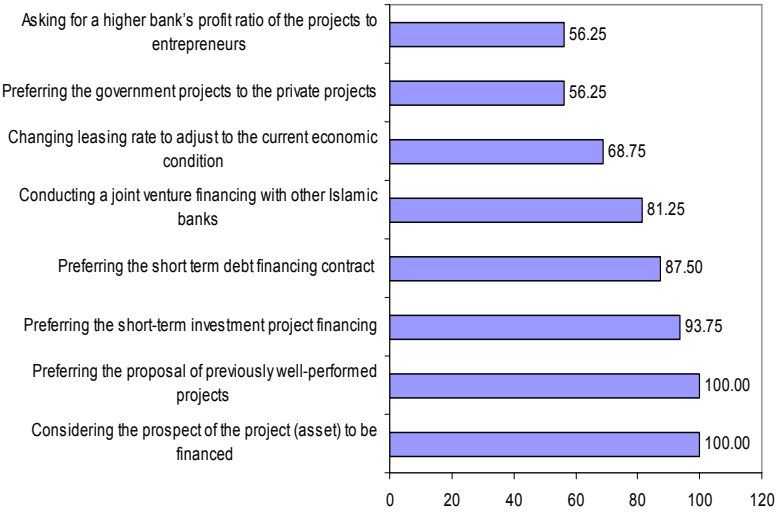
It is also proven by a correlation test which says that the variable of conducting joint venture financing with other Islamic banks modestly correlates with the variable of opening saving deposits to develop Islamic projects from the depositors side ($\chi^2 = 10.256$; asym sig = 0.036; phi value = 0.159). This is a good starting point to diminish the domination of debt financing and increase equity financing.

Figure 7.8 further explains the policies of banks to expand financing. Considering the prospect of the projects (assets) to be financed stays in the 1st place of their financing expansion policies. It means that they are quite open to try new projects so long as they are profitable.

If the new projects proposal is unconvincing, they then turn to the second policy which prefers proposals from those involved in previously well-performing projects (either long-term or short-term tenure) as clarified by 16 of 17 banks in the survey.

Finally, when the proposals of historically well-performed long-term projects are limited, financing short-term projects and short-term asset (debt) financing have become their next priorities.

Figure 7. 8: Financing Expansion Policies (%)



7. 6. 3. Balancing Assets and Liabilities

This survey reveals how Islamic banks manage the routine demand for liquidity from depositors. The rating scale listed in table 7.12 shows that Islamic banks employ two main actions: (i) regularly calculating and analyzing the patterns of liquidity withdrawals (1st priority); and (ii) relying on cash reserves to fulfill the daily liquidity withdrawals (2nd priority).

It implies that during normal conditions the calculation and analysis of the demand for liquidity are relatively accurate and reliable. Particularly, the patterns are analyzed from the movement in the money market as stated by the chairmen of all BUS through bilateral email communications with the author. These facts are in line with the ones from industrial analysis in Chapter 5.

Table 7.12: Managing the Routine Demand for Liquidity

Policies to Manage the Routine Demand for Liquidity	Rating Scores	Final Result
Regularly calculating and analyzing the pattern of liquidity withdrawal.	4.35	1st Priority

Relying on cash reserves to fulfill daily liquidity withdrawal.	4.06	2nd Priority
Coordinating withdrawal schedule of big depositors.	3.94	3rd Priority
Locating extra liquidity above reserve requirement in BI.	3.41	4th Priority
Convincing depositors to lengthen tenor of time deposits.	3.18	5th Priority
Knowing how many rational and religious depositors	2.06	6th Priority

However, besides those two actions, there are other actions that banks can take to balance assets and liabilities, which are their 3rd, 4th, 5th, and 6th priorities, as follows:

i. Coordinating withdrawal schedules of big depositors (3rd priority).
ii. Locating extra liquidity above reserve requirement in BI (4th priority).
iii. Convincing depositors to lengthen tenor of time deposits (5th priority).
iv. Knowing the number of rational and religious depositors (6th priority).

Nevertheless, these supporting actions require extra effort, especially those dealing with the behavior of depositors and motivations (point number one and three above).

After knowing how the banks manage the routine demand for liquidity, the survey intends to find out how they maintain the equilibrium of the asset and liability sides. Three policies which are acknowledged by than 12 banks (70.6%) are:

i. Matching tenor and amount of funds on the assets and liabilities (14 banks, 82.3%).
ii. Buying government *Sukuk* (SBSN) for alternative financing allocation (13 banks, 76.4%).
iii. Pooling the short-term and long-term funds and distributing them to certain allocations (12 banks, 70.6%).

The first policy is a theoretically based concept that Islamic banks have been trying to implement. The second one is essentially the preemptive policy of banks against unanticipated liquidity withdrawals or project failure by locating some funds in *Sukuk*, which is very liquid, profitable and secure.

The last one reveals the actual condition where many of the deposits are available for short-term rather than long-term tenors, whilst financing proposals consist of short and long-term tenors (analyzed in detail in chapters 5 and 6). Hence, pooling the short-

term and long-term deposits and placing them proportionally into various assets/projects financing is the best practice that banks might do under the current circumstance.

Despite those main policies, some banks practice other policies such as locating some short-term deposits in Islamic money market and SBIS (11 banks, 64.7%), offering a *Mudarabah muqayyadah* account (10 banks) and convincing depositors to lengthen the tenor of time deposits (4 banks, 23.5%). The first one is clearly for the purpose of short-term liquidity, while the second and third ones are the effort of banks to shore up the previous policy to match the tenor and amount of funds on the assets and liabilities.

7. 7. SOURCES OF LIQUIDITY RISK PROBLEM AND LIQUID INSTRUMENTS

Besides undertaking various policies to manage liquidity risk, Islamic banks still have to be aware of some potential sources of liquidity problem and prepare liquid instruments to mitigate them. In general, such sources come from bank balance sheet (asset and liability sides) such as from the performance of depositors and entrepreneurs, and from the non-balance sheet sources such as problems in the Islamic money market. All Islamic banks engaged in this survey rank six potential sources of liquidity distress as listed in table 7.13.

The most two serious liquidity problems are: (a) the rational depositors who are very sensitive to interest rate return; and (b) the large portion of short-term time deposits (1-month). Precisely, these two potential problems arise from the investigation of Islamic banks to the investment and liquidity behavior of depositors. In particular, Islamic banks are aware of depositors who are very sensitive to movements of interest and become depositors just for transaction purposes.

Table 7. 13: Sources of Liquidity Risk Problems

Sources of Liquidity Risk Problems	Rating Score	Final Result
Rational depositors who are very sensitive with interest rate return.	2.53	1st Priority
Large portion of short-term time deposits (1 month).	2.41	2nd Priority
NPF which can lower your profit and revenue-sharing to depositors.	2.19	3rd Priority
Increasing interest rates because of tight monetary policy	2.12	4th Priority

Difficulty or limited access to Islamic money market (PUAS)	1.71	5th Priority
Difficult to find prospective and profitable financing proposal.	1.63	6th Priority

The next potential sources are not from depositors. First is non-performing financing (NPF) which can interrupt the return-sharing to depositors; the second one is increasing interest rates because of the tight monetary policy. These two facts actually clarify the prior result of banks' placements in government *Sukuk* (SBSN) and central bank certificate (SBIS), which are for liquidity and return oriented purposes. Because the worries of NPF and interest are ranked in the 3rd and 4th potential sources of liquidity distress, the main orientation of Islamic banks is to prefer short-term (debt) financing to long-term (investment) financing.

The least potential liquidity problems are the difficulty to access Islamic money market (PUAS) and to find a profitable financing proposal. Islamic banks are less anxious about access to Islamic money market because so far there is no significant entrance barrier to the market.

Most Islamic banks are very willing to lend and borrow among themselves in the market and there is no competition or market segmentation like in the conventional banking sector. Finally, so far Islamic banks are very unlikely to have difficulty in finding prospective projects. This is shown by FDR, which lies beyond 100%, as stated in Chapter 5.

How do banks remedy the liquidity problem if it occurs? Seventeen banks in this survey share their policies with respect to solving liquidity problem, especially what liquid instruments are used to tackle them, as listed in table 7.14. The most preferred option is borrowing from the Islamic money market, which confirms that this market is easily accessible with no significant entrance barrier.

All chairmen of BUS in the bilateral email communications with the author share that one of their ultimate elements of the contingency funding plan (CFP) is borrowing from the Islamic money market. The second most preferred policy is borrowing from the parent company.

Table 7.14: Liquid Instruments

Liquid Instruments	Rating Score	Final Result
Borrow funds from Islamic Money Market (PUAS).	5.71	1st Priority
Borrow funds from parent company (for UUS).	5.24	2nd Priority
Repurchase (repo) SBI *Sharia* to Bank Indonesia.	3.94	3rd Priority
Withdraw private placement in other banks.	3.88	4th Priority
Use bank's capital to cover liquidity demanded.	3.06	5th Priority
Sell Islamic securities owned in secondary market.	2.53	6th Priority
Ask depositors to wait for extra days.	2.00	7th Priority
Use intra day emergency liquidity facility (FLI).	1.06	8th Priority

For UUS (11 banks out of 17 Islamic banks), relying on parent company is the fastest and the safest way to gain urgent liquidity, because structurally they are under the coordination of parent company, as stated before. The other liquid instruments used by Islamic banks are repurchasing (repo) SBI *Sharia* to Bank Indonesia or withdrawing private placements in other banks, positioned in their 3rd and 4th priorities.

Because the allocation of funds in the forms of SBIS and private placement is not dominant, settling them into cash is not a lesser priority than borrowing from the Islamic money market or the parent company. Finally, the least favorite instruments are consecutively:

i. Using the bank capital to cover the demand for liquidity (the 5th priority).
ii. Selling Islamic securities owned in secondary market (the 6th priority).
iii. Asking depositors to wait for extra days (the 7th priority).
iv. Using intra-day emergency liquidity facility (FLI) (the last priority).

Actually using these instruments would bring consequence of negative sentiment in the Islamic banking industry about the robustness of an Islamic bank's liquidity management, principally using the 7th and the 8th priorities. Hence, all Islamic banks being surveyed consider them less.

7. 8. CLOSING REMARKS

The Indonesian Islamic banking depositors can be divided into three segments, namely: (i) *Sharia*–driven depositors, who become depositors based on their belief in *Sharia* principles and values; (ii) profit–driven depositors, who are mostly driven by

profit and position Islamic banks indifferently from conventional banks; and (iii) transaction-driven depositors, who deal with Islamic banks for transaction purposes *per se*.

With regard to withdrawing funds from Islamic banks, depositors do it: (i) for the purpose of regular transaction needs; (ii) to relocate tenor of time deposits for a better return; (iii) to switch time deposits to conventional deposits and; (iv) to switch time deposits to other BUS/UUS for a better return.

Meanwhile, Islamic banks have ALCO chaired by a director/manager to manage liquidity and in UUS, the parent company coordinates the decisions on liquidity management. Further, it is found that Islamic banks apply two approaches to manage liquidity on the liability side, which are: (i) managing liquidity reserves during normal conditions; and (ii) managing extra liquidity reserves during special conditions, both are placed on the asset side.

On the asset side, Islamic banks carry out some approaches to manage liquidity such as: (a) financing of previously well-performed projects; (b) requiring collateral or *Kafalah* (third party guarantee) and; (c) financing entrepreneurs who are depositors of the banks.

Lastly, if liquidity risk problems occur, Islamic banks undertake some actions. The most preferred action is to borrow funds from either the Islamic money market or parent company. If further liquidity is required, they repurchase (repo) SBI *Sharia* to Bank Indonesia or withdraw their private placements in other banks.

Chapter 8
CONTEXTUALIZING THE FINDINGS: AN INTERPRETATIVE DISCUSSION AND RECOMMENDATIONS

8. 1. INTRODUCTION

This chapter, which is part of the empirical research chapters, integrates the empirical analyses in chapters 5, 6, and 7 and evaluates them in light of the *Sharia* guides and international banking standards on liquidity risk management which were outlined in chapters 3 and 2.

Moreover, this final part not only comprehensively discusses the issue of liquidity risk but also proposes an integrated and comprehensive program to improve the recent practices of managing liquidity risk in the Indonesian Islamic banking industry. The program suggests three consecutive steps to manage liquidity risk and banking activities in a more professional and profitable manner under the *Sharia* corridor.

First of all, the chapter discusses the organizational structure in relation to managing liquidity risk. The current structures of BUS and UUS open some areas of improvements, and the thesis suggests some advancement in the functions of risk management departments/committees, the improvement of cooperation and coordination among them, as well as the inclusion of external parties in liquidity management decisions.

The second discussion explores the liability side that represents the liquidity behavior of depositors and the source of short-term liquidity withdrawals. Based on the findings from the three empirical research chapters, this part proposes rearranging the liquidity management on the liability side and educating depositors concerning liquidity behavior.

The third part of the chapter discusses the asset side and assesses the banks' liquidity management practices, including the liquidity risk problems and Islamic liquid instruments. This asset side also shows area of potential improvement concerning banking performance and matching activities with the liability side to prevent asset-liability imbalance.

In the end, the thesis constructs and proposes an integrated and comprehensive program to manage liquidity risk which captures and assimilates all aspects of the problem. The program would propose to the industry a better way of managing liquidity risk and running the banking activities based on *Sharia* guides and standard banking practices.

8. 2. ORGANIZATIONAL STRUCTURES

The organizational structures of BUS and UUS depicted in figures 5.2 and 5.3 in Chapter 5 raise some issues. Those are: (i) the lack of cooperation/coordination with external parties (banking regulators, entrepreneurs, depositors); (ii) a merely implicit control of liquidity risk within departments under the responsibility of the head of UUS; (iii) the centralization of liquidity management; and (iv) a blended function in the structure of the parent company of UUS in managing liquidity.

However, referring to the current business environment, the operations of Islamic banks are more challenging and complicated than before. Inter-bank cooperation needs to be intensified greatly as suggested by the BIS and IFSB, as does the coordination of regulators and Islamic banks to manage liquidity.

It is very important since the industry: (i) has the potential of short-term liquidity withdrawals of up to 33.13% of the total deposits as calculated in Chapter 5; (ii) has to be aware of the interest-benchmarking rational depositors as identified and modeled in chapters 6 and 7; and (iii) has to consider the profit- and transaction-driven depositors as found by the field survey in chapters 5 and 7.

Furthermore, comparing those structures with the standard structures in figures 2.4 and 2.5 (Chapter 2) provides the following suggestions regarding how to improve the present structure:

i. Establishing a direct interconnection between the three bodies in BUS. The existing structure of BUS interconnects each body in the structure through the authority of the body, while a direct link between the three bodies has not yet been established. For example, communication among the risk management committee, risk monitoring committee, and directorate of compliance and risk management depends entirely on the communication between the President Director and the Board of Commissioners. In order to establish a sound process to measure and monitor liquidity (one of the important points noted in IFSB guides on risk management of 2005, see Chapter 3), the independent direct link and interconnection among the three bodies should exist as structured in figures 2.4 and 2.5.
ii. By looking at figures 5.2 and 5.3, Islamic bank should realize the importance of banking regulators (government, central bank), inter-bank cooperation and the public in supporting the structures of BUS and UUS to manage liquidity as recommended by BIS in Chapter 2. The communication and coordination between the related bodies responsible for managing liquidity risk in banks and the regulators, the other Islamic banks and the public do not particularly and strongly exist. The BUS structure relies solely on the actions of the Board of Commissioners (chairing the risk monitoring committee) and the President Director (chairing the risk management committee and the directorate of *Sharia* compliance and risk management) to manage liquidity. External parties are not actively engaged in the formulation of liquidity management decisions in the Islamic banking organizations. For the UUS, their interaction with external parties goes through both the President Director, who manages both the conventional and *Sharia* operations of the bank, and the head of UUS, without specific support from the particular Islamic risk management departments.
iii. As such, both BUS and UUS are strongly recommended to have: (i) a business risk management committee to focus on entrepreneurs, (ii) an operational risk management committee to ensure the compliance of banking operations with banking regulations, and (iii) a financial risk management committee to accommodate any

improvement in depositors or public as mentioned in chapters 3 and 5. These three additional committees support the tasks of the Board of Directors and *Sharia* Supervisory Board to manage liquidity risk.

iv. The standard structure and IFSB guides highlight the possibility that the flow of feedback can directly come from the bottom ranks (decision followers) of the structure to the upper ranks (decision makers) as explained in chapters 2 and 3. In fact, the present BUS and UUS structures do not yet facilitate this flow of feedback. Rather, the flow of feedback only goes through the Directorate of compliance and risk management in the BUS or Treasury department in the UUS. There is no possibility of cooperation/communication with other bodies such as the risk management committee, risk monitoring committee, President Director, and Board of Commissioner in the BUS or risk management department, and the head of UUS and President Director in the UUS.

v. Further, the ALCO in the parent company should have a special sub-committee capturing risk management in UUS. Under the authority of the Board of Directors (particularly the Director of Risk Management) and the Board of Commissioners, ALCO might collaborate with the risk management department to have direct access to the operations of UUS and to be involved in its liquidity risk management process.

8. 3. INTEGRATED OUTPUT OF THE EMPIRICAL RESEARCH CHAPTERS

This section compiles and integrates the output of the empirical research chapters and constructs figure 8.1 below. The empirical research chapters recognize three integrated aspects to explain the liquidity risk management mechanism in the Islamic banking industry. The first aspect, as shown in the big black box in figure 8.1, consists of examining: (i) the characteristics of depositors, (ii) the investment and liquidity behavior of depositors, and (iii) the investment expectations of depositors.

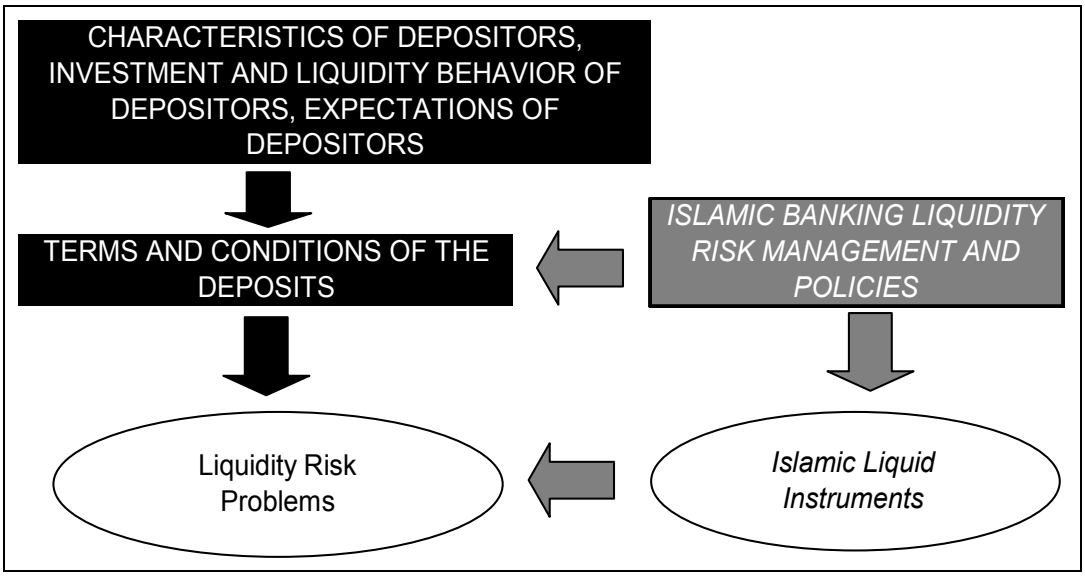
The assessments in this black box generate information about the terms and conditions of deposits that is depicted in the small black box. This is because the analyses of the characteristics of depositors, investment behavior of depositors, and investment expectations of depositors underlie the understanding about the characteristics of the funds and the depositors' liquidity behavior (terms and conditions of the deposits). These

are the main results of the analyses of depositors, brought together comprehensively in figure 8.1.

Following the analyses of the depositors, the empirical research chapters continue with the investigation of the way Islamic banks manage liquidity risk; this is portrayed in the grey box. This grey box represents the liquidity management practices and policies of Islamic banks in balancing the asset and liability sides and avoiding liquidity mismatch.

These tasks indeed become easier if the funds are well-managed; the depositors are very cooperative and communicative with the banks and well-informed about liquidity behavior. In reality, some depositors are very sensitive to interest rate return (profit-oriented or rational depositors) and locate their funds in the short-term deposit tenors that do not support financing activities, as identified and discussed in chapters 5, 6 and 7.

Figure 8. 1: Framework of the Output of Empirical Research Chapters



As such, although the Islamic banks have tried to set up a robust liquidity management and consider liquidity behavior of depositors, liquidity risk problems may sometime still exist, as drawn by the 1st ellipse of figure 8.1. In order to anticipate such problems, Islamic banks have prepared Islamic liquid instruments (from external and internal sources of the banks) to control and maintain the overall balance of the liquidity as drawn by the 2nd ellipse of figure 8.1.

8. 4. DISCUSSION OF THE DEPOSITORS' SIDE

8. 4. 1. Characteristics of Depositors, Investment Behavior and Expectations

The three empirical research chapters (chapters 5, 6, and 7) describe the characteristics of depositors, their investment behavior, and expectations, which are explained through: (i) the analysis of general characteristics of depositors, (ii) the segmentation of depositors, (iii) the considerations/expectations of depositors when depositing money, and (iv) the ending of the depositors' relationship with Islamic banks.

In particular, Chapter 7 discusses the general behavior and characteristics of the depositors. It finds that the understanding of depositors regarding Islamic deposit instruments is very high, but their understanding of financing instruments is very low and the same as their use of financing instruments.

These underlying conditions should become the bases for Islamic banking policies, including liquidity risk management policies. The next elaboration on depositors finds that they do not monitor their Islamic banks intensively and prefer taking their funds out of the banks if the economy is unstable (see table 8.1).

Further inspection comes with the segmentation of depositors which clarifies and strengthens the previous messages. As analyzed in chapters 5 and 7, the dominant segments of depositors are those who look for profit (primarily from the profit-driven segment and from the *Sharia*-driven segment). The others, who are not profit-oriented and the transaction–driven segment, are less dominant than the former.

Table 8. 1: Characteristics of Depositors, Investment Behavior and Expectations

General Behavior/Characteristics of Depositors	Considerations/Expectations of Depositors When Depositing Funds
High understanding of the Islamic deposit contracts.	Revenue-sharing of Islamic banks.
Low understanding of the Islamic financing contracts.	Operational income of Islamic banks.
Low involvement in Islamic financing schemes.	SBI rate.
No intensive monitoring of Islamic banking performance.	Cost of operation of Islamic banks.
Holding cash if the economy is unstable.	Prior position of deposits.

Segments	Ending the Relation with Islamic Bank
Sharia-driven.	If the Islamic bank is found not *Sharia*-compliant.
	If economic conditions cause them to leave Islamic banks.
Profit-driven.	If the Islamic bank ever delays any withdrawal request.
Transaction-driven	If the Islamic bank ever needs emergency liquidity from Bank Indonesia.
	If the Islamic bank does not have proper facilities/networks.

The general behavior/characteristics and segmentation of depositors leave one important message, namely that the active interaction of depositors with Islamic banks is still concentrated on the liability side. As such, the contributions of depositors in providing funds for Islamic financing are not optimal yet because:

i. short-term profit motives mostly underpin their investment activities;
ii. some of the depositors use Islamic banks for transaction purposes only;
iii. the depositors have asymmetric information about the financing activities (asset side) of Islamic banks.

The other examination, which is the econometrics approach in Chapter 6, reconfirms such depositor behavior/characteristics. The econometrics models reveal the top three considerations of depositors when depositing funds in Islamic banks, which are: (i) how much revenue-sharing is paid by Islamic banks; (ii) how much operational income is received by Islamic banks; and (iii) the SBI rate. Therefore, continued improvement of the performance of the asset side (financing return) is another important way for Islamic banking to maintain the loyalty and fulfill the investment expectations of depositors.

The final information pertains to the reasons why depositors will end their interaction with Islamic banks. It is essential that Islamic banks understand these reasons because Islamic financing (projects) requires a long-term commitment of funds, and any termination/permanent disconnection from the bank might interrupt the sustainability of the projects and create liquidity imbalance. Interestingly, this study finds that improper

performance and operations of the Islamic banks and unfavorable economic conditions are the primary reasons for depositors to leave the bank. The list of such reasons is below:

i. A non-*Sharia*-compliant Islamic bank.
ii. Unfavorable economic conditions.
iii. Requirement of emergency liquidity from the central bank at any point.
iv. Poor liquidity management such as delaying any liquidity withdrawal.
v. Unfavorable economic conditions and lack of standard banking facilities.

In conclusion, this sub-section suggests three main messages which are key factors in successfully managing liquidity risk in the Indonesian Islamic banking industry:

i. The depositors of Islamic banks want professional management of the funds. Despite their intention to support Islamic banks for religious reasons, depositors expect the banks to produce continuous profit (income) and pay competitive revenue-sharing.
ii. However, such depositors' expectations should be realized under the corridor of *Sharia* (*Sharia*-compliance). *Sharia*–compliance of the bank is the ultimate request of depositors, who otherwise will leave the banks.
iii. Moreover, Islamic banks are also expected to have proper liquidity management and to provide standard banking facilities and networks.

8. 4. 2. Terms and Conditions of the Deposits and Liquidity Behavior

The assessment of the characteristics of depositors, their investment behavior, segmentations, and expectations underlies the information regarding the terms and conditions of the funds. Based on the industry's performance analysis in Chapter 5, the terms and conditions of the funds can be summarized as:

i. The ratio of liquid and less liquid deposits is almost fifty-fifty (50:50), including more than 19.53% of less liquid deposits which are 1-month tenor *Mudarabah* time deposits.
ii. The total short-term demand for liquidity is 33% of the total deposits.

iii. The individual depositors own 97.4% of the total accounts (but in small nominal values) and most of them (94%) place the funds in the *Mudarabah* time deposits.
iv. The corporate depositors own 2.6% of the total accounts (but in high nominal values) and most of them (90.9%) place the funds in demand and saving deposits.
v. The *Wadiah* demand deposits are very sensitive to unpleasant economic conditions.

The 1st and the 2nd points highlight the potential of short-term liquidity withdrawals that have to be promptly managed by Islamic banks. Specifically, based on the prior findings and conclusions of the characteristics of depositors, their investment behavior, segmentations, and expectations, such potential liquidity problems may happen if the Islamic banks fail to fulfill and realize the expectations of depositors.

The remainder of the points again highlights the importance of convincing depositors to locate appropriately the tenor of placement of the funds. The individual depositors can be offered a longer tenor of *Mudarabah* time deposits which offers a more promising return.

For the potential individual depositors, Islamic banks may even offer a special time deposit contract (*Mudarabah Muqayadah* or *Musharakah* time deposit) which concentrates financing to certain project(s) under bilateral agreements. In this case, these potential depositors are actively involved in choosing and deciding which project(s) to finance. Hence, their portion of revenue-sharing might be bigger than that in the non-special time deposit, but the depositors have to be ready for loss-sharing as well.

Based on the results of the field survey in Chapter 7, only 10 BUS/UUS of the total 17 BUS/UUS are conscious of this idea, a fact which is reflected in an insignificant share of these special contracts among their total time deposits. However, referring to the previous conclusions regarding the characteristics of depositors, their investment behavior, segmentation, and expectations, it can be concluded that one of the depositors' main purposes of depositing money is how much revenue-sharing is paid by Islamic banks. Therefore, offering a special time deposit contract might be one of the best solutions to redirect the tenor of placement of the funds and optimally utilize the funds.

Meanwhile the transaction motive of corporate depositors for depositing money in Islamic banks can further be facilitated by improving the bank facilities (ATM machines, withdrawing schemes, online banking services, mobile phone banking services, etc.). In addition, Islamic banks should guide them to have investment motive concerning that the funds available in the corporation are higher than the ones in individuals. To do this, Islamic banks might:

i. Approach the prospective corporations to negotiate longer placement and higher nominal values of the funds. Offering these corporations a negotiable return-sharing ratio or prospective projects to be financed is an example of such an approach.
ii. Approach the government, which is one of the prominent corporate depositors, to support the development of the industry by placing more funds in long-term time deposit tenors.
iii. Keep improving sound banking performances which have been achieved for years. This will hopefully bring more trust from corporate depositors to invest more funds for investment purposes and they will be less sensitive to short-term unfavorable economic conditions.

8. 5. DISCUSSION OF THE ISLAMIC BANKING SIDE

This section extends the study of the depositor (liability) side into the Islamic banking side. In fact, Chapter 7 explained the efforts of Islamic banks to manage liquidity on the liability and asset sides as well as balancing liquidity on both sides.

For example, on the liability side, Islamic banks try to prevent liquidity outflows of the depositors by: (a) negotiating revenue-sharing ratios and, (b) sacrificing profit to continue the payment of positive return-sharing. On the asset side, they release financing prudentially to prevent business losses or defaults and to optimally gain profit (return). To balance both asset and liability sides, they try to match the tenors and balance the funds on the liability and asset sides.

Furthermore, Chapter 5 found that Islamic banks have prepared internal liquidity reserves to serve regular demand for liquidity. They also have organized three tiers of groups of liquid instruments to mitigate both predictable and unpredictable irregular

demand for liquidity. In particular, the determination of the optimal liquidity reserves has been assessed in Chapter 6 and finds that it is a function of:

i. Profit from operational financing,
ii. Profit from all investments,
iii. Revenue-sharing over total deposits and,
iv. Previous position of liquidity reserves.

In the end, in order to manage routine demand for liquidity, Islamic banks study the pattern of liquidity withdrawals and rely on cash reserves together with communications with big depositors, as analyzed in chapters 5 and 6.

All of the Islamic bank efforts have been quite successful in managing liquidity. As mentioned in Chapter 5, the main Islamic banking indicators keep growing and promising, but the market share of the industry is still small compared with the conventional banking. Nonetheless, the trust of depositors is still very high since there is no significant liquidity withdrawal as indicated in Chapter 7.

This means that the industry has the potential to be the dominant market player but it has to be well-prepared since Islamic banks never had an experience of becoming the dominant industry player with very complicated banking products, huge numbers of creditors, networks, being rushed by the rational depositors, or facing big business defaults or losses.

8. 6. LIQUIDITY PROBLEM AND ISLAMIC LIQUID INSTRUMENTS

It is realized that liquidity problem might still occur even after Islamic banks apply robust policies and strategies to manage liquidity. The empirical survey in Chapter 7 identifies the top three potential causes of liquidity problems. The first cause is the rational depositors who are very sensitive to the movement of interest rates.

The second one is the significant portion of the short-term demand for liquidity, especially the 1-month *Mudarabah* time deposits that may imbalance the asset-liability equilibrium and limit the Islamic banks to arrange the optimal financing allocations. The

last one is macroeconomic factors, particularly raising interest rates that could tempt rational depositors to switch their deposits from Islamic banks to conventional banks.

These truths imply the importance of preemptive, continuous, and comprehensive efforts to educate depositors of the consequences of their investment and interaction with Islamic banks. In addition, maintaining the stability of economic conditions is also required in order to prevent any potential liquidity withdrawals. As noted in Chapter 7, one of the reasons depositors take money and leave Islamic banks is because of economic conditions which oblige them to hold cash.

In anticipating liquidity risk problem, Islamic banks already use some liquid instruments explained in Chapter 7. The top three liquid instruments are:

i. Borrowing funds from the Islamic money market.
ii. Borrowing funds from the parent company (for UUS).
iii. Repurchasing SBIS to Bank Indonesia.

The application of these instruments has been helping the banks mitigate both predictable and unpredictable irregular demand for liquidity.

However, relying on the money market, parent company or central bank is not always appropriate. In the case of economic turbulence, such as the Asian economic crisis of 1997-1998 or the global financial crisis of 2008-2009, the money market was very rigid, many big (parent) companies experienced liquidity shortages, and it was not easy to repurchase the central bank securities. As such, Islamic banks could better manage liquidity if the structure of liquidity on the liability and asset sides were reconstructed as discussed in the next section.

8. 7. A RECOMMENDED PROGRAM TO MANAGE LIQUIDITY RISK

After identifying and analyzing the depositor side (characteristics, behavior, etc.), and after examining the efforts of Islamic banks to manage liquidity, the thesis recognizes that the current Islamic banking liquidity risk management is not heading in the right direction. Based on the BIS standard banking operations and IFSB guiding principles of risk management for institutions offering only Islamic financial services which have been

explained in chapters 2 and 3, the present liquidity risk management practices should be strengthened and improved to be more compliant with the *Sharia* principles and reach the ideal Islamic banking operations.

This final section constructs and proposes an integrated and comprehensive program to manage liquidity and is shown in table 8.2. The program is comprised of three important consecutive elements:

i. Institutional deepening.
ii. Restructuring liquidity management on the asset and liability sides.
iii. Revitalizing the usage of the Islamic liquid instruments.

8. 7. 1. Institutional Deepening

This first element proposes continuous socialization of Islamic banking principles and operations to the public to deepening its understanding of Islamic banking institutions. This can be done through cooperation among Islamic banks, stakeholders, and regulators to expand the public understanding, in particular the understanding of entrepreneurs, suppliers, depositors, academics, and Islamic scholars. *Sharia* requires the engagement of all related parties in the process of liquidity management as elaborated in Chapter 3.

Table 8. 2: The Program to Manage Liquidity Risk

I. Institutional Deepening	
a. Continuous socialization of Islamic banking principles and operations to the public.	
b. Cooperation with the stakeholders and government to expand the public understanding of Islamic banks.	
c. An intensive and continuous education of current and potential depositors and entrepreneurs regarding Islamic banking principles.	
II. Restructuring Liquidity Management on the Asset and Liability Sides	
II. 1. Restructuring liquidity management on the liability side	II. 2. Restructuring liquidity management on the asset side
a. Developing more varieties of the deposits products.	a. More financing to equity-based financing.
b. Redirecting the tenor of placement into longer-term deposit tenors.	b. Intensifying a joint (syndicated) and gradual payment of financing.
c. Fostering the *Mudarabah muqayadah* deposits contract.	c. Investing funds in the SBSN.

d. Attracting high amounts of investment funds.	d. Strictly matching tenor of funds and financing.
II. 3. Improving Islamic bank policies to balance assets and liabilities	
a. Implementing a profit- and loss-sharing concept instead of a revenue-sharing concept.	
b. Paying deposit return purely based on the performance of real business and not influenced by the interest rate.	
c. Calculating and analyzing the patterns of liquidity withdrawal should count on the impact of unstable economic conditions.	
III. Revitalizing the Usage of the Islamic Liquid Instruments	
a. Diversifying Islamic money market instruments.	
b. Diversifying the placement of funds into various tenors of SBI *Sharia*.	
c. Utilizing SBSN (purchase or repurchasing) and the domestic/foreign *Sukuk* market to optimize liquidity management.	

Lastly, the intensive and continuous education of current and potential depositors and entrepreneurs regarding Islamic banking principles should be applied by Islamic banks, banking regulators, and all related parties. This education is based on the findings of Chapter 7 that depositors know about Islamic banks but still choose the banks for transaction purposes only instead of investment ones. Many of the individual depositors also expect continuous return payments on deposits but still place their funds in the short-term tenor of *Mudarabah* time deposits.

The expected results of applying the first element are:

i. The level of understanding, awareness, and knowledge of the public in general and depositors/entrepreneurs in particular will improve and move toward the ideal contribution to the development of Islamic banking industry.
ii. Considering that depositors, entrepreneurs, and all stakeholders are integral parts of Islamic banking operations (passive or active partners), such an improvement will hopefully relieve the existing problems of rational depositors, transaction-motive depositors, concentration of funds in the short-term tenor of *Mudarabah* time deposits, and sensitivity of depositors to interest rate return.
iii. Good cooperation and communication with the public (depositors, stakeholders, etc.) will help Islamic banks to manage funds more appropriately by: (a) managing the time of liquidity withdrawals; (b) planning, organizing and monitoring financing of the business sectors; (c) estimating an optimal and accurate return on investment and;

(d) setting the real profit- and loss-sharing ratios independently and unaffectedly from interest rate return.

8. 7. 2. Restructuring the Management of Liquidity on the Asset and Liability Sides

In line and integrated with the implementation of the first element, the second element restructures the management of liquidity on the liability and asset sides. The first action is restructuring liquidity management on the liability side. This thesis recommends the Islamic banks to develop more varieties of deposit products.

One of the reasons for depositors' ignorance and their lack of communication with the banks is because of the limited Islamic banking products. They ask for the products which suit their needs and expectations. For example, Islamic banks should offer special purpose deposits, bassacurance (bank and insurance) deposits, children's (i.e. educational) deposits, and pilgrimage deposits.

The next action is redirecting the tenor of placement of funds from short-term deposit tenor into longer-term deposit tenor. Supported by the improvement of business partners in the first element and the varieties of incentives/advantages to be offered in deposit contracts, this task should easily be accomplished. The banks just have to show their professionalism in managing the well-arranged funds under the principles of *Sharia* as requested by depositors/public.

The other action is to foster the employment of special investment time deposits (*Mudarabah muqayadah, Musharakah, Ijarah* deposit). Finally, it is realized that Islamic banks have not made reasonable attempts to attract more funds from potential depositors such as the government or retail depositors.

The two percent of market share and the deposit amounts of only between Rp2-5 million per individual depositor (mentioned in Chapter 5) opens the opportunity for the banks to invite new depositors and convince them (i.e. the new and the current depositors) to deposit more funds.

The second action is restructuring liquidity management on the asset side. Assuming that the restructuring on the liability side works as expected, this second

restructuring will make it possible to expand bank financing to equity-based financing. Moreover, the Islamic banks may go beyond the existing contracts to try new financing contracts such as *Musharakah mutanaqisah, Waqf, Forward ijarah, Wakalah* contracts as the potential and promising financing contracts based on *Sharia* principles.

Bilateral contracts between Islamic banks and entrepreneurs might be complemented with intensive applications of: (i) syndicated financing of a group of Islamic banks (or Islamic banks and the government) to finance prospective projects and (ii) the gradual payment of financing funds to entrepreneurs.

The database of business information in Bank Indonesia (launched in 2007) provides information for Islamic banks and entrepreneurs to select prospective projects. Moreover, this facility is hoped to expand equity-based financing that could generate more profit and show the real function of Islamic banks to develop the economy.

The next action is to utilize the government *Sukuk* (SBSN), which is also recommended by the IFSB in its technical notes as explained in Chapter 3. Since the approval of the *Sukuk* Act on May 7th, 2008, SBSN has formally and legally come into the market and Islamic banks may employ it to participate in the long-term project financing. SBSN is a secure and profitable Islamic liquid instrument.

By participating in SBSN, Islamic banks not only spread the alternative of investment but also develop the *Sukuk* market. Finally, restructuring liquidity management on the liability and asset sides should make it easy for Islamic banks to match the tenors and maturity dates of deposits on the liability side and funds allocations on the asset side.

The last action in the second element is to improve Islamic bank policies to balance the asset and liability sides. Assuming that the first element and the previous actions of the second element go well and are under control, the Islamic banks in Indonesia may start applying the profit- and loss-sharing (PLS) concept on both the liability and asset sides. In fact, the banks have so far only applied PLS on the asset side but not on the liability side as identified in chapters 5 and 7.

Indeed, the application of PLS on the asset and liability sides will synchronize the management of liquidity. It brings many benefits, including: (i) the return on investment shared with depositors is the actual and net result of bank financing; (ii) loss-sharing with depositors eases the liquidity risk management on the liability side and lessens the capital adequacy requirement; and (iii) the depositors become more aware and engaged in every financing activity and they do not just act passively as indicated in Chapter 7.

If the implementation of PLS is successful, the Islamic banks can turn to the next action of paying the deposit return based on the performance of real business, and free from the influence of interest rates. Islamic banks are capable of doing this since liquidity on the liability side is already well-organized to support real projects on the asset side.

Finally, the success in managing liquidity on the asset and liability sides helps Islamic banks to estimate accurately the patterns of liquidity withdrawals. However, as recognized in Chapter 7, economic conditions may trigger liquidity withdrawals, hence estimates should accommodate the possibility and impact of current and potential unfavorable economic conditions.

The expected improvements of applying the second element are:

i. The problem of short-term deposit concentration is solved because depositors are provided with various deposit schemes with different prospects of return.
ii. Islamic banks can precisely match the long-term demand for liquidity of the projects on the asset side and the available long-term tenor of deposits for investment on the liability side. The long-term investment deposits should grow since the banks attract more funds from retail investors as well as government institutions. This point and the previous one enable the Islamic banks to manage liquidity better, enlarge the market share of Islamic banking, and contribute more to the development of the Indonesian economy.
iii. The professionalism of Islamic banks to manage funds and generate high and competitive profit comes into the public. In this level of achievement, the operations of Islamic banks have reached the ideal ones due to:

a) The domination of equity (investment) based financing;
b) The application of PLS concept on the liability and asset sides;
c) The high involvement of depositors and entrepreneurs in the success of business project(s).

These conditions allow the banks to lower (minimize) the risk of business losses/defaults as well.

iv. The credibility and independence of Islamic banks become obvious because the determination of PLS is free from the influence of interest rates. These will also lead Islamic banks to create an Islamic benchmark rate instead of just using the SBI rate (central bank rate) or London inter bank offer rate (LIBOR).
v. The overall actions in this second element will hopefully allow Islamic banks to manage better the regular (routine) demand for liquidity.

8. 7. 3. Revitalizing the Usage of the Islamic Liquid Instruments

In order to mitigate the irregular (non routine) demand for liquidity, the last element of revitalizing the usage of the Islamic liquid Instrument is being proposed. The first action refers to the fact that Islamic banks prefer borrowing funds from the Islamic money market (PUAS). This is one of their CFP elements but unfortunately there is a limited Islamic money market instruments (see chapters 5 and 7). In this case, Islamic banks need to create new Islamic money market instruments in cooperation with the banking regulators.

One possibility is creating *Tabarru'* (non-commercial) Islamic money market instruments such as inter-bank *Qard hassan* certificates or inter bank *Wadiah* certificates to help each other in the spirit of *Tabayyun* (*Qur'an*, 26:176-183). The implementation of these two instruments requires good relations and cooperation among Islamic banks, and the second element has established such cooperation in the form of joint financing.

In addition, a command or recommendation from the association of Indonesian Islamic banking (ASBISINDO) to its members to assist each other can support the implementation of new instruments as well (Republika, 2004).

The second action is diversifying the placement of funds into various tenors of SBIS. Based on Bank Indonesia Regulation number 10/11/PBI/2008 article 4, the tenor of SBIS is available from 1 month to 12 months (Bank Indonesia, 2008a:3-10). The robust portfolio allocation of funds in the various tenors of SBIS will enable Islamic banks to match any unanticipated demand for liquidity because repurchasing SBIS to BI is one of the easiest ways to gain instant liquidity.

Last but not the least is utilizing the government *Sukuk* (SBSN). Islamic banks have an option to employ SBSN not only to locate the funds as suggested above, but also to obtain immediate liquidity to fulfill irregular demand for liquidity by repurchasing SBSN. As mentioned previously, from the larger perspective, the attachment in SBSN will also support the real sector (government projects), develop the *Sukuk* market, and expand the market share of the Islamic banking industry. Hence, under this recommended element, Islamic banks are strongly advised to utilize SBSN and to develop the *Sukuk* market.

The expected benefits of applying the third element are:

i. Islamic banks have various portfolio tenors that are ready to be used to fulfill any irregular demand for liquidity from the depositors.
ii. Islamic banks receive regular and positive return from SBIS or SBSN rather than leaving reserve money unutilized. As stated in Chapter 3, the *Sharia* terminology on managing liquidity is more than just matching asset and liability but should also include profit maximization and risk minimization.
iii. Islamic banks participate in economic development through participation in SBSN. *Sharia* requires that all economic/financial activities of Islamic banks should engage with the development of the real sector.
iv. Creating a more liquid Islamic money market after building sound cooperation among BUS/UUS. This action strengthens the BUS/UUS networks that have been established.

In conclusion, the final purpose of proposing an integrated and comprehensive program to manage liquidity is to lead the Indonesian Islamic banking industry into a better way of managing liquidity risk. In particular, the industry will have:

i. A better approach to treating depositors, entrepreneurs, and the public in their banking operations, and to guide and manage liquidity behavior of depositors and entrepreneurs.
ii. A better structure of liquidity on the liability and asset sides that links, integrates, and supports both sides in order to produce optimal return under the passage of *Sharia*.
iii. A better way of managing regular and irregular demand for liquidity.

8. 8. CLOSING REMARKS

The overall empirical research chapters (chapters 5, 6, 7, and 8) provide a comprehensive analysis of liquidity risk management in the case of the Indonesian Islamic banking industry. The chapters identify the characteristics of depositors, investment, the liquidity behavior of depositors, and the expectations of depositors.

They also analyze the liquidity risk management policies of Islamic banks, the potential sources of liquidity problems, and the Islamic liquid instruments to mitigate liquidity problem. Based on all of the discussions of the empirical research chapters, the thesis recommends an integrated and comprehensive program of liquidity risk management.

The program is comprised of three elements, which are: (i) institutional deepening, (ii) restructuring liquidity management on the asset and liability sides, and (iii) revitalizing the usage of the Islamic liquid instruments. The final purpose of such a program is to guide the Indonesian Islamic banking industry into a better way of managing liquidity risk. In addition, the recommended program contributes to the Islamic banking literature on managing risk.

Chapter 9
CONCLUSION

This chapter concludes the thesis. First of all, the research summary highlights the aim and objectives of the thesis and is followed by the brief findings and outcomes of two general parts of the thesis: the literature review chapters and the empirical research chapters. Then, the comprehensive analyses and the ultimate output of the PhD thesis follow in the interpretative discussion and recommendation chapter.

Following the research summary, the study recommends the policy makers and all stakeholders of the Islamic banking industry to consider and apply the recommended integrated and comprehensive program to manage liquidity risk. In fact, the results of this research are also applicable to the other countries having an Islamic banking industry. It is because the characteristics and liquidity behavior of Islamic banking depositors and the operations of Islamic banks in many parts of the world are more or less the same.

Finally, the research opens some potential areas of future development, especially if the current condition of the Islamic banking industry changes in the future. Nevertheless, such developments should not significantly change the recommended program which positions as the base policy program in Islamic banks instead they will strengthen and complement it with the new changing business conditions and environments.

9. 1. RESEARCH SUMMARY

The aim of the thesis is to analyze the management of liquidity risk in the Indonesian Islamic banking industry through balancing assets and liabilities. By adopting quantitative research methodology, it has some objectives which are followed up by the quantitative and qualitative methods used in the empirical research chapters.

The research starts elaborating the international banking standards and *Sharia* guides on liquidity risk management. Then, it does empirical research analyses to analyze

the performance of the industry, identify factors determining a balance asset-liability, and observe the behavior of banking depositors and Islamic banks. All are done by using a combination of quantitative and qualitative research methods. Finally, the recommendations of the thesis are the result of comprehensive and overall analyses between the findings from empirical researches and referred literature.

First of all, the literature on international banking standards addresses the importance of the following in managing bank's liquidity: (a) determining accurate, understandable and accommodative liquidity risk management policies, (b) having a responsive asset and liability committee (ALCO), (c) establishing an effective information system for monitoring and reporting and, (d) having a robust internal control system to manage liquidity in banks. In addition, the literature identifies some techniques to mitigate liquidity risk and financial instruments as sources of funds for the banks to fulfill the demand for liquidity from depositors.

Meanwhile, secondly, the literature of *Sharia* guides to manage liquidity risk suggests Islamic banks to manage liquidity risk by engaging and requiring active roles of depositors, entrepreneurs, and Islamic banks in managing liquidity risk and anticipating liquidity risk problem cooperatively. In addition, the literature points out that in managing regular demand for liquidity, Islamic banks can: (i) have standby reserves, (ii) regulate the redemption time of deposits, (iii) undertake some efforts to mitigate business losses and default in both equity and debt based financing and, (iv) set up the internal liquidity agreement with the parent company.

Further, to manage predictable irregular demand for liquidity, Islamic banks can: (a) sell the short-term Islamic financial instruments; (b) sell the long-term Islamic financial instruments; and (c) borrow from the Islamic money market. Finally, to manage unpredictable irregular demand for liquidity, Islamic banks can rely on: (i) the parent company's lending, (ii) the shareholder's lending, (iii) the central bank emergency liquidity funds and, (iv) bail-out funds from the government.

Thirdly, the first empirical research assessment of the Islamic banking industry identifies the non-optimal organizational structure of Islamic banks related to managing

liquidity. It also finds and estimates the significant demand for short-term liquidity from depositors by analyzing the sources of liquidity (types of deposit products).

It further analyzes the financing policies (allocation of funds) and finds the way Islamic banks manage the demand for liquidity by using the 1st, 2nd and 3rd tiers of liquidity instruments. Up to now, the three tiers have successfully managed the demand for liquidity from depositors but such operations are not ideal from the perspective of *Sharia*.

Fourthly, by using econometric models, the second empirical research chapter finds variables representing liquidity behavior of depositors from the liability model that determines the balance of assets and liabilities. Those are: (i) the SBI rate, (ii) how much benefit they received from Islamic deposits in the past, (iii) how much return-sharing is paid by Islamic banks in a short-term period, (iv) the cost of banking operations, and (v) income from operational financing of Islamic banks.

In line with identification of depositors' liquidity behavior, the liquidity behavior of Islamic banks in cooperation with entrepreneurs is also assessed through the asset model. The factors that determine the balance of assets and liabilities from the asset side are: (a) profit from non-operational financing, (b) how much return-sharing is paid by Islamic banks to depositors, (c) the results of the previous decisions on investment in operational financing, (d) the performance of business partners and the prospects of projects being financed and; (e) cost of banking operations.

Then, the liquidity reserves model indicates that the most important factors determining the optimum position of liquidity reserves are: (i) return-sharing paid by Islamic banks to depositors, (ii) the previous position of liquidity reserves, (iii) the prior investment in operational financing, and (iv) profit from operational financing.

In addition, the research finds that, although historically the industry performs well in managing liquidity, liquidity mismatch may occur in the future. As such, there are a number of things that all market players and banking regulators can do to maintain the sound condition of the Islamic banking industry and prevent liquidity runs.

These include: (i) intensifying the education of depositors and the public by involving the government, banking regulators, and Islamic scholars, (ii) improving the structure of liquidity on the asset and liability sides, and (iii) optimizing bank financing in order to be able to gain and pay competitive return to depositors and stakeholders.

Fifthly, the third empirical chapter analyzes the result of the questionnaire surveys and bilateral discussions with respondents (depositors and Islamic bankers). The chapter gains the primary information and confirms the results of the previous empirical research chapters.

Particularly, it gathers information about the understanding of depositors with regard to the Islamic banking operations and products, the investment and liquidity behavior of depositors, Islamic banking liquidity risk management from the asset and liability sides, the sources of liquidity risk problems, and the liquid instruments available in the Indonesian Islamic financial markets.

Finally, the interpretative discussion and recommendations chapter combines the overall empirical research chapters and comprehensively analyzes them with the literature reviews to construct and propose an integrated program to manage liquidity risk. In particular, it suggests the improvement of the organizational structures of Islamic banks to manage liquidity risk based on *Sharia* principles and international banking standards.

Then, it constructs and proposes an integrated program to manage liquidity risk which is comprised of three elements called:

i. institutional deepening,
ii. restructuring liquidity management on the asset and liability sides, and
iii. revitalizing the usage of the Islamic liquid instruments.

In fact, the recommendations of this thesis are not only applicable to Indonesia but also to other countries having the same Islamic banking industry. This is also the contribution of the thesis to the knowledge and to the Islamic banking literature on managing liquidity risk.

9. 2. OUTPUTS OF THE THESIS AS THE RECOMMENDATIONS

The research recommends that banking regulators, Islamic banks, depositors, business partners, and all related parties should improve the current practice of liquidity risk management. The recommendations of this thesis would bring the Indonesian Islamic banking industry to a better way of managing liquidity risk based on *Sharia* and standard banking concepts. However, one should be aware that the implementation of the integrated and comprehensive program requires strong commitment, involvement, and cooperation of all parties related to the Islamic banking industry.

Considering that Indonesia has targeted the Islamic banking industry to reach a 5% market share in the following years (Bank Indonesia, 2007a:1) and to be the most attractive one in ASEAN in 2009 and the leader in ASEAN in 2010 (Grand Strategy, 2008:4), having a robust and *Sharia*-compliant liquidity risk management is very important. The recommendations of the thesis support the achievement of such targets especially to strengthen the management of liquidity risk in the Indonesian Islamic banking industry.

9. 3. FUTURE RESEARCH AND DEVELOPMENT

This research is made under assumptions of the present condition of Islamic banking industry such as: (i) the market share of Islamic banks is still trivial compared with conventional banks; (ii) the number of Islamic banks (BUS and UUS) and their depositors are only a few compared with conventional banks; (iii) the Islamic financial markets (the money market and capital markets such as *Sukuk* market) are less developed with limited available liquid instruments; and (iv) the Islamic banking industry is relatively immune from the local or global economic/financial crises. In the future, these may change.

The research conducts the analyses of the Islamic banking sector, depositors, entrepreneurs (public sectors), and banking regulators (the central bank); these are the most significant contributors to the development of the Islamic banking industry nowadays. Nevertheless, it does not capture the roles of: (a) the Indonesian Islamic Scholars (MUI and DSN), (b) local governments, (c) academics, (d) formal schools and

informal private training/seminars/conferences, and (e) foreign investors. They have indeed contributed to the process of managing liquidity risk in Islamic banks as well.

If economic and business conditions change, the research on this topic should be expanded and adjusted to include and analyze more Islamic banks and depositors. In addition, it also has to attach the (future) well-established Islamic financial markets, and include the roles of the regulators (such as MUI, the government) which can become more important in the years to come.

Finally, the integrated program to manage liquidity risk is constructed with a forward-looking perspective. It assumes the condition where the Indonesian Islamic banking industry grows progressively, the Islamic financial markets is developing, and the number of Islamic banking depositors is growing. Hence, the program should be viewed as the base policy program to manage liquidity risk, and the future areas of development should not significantly change this base policy program but instead strengthen and complement the program.

9. 4. EPILOGUE

As stated in Chapter 1, the thesis aimed to explore and analyze the management of liquidity risk through balancing the assets and liabilities of the Indonesian Islamic banking industry. It also intended to investigate and understand the liquidity behavior of banking depositors and Islamic banks, and the performance of the industry in relation to managing liquidity by using both the quantitative and qualitative analyses.

The empirical chapters included a comprehensive investigation of the performance of the industry to manage liquidity, the liquidity behavior of both banking depositors and Islamic banks, an analysis of the resilience of the industry against liquidity pressures, and the actual practices and problems in managing liquidity. Finally, the thesis contextualized the overall findings and proposed an integrated and comprehensive program to manage liquidity.

As such, the thesis has achieved its aims and objectives and could bring the Indonesian Islamic banking industry into a better way of managing liquidity risk and

running the banking activities based on *Sharia* guides and standard banking practices. At the end, it also contributes to the knowledge and understanding of managing liquidity risk in Islamic banking literature, *insha Allah*.

***

APPENDICES

Appendix A

$\pi(R) = r_L(D-R) + rR - r_p E[\max(0, \tilde{x} - R)]$ so that,

$\pi(R) = r_L D - r_L R + rR - r_p E[\max(0, \tilde{x} - R)]$ such that,

$\pi'(R) = -r_L + r + r_p \Pr oba[\tilde{x} \geq R] = 0$ finally,

$\Pr oba[\tilde{x} \geq R^*] = \dfrac{(r_L - r)}{r_p}$ (proven)

Appendix B

$\pi = r_L L(r_L) - r_D D(r_D) + rR - r_p E[\max(0, \tilde{x} - R)]$ or,

$\pi = r_L L(r_L) - r_D D(r_D) + r[D(r_D) - L(r_L)] - r_p E[\max(0, \tilde{x} - R)]$ so that,

$\pi = r_L L(r_L) - r_D D(r_D) + rD(r_D) - rL(r_L) - r_p E[\max(0, \tilde{x} - R)]$ finally it becomes,

$\pi = (r_L - r)L(r_L) + (r - r_D)D(r_D) - r_p E[\max(0, \tilde{x} - R)]$ (proven)

Appendix C

$\dfrac{\partial \pi}{\partial r_L} = (r_L - r)L'(r_L) + L(r_L) - r_p \Pr oba[\tilde{x} \geq R]L'(r_L) = 0$ so that,

$r_L L'(r_L) - rL'(r_L) + L(r_L) - r_p \Pr oba[\tilde{x} \geq R]L'(r_L) = 0$ then,

$r_L = r_p \Pr oba[\tilde{x} \geq R] + r - \dfrac{L(r_L)}{L'(r_L)}$ by multiplying with $\dfrac{r_L}{r_L}$ and knowing

$\varepsilon_L = -\dfrac{r_L L'(r_L)}{L(r_L)}$

We comes up with the optimum reserves (R*) as $\Pr oba\left[\tilde{x} \geq R^*\right] = \dfrac{r_L\left(1-\dfrac{1}{\varepsilon_L}\right)-r}{r_p}$ (proven)

Appendix D

$\dfrac{\partial \pi}{\partial r_f} = (1-r_\beta)F(r_f) - r_p \Pr oba[\tilde{x} \geq R]F'(r_f) = 0$ then,

$\Pr oba[\tilde{x} \geq R] = \dfrac{(1-r_\beta)F(r_f)}{r_p F'(r_f)}$ by multiplying with $\dfrac{r_f}{r_f}$ and knowing $\varepsilon_f = -\dfrac{r_f F'(r_f)}{F(r_f)}$ We comes up with the optimum reserves (R*) as $\Pr oba\left[\tilde{x} \geq R^*\right] = \dfrac{(1-r_\beta)}{r_p}\left(\dfrac{r_f}{|\varepsilon_f|}\right)$ (proven).

Survey of Liquidity Risk Management for Islamic Bankers

1. **Your email address :**

2. **With regard to the organizational structure of your Islamic bank (Islamic windows/UUS), does your Islamic bank/UUS *(Please answer with yes or no)***
   - Have a special Division/Team dealing with risk management?
   - Have a particular Director/Manager responsible for liquidity management?
   - Coordinate liquidity management decision with the parent company (for UUS)?
   - Depend on parent company's decision (direction) to manage liquidity risk problem?

3. **Regarding time deposits (deposito), your Islamic bank (UUS) *(Please answer with agree or disagree)***
   - Charge a penalty to depositors for withdrawal where no notice is given.
   - Offer a *Mudarabah muqayyadah* account instead of *Mudarabah mutlaqah* account.

- Apply profit and loss sharing instead of revenue-sharing scheme.
- Consider (look at) other Islamic bank's revenue-sharing ratio to determine your own revenue-sharing ratio with depositors.
- Consider the level of interest rate (for example SBI rate) to determine your revenue-sharing ratio with depositors.

4. **In implementing equity based financing (*Mudarabah, Musharakah*, etc), your Islamic bank *(Please answer with the most preferable; preferable; less preferable; not preferable)***
- Adjusts time frame and total amount of available deposits with time frame and total amount of project to be financed.
- Prefers proposal of (historically) well-performed projects ever financed previously.
- Is welcome with new project proposals.
- Requires entrepreneurs to put collateral or provide *Kafalah* (third party guarantee).
- Prefers to finance entrepreneurs who also have an account in your Islamic bank.
- Prefers short-term investment project financing to long-term one.
- Sells bank's ownership of the project if the entrepreneur/project is in default/loss.

5. **In implementing trade and leasing based financing contract (*Murabahah, Salam, Istishna, Ijarah*, etc), your Islamic bank *(Please answer with the most preferable; preferable; less preferable; not preferable)***
- Prefers to finance short-term contract (maximum 1 year).
- Is welcome to finance more than 1 year up to 3 years trade/leasing proposal.
- Charges penalty for a late payment.
- Gives extra time to business partner for a late payment.
- Changes leasing rate (*Ijarah* contract) to adjust with current economic condition.
- Prefers financing entrepreneur who also has an account in your Islamic bank.
- Requires entrepreneur to put collateral or provide *Kafalah* (third party guarantee).
- Sells the project's (asset's) collateral if entrepreneur is in default.
- Compensates loss with your profit reserve.

6. **When giving financing, your Islamic bank** ***(Please answer with agree or disagree)***

- Finances short-term projects with short-term available funds (deposits).
- Pools short and long-term available fund and distributes with certain allocations.
- Locates some short-term deposits in money market and BI's *Sharia* certificate (SBIS).
- Buys government *Sukuk* (SBSN) for alternative financing allocation.
- In some cases conducts joint venture financing with other Islamic banks.
- Considers the revenue-sharing ratio promised to be paid to depositor.
- Considers prospect of project (asset) being financed.
- Monitors your business partner regularly.
- Considers cost of financing especially in the last 6 months.
- Refers the next financing decision from the performance of the previous financing portfolio decision.
- Prefers government projects to private projects.
- Allocates some fund in form of investment risk reserve (IRR) and Profit Equalization Reserve (PER).
- Prefers liquidity of the projects (assets) being financed rather than profit oriented.
- Uses shareholder capital to finance long-term equity based financing.
- Terminates the project if it is not profitable.

7. **To manage demand for liquidity from depositors, your Islamic bank** ***(Please answer with 1st choice, 2nd choice, 3rd choice, 4th choice, 5th choice, 6th choice)***

- Relies on cash reserve to fulfill daily liquidity withdrawal.
- Puts extra liquidity above your reserve requirement (GWM) in Bank Indonesia.
- Communicates with depositors who have big amount of deposits regarding their withdrawal time/schedule.
- Regularly calculates and analyzes pattern of liquidity withdrawal for anticipation.
- Knows how many rational and religious depositors in your bank.
- Convinces depositors to lengthen tenor of time deposits from short-term into long-term.

8. **The potential liquidity problem that your Islamic banks predicts *(Please answer with the most possible, possible, impossible)***

- o Rational depositors who are very sensitive with interest rate return.
- o Non performing financing which can lower your profit and revenue-sharing to depositors.
- o Increasing trend of interest rate because of tight monetary policy.
- o Big portion of short-term time deposits (1 month).
- o Difficulty or limited access to Islamic money market (PUAS).
- o Difficult to find prospective and profitable projects (financing proposal).

9. **If depositors' withdrawal exceeds your liquidity reserve (cash reserve and reserve requirement/GWM), your Islamic bank will *(Please answer with 1st choice, 2nd choice, 3rd choice, 4th choice, 5th choice, 6th choice, 7th choice, 8th choice)***

- o Borrow fund from Islamic Money Market (PUAS).
- o Borrow fund from parent company (holding bank) (for UUS).
- o Sell Islamic securities owned in secondary market.
- o Repurchase (repo) SBI *Sharia* to Bank Indonesia.
- o Withdraw private placement in other banks (companies).
- o Use intra day emergency liquidity facility (FLI) from Bank Indonesia.
- o Use bank's capital to cover liquidity demanded.
- o Ask depositors to wait for extra days.

10. **What does your Islamic bank do in the increasing trend of interest rate? *(Please answer with the most preferable, preferable, less preferable, not preferable).***

- o Increasing revenue-sharing ratio for all depositors and sacrificing bank's sharing.
- o Renegotiating revenue-sharing ratio with certain depositors who have high nominal deposits.
- o Slowing the financing activities and locating more funds in SBI *Sharia*.
- o Asking for a bigger bank's profit ratio in the on going investment project with entrepreneurs.
- o Do not do anything.

Survey of Liquidity Risk Management for Depositors

1. **Your email address :**

2. **Latest degree of education *(Please choose only one answer)*.**

( ) Senior high school ( ) Undergraduate (S1) degree ( ) Postgraduate (S2 and S3)

3. **As depositor of Islamic bank or UUS, do you *(Please answer with yes or no)***

- Also have an account in conventional bank?
- Frequently monitor the performance of your Islamic bank (through media, TV, etc)?
- Understand what is a *Mudarabah* time deposits and a *Mudarabah* saving deposits?
- Ever use Islamic banking financing (house financing, etc)?
- Fully understand the Islamic banking operation and *Sharia* principles?

4. **If you have Islamic saving deposits (tabungan), your purposes are: *(Please answer with 1st priority; 2nd priority; 3rd priority; 4th priority; 5th priority)***

- I can take my money in a daily basis to fulfill my daily transaction needs.
- I can take my money whenever I want (anytime not always daily).
- Saving deposits (tabungan) pays a routine revenue-sharing return.
- I want to enjoy my bank's facilities (debit/credit card, gift, etc).
- I deposit my money to support the development of Islamic banking and business sector.

5. **If you have Islamic time deposits (deposito), your purposes are: *(Please answer with 1st priority; 2nd priority; 3rd priority; 4th priority; 5th priority; 6th priority)***

- I want to earn a bigger revenue-sharing return than saving deposits (profit motive).
- I want to support Islamic investment projects for the sake of people (*ummah*) (religious and investment motive).
- It will make me easy to get bank's financing facilities (free loan, house financing, etc) (commercial motive).

6. **What is your preferred withdrawal period of time deposits (deposito)?** ***(Please answer with 1st priority; 2nd priority; 3rd priority)***

- o I want to take my money in its 1 month maturity date (routine transaction motive).
- o I want to take my money in between 3 – 6 months in its maturity date.
- o I want to take my money after 1 year (12 month tenor) in its maturity date.

7. **If you want to add more fund into your Islamic time deposits (deposito), you will consider** ***(Please answer with 1st consideration; 2nd consideration; 3rd consideration; 4th consideration; 5th consideration)***

- o How much deposit return I received in the last 1 or 2 months.
- o SBI rate in the last 6 months as comparison with deposit return that I get.
- o How much profit (revenue) earned by my Islamic bank from its business operation.
- o My Islamic bank's cost of operation (related to its financing activities).
- o How much my Islamic bank profit and loss (PLS)/revenue-sharing rate. I will increase my deposit if the PLS/revenue-sharing for depositors is higher than before.

8. **If you liquidate (take money from) your Islamic time deposits (deposito), your reasons are** ***(Please answer with the most preferable; preferable; less preferable; not preferable)***

- o I need it to fulfill my regular transaction.
- o I want to switch tenor of my deposit from short-term into long-term one or vice versa.
- o I want to relocate my money into conventional bank.
- o I am offered a better revenue-sharing by other Islamic banks.

9. **You will surely take all of your money and close your account in Islamic bank if** ***(Please answer with agree, neutral or disagree)***

- o My Islamic bank does not pay competitive return as I expected.
- o My Islamic bank pays lower return sharing than other Islamic banks.
- o My Islamic bank pays lower return sharing than interest rate in conventional banks.
- o My Islamic bank faces business loss or needs Bank Indonesia's emergency liquidity.
- o Economic condition requires me to hold cash on hand.
- o It is proven not a *Sharia* compliance Islamic bank.

- It does not have proper network services, IT and offer attractive banking products.
- My request to take my money has ever been delayed without any acceptable reason.

10. If you want to terminate your time deposits (deposito), do you give prior notice to your Islamic bank? ***(Please choose only one answer)***

- Yes, if it is not in its maturity date (jatuh tempo).
- No, if I end it in its maturity date (bank should know it).
- No, even though it is not in its maturity date (jatuh tempo).

11. If conventional banks' interest rate deposit is going up, you will ***(Please answer with agree, neutral or disagree)***

- Not do anything (unaffected as it is *Riba*/prohibited in Islam).
- Switch my deposits from Islamic bank into my account in conventional bank.
- Ask my Islamic bank to give higher revenue-sharing ratio for my account.
- Take my money to hold cash on hand.

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