

## Durham E-Theses

---

*Liquidity Creation and Liquidity Risk Exposures in  
the Banking Sector: A Comparative Exploration  
between Islamic, Conventional and Hybrid Banks in  
the Gulf Corporation Council Region*

SABRI MOHAMMAD

### How to cite:

---

MOHAMMAD, SABRI (2014) Liquidity Creation and Liquidity Risk Exposures in the Banking Sector: A Comparative Exploration between Islamic, Conventional and Hybrid Banks in the Gulf Corporation Council Region. Doctoral thesis, Durham University.

### Use policy

---

The full-text may be used and/or reproduced, and given to third parties in any format or medium, without prior permission or charge, for personal research or study, educational, or not-for-profit purposes provided that:

- a full bibliographic reference is made to the original source
- a <https://etheses.durham.ac.uk/id/eprint/10890/> is made to the metadata record in Durham E-Theses
- the full-text is not changed in any way

The full-text must not be sold in any format or medium without the formal permission of the copyright holders.

Please consult the [full Durham E-Theses policy](#) for further details.

# **Liquidity Creation and Liquidity Risk Exposures in the Banking Sector: A Comparative Exploration between Islamic, Conventional and Hybrid Banks in the Gulf Corporation Council Region**

**Sabri Mohammad**

## **Abstract**

Banks as intermediary institutions raise funds by offering deposits and invest them in assets, by means of which they transform the maturities of their positions on the balance sheet. Such a function enables the banks to channel available liquidity into investments whereby they contribute to economic growth. In other words, when banks use their liquid liabilities to finance illiquid assets, they consequently create liquidity and hence promote productive investments that boost the economy. However, as a result of such a function, banks may face the risk of illiquidity that may cause an early liquidation of productive business activities, which in turn may lead to a disruption to the economy.

Given the importance of the liquidity transformation function of banks, this research examines the ability of Islamic banks in creating liquidity in a comparative manner with conventional and hybrid banks in the Gulf Corporation Council (GCC) countries. In doing so, this study also explores the key determinants of such a function in the identified bank types. This study, furthermore, assesses the liquidity risk that Islamic banks are exposed to in comparison with conventional and hybrid banks and investigates the significant factors that may affect such exposures in the case of the GCC region. In conducting the empirical study, this research examined 58 GCC commercial banks during the period between 1992 and 2011 through developing two empirical models through panel data regressions with a fixed effects model in relation to the identified aims.

In the first empirical model, the results demonstrate that Islamic banks create higher levels of liquidity than conventional and hybrid banks in the examined sample. The results also show that officially supervisory power, stringency on capital regulations and banking activity restrictions negatively and significantly determine the liquidity creation of the examined banks. The empirical results also detect a positive and significant impact of restrictions on the banking market entry standards on liquidity creation. In addition, while this study found that credit risk has a negative and significant impact on liquidity creation, the results show a positive and significant association between liquidity creation and bank size. This study also finds insignificant positive association between GDP and liquidity creation of the examined GCC banks.

In the second model in this study, further statistical and empirical evidence demonstrates that Islamic banks are more exposed to liquidity risk than conventional and hybrid banks in the case of the examined sample of the GCC region. In addition, the results show that the stringency on capital regulations, credit risk, banks size and GDP has a negative and significant impact on liquidity risk. Moreover, the results detect that liquid assets and long-term debts are positively associated with liquidity risk exposures. While the empirical results show that the liquid assets significantly affect liquidity risk, the results detect an insignificant impact of long-term debt on the liquidity risk exposures of the examined banks in the GCC region.

Accordingly, it can be stated that the empirical results of this study, consistently with the conceptual framework of Islamic financial principles as well as with previous studies, stress the importance of exploring the liquidity creation and liquidity risk in promoting the role of banks in the economic system and highlighting their key determinants that need to be well examined to fully understand the liquidity creation and liquidity risk issues.



**Durham**  
**University**  
Business School

**Liquidity Creation and Liquidity Risk Exposures in the Banking Sector:  
A Comparative Exploration between Islamic, Conventional and Hybrid Banks  
in the Gulf Corporation Council Region**

**By**

**Sabri Mohammad**

*A thesis submitted for the degree of Doctor of Philosophy*

University of Durham

Durham University Business School

United Kingdom

2014

<b>Table of Contents</b>	<b>i</b>
List of Tables	v
List of Figures	vi
List of Abbreviations	vii
Declaration	viii
Statement of Copyright	ix
Acknowledgements	x
<b>1. Chapter One: Introduction</b>	<b>1</b>
1.1. Background	2
1.2. The Motivation	5
1.3. Research Aims, Objectives and Questions	5
1.4. The Contribution of the Research	7
1.5. Research Methodology	8
1.6. Overview of the Thesis	11
<b>2. Chapter Two: A Theoretical Framework</b>	<b>14</b>
2.1. Introduction	15
2.2. The Concept of Liquidity Creation and Liquidity Risk	15
2.3. The Key Features of Islamic Finance in Relation to Liquidity Creation and Liquidity Risk Exposure	18
2.3.1. Prohibitions in Islamic Finance	19
2.3.1.1. Prohibitions of <i>riba</i> (Interest)	19
2.3.1.2. Prohibitions of <i>gharar</i> (Uncertainty)	21
2.3.1.3. Prohibition of <i>maisir/qimar</i> (games of chance)	23
2.3.2. The Concept of Risk Sharing	23
2.3.3. Asset-Backed/Based Nature of Business Operations	24
2.3.4. Status of Money	25
2.3.5. Islamic Financial Modes for Accumulating of Funds	26
2.3.5.1. Current deposit accounts	27
2.3.5.2. Saving deposit accounts	28
2.3.5.3. Investment <i>mudaraba</i> -based deposits (time deposits)	29
2.3.6. Islamic Financial Models of Using Funds	31
2.3.6.1. Equity-based/profit-sharing-based financing models	32
2.3.6.1.1. <i>Mudarabah</i> (trustee partnership)-based products	32
2.3.6.1.2. Musharakah (joint venture)-based products	34
2.3.6.2. Debt/Sell-Based Islamic Financing Models	35
2.3.6.2.1. <i>Murabaha</i> (deferred payment)-based products	35
2.3.6.2.2. <i>Salam</i> (deferred delivery sale)-based products	36
2.3.6.2.3. <i>Ijarah</i> (leasing)-based products	38
2.3.6.2.4. Istisna' (manufacture sale)-based products	39
2.4. Conclusion	40

<b>3. Chapter Three: Liquidity Creation and Liquidity Risk Literature Review</b>	<b>42</b>
3.1. Introduction	43
3.2. Exploring Liquidity Creation: A Literature Review	43
3.3. Exploring Liquidity Risk: A Literature Survey	56
3.4. Conclusion	65
<b>4. Chapter Four: The Economic, Financial System and Banking Sectors: A Background On The GCC Region</b>	<b>67</b>
4. 1. Introduction	68
4. 2. Background of The GCC Countries	68
4.3. Country-Based Background of The GCC Region	73
4.3.1. Kingdom of Saudi Arabia	73
4.3.2. United Arab Emirates	74
4.3.3. Kingdom of Bahrain	75
4.3.4. State of Qatar	77
4.3.5. State of Kuwait	78
4.4. Conclusion	79
<b>5. Chapter Five: Research Methodology Framework</b>	<b>81</b>
5.1. Introduction	82
5.2. Research Methods For Data Collection and Analysis	82
5.3. Aspect of Empirical Modelling	84
5.3.1. Econometric Model Specification	84
5.3.1.1. Econometric Specification of the First Empirical Model	84
5.3.1.2. Econometric Specification of the Second Empirical Model	86
5.3.2. Sample Selection Process	88
5.3.3. The Sources and Characteristics of the Sampled Data	90
5.3.4. Definitions and Measurements of the Dependent and Independent Variables	91
5.3.4.1. Definition and Measurement of the Dependent Variables	91
5.3.4.1.1. Measuring Liquidity Creation	91
5.3.4.1.2. Measuring Liquidity Risk Exposures	95
5.3.4.2. Measuring Independent Variables	97
5.3.4.2.1. Bank Type: Islamic Banks (IB), conventional banks (CB), and hybrid banks (HB)	97
5.3.4.2.2. Banking Regulatory and Supervisory Standards	99
5.3.4.2.2.1. Official supervisory power (OSP)	99
5.3.4.2.2.2. Banking market entry standards (MES)	100
5.3.4.2.2.3. Bank activities restrictions (BAR)	101
5.3.4.2.2.4. Capital requirement regulations (CAP)	102
5.3.4.3. Measuring Bank Specific Variables	103
5.3.4.3.1. Credit risk (CR)	103
5.3.4.3.2. Long-term debt (LTD)	104
5.3.4.3.3. Liquid Assets (LA)	104
5.3.4.3.4. Bank Size (SIZE)	105
5.3.4.4. Measuring Economic Growth (GDP)	105
5.3.5. Econometric Procedures for Data Analysis	106
5.3.5.1. The Econometrics Package	106
5.3.5.2. The Statistical Examination of the Data Validation	106

5.3.5.3. Regression Analysis Methods	107
5.3.5.3.1. Panel Data Regression Analysis	107
5.3.5.3.2. Fixed Effects Estimator Model	108
5.3.5.3.3. Random Effects Estimator Model	108
5.3.5.3.4. Choosing between Fixed Effects and Random Effect	108
5.3.5.4. Sensitivity Test for Assessing Empirical Results	109
5.4. Limitations and Difficulties	110
<b>6. Chapter Six: Exploring Liquidity Creation in the GCC Banking Sector: A Comparative Empirical Analysis between Islamic, Conventional and Hybrid Banks</b>	<b>112</b>
6.1. Introduction	113
6.2. Hypotheses Development	114
6.2.1. Bank Type: Islamic Banks (IB), Conventional Banks (CB), and Hybrid Banks (HB)	114
6.2.2. Official Supervisory Power (OSP)	116
6.2.3. Bank Activities Restrictions (BAR)	117
6.2.4. Capital Requirement Regulations (CAP)	117
6.2.5. Banking Market Entry Standards (MES)	118
6.2.6. Credit Risk (CR)	119
6.2.7. Bank Size (SIZE)	119
6.2.8. Economic Growth (GDP)	120
6.3. Descriptive Data Analysis and Interpretation	121
6.3.1. The Trends of the Examined Variables over the Sample Period	124
6.3.2. Comparative Descriptive Statistics of the Factors Determining Liquidity Creation in Islamic, Conventional and Hybrids in the GCC Region over the Sample Period	125
6.4. Testing the Hypotheses: Econometric Analysis	131
6.5. Sensitivity Tests for Examining the Robustness of the Empirical Results	139
6.5.1. Measuring the Determinants of Liquidity Creation through Additional Four Panel Data Regressions with Fixed Effects Model Using Robust Standard Error	139
6.5.2. Estimating the Determinants of Liquidity Creation through Panel Data Regressions with Random Model and Durbin-Wu-Hausman Test for Endogeneity	141
6.6. Conclusion	143
<b>7. Chapter Seven: Assessing Liquidity Risk Exposure of the GCC Banks: A Comparative Analysis between Islamic, Conventional and Hybrid Banks</b>	<b>145</b>
7.1. Introduction	146
7.2. Hypotheses Development: Operationalising the Research	147
7.2.1. Bank Type Variables: Islamic Banks (IB), Conventional Banks (CB) and Hybrid Banks (HB)	148
7.2.2. Banking Capital Regulation (CAP)	149
7.2.3. Credit Risk (CR)	150
7.2.4. Liquid Assets (LA)	151
7.2.5. Long-Term Debt (LTD)	152
7.2.6. Bank Size (SIZE)	153
7.2.7. Economic Growth (GDP)	154
7.3. Descriptive Data Analysis	155

7.3.1. Trends of the Examined Variables	156
7.3.2. Comparative Trends of the Variables between Islamic, Conventional and Hybrid Banks	160
7.4. Testing Hypotheses: An Empirical Comparative Analysis	166
7.5. Sensitivity Tests: Assessing the Robustness of the Empirical Findings	176
7.5.1. Estimating the Determinants of Liquidity Risk Exposures through Additional Three Panel Data Regressions with Fixed Effects Model Applying Robust Standard Error	176
7.5.2. Estimating the Determinants of Liquidity Risk Exposures through Panel Data Regressions with Random Effects Model and Endogeneity Test	178
7.6. Conclusion	180
<b>8. Chapter Eight: Conclusion</b>	<b>182</b>
8.1 Introduction	183
8.2. Summary of the Research Findings	183
8.3. Critical Reflections on the Research Findings and Theoretical Considerations	187
8.4. Policy Implications and Recommendations	189
8.5. Limitations and Future Research	192
8.6. Epilogue	193
<b>Bibliography</b>	<b>195</b>

## List of Tables

Table 4.1: Top Ten Countries by <i>Shari'ah</i> -Compliant Assets (US\$M)	71
Table 5.1. Definitions of the Examined Variables of the First Empirical Model	86
Table 5.2. Definitions of the Examined Variables of the Second Empirical Model	88
Table 5.3: Distribution of Sampled GCC Banks (Numbers and Percentages)	89
Table 5.4: Liquidity Classification of Bank Activities and Construction of Liquidity Creation Measure	94
Table 5.5: Official Supervisory Power Index (OSP)	100
Table 5.6: Market Entry Standards Index (MES)	101
Table 5.7: Bank Activity Restrictions Index (BAR)	102
Table 5.8: Capital Requirement Regulations Index (CAP)	103
Table 6.1: The sample distribution based on bank type and country	122
Table 6.2. Descriptive statistics	123
Table 6.3: Skewness and Kurtosis Statistics	132
Table 6.4: Pearson Correlation Matrix Test	132
Table 6.5: Panel Data Regressions with Fixed Effects Model: Measuring the Determinants of Liquidity Creation	133
Table 6.6: Estimating the Determinants of Liquidity Creation through Additional Four Panel Data Regressions with Fixed Effects Model Using Robust Standard Error	140
Table 6.7: Panel Data Regressions with Random Effects Model and Durbin-Wu-Hausman Test for Endogeneity	142
Table 7.1: Descriptive Data of Liquidity Risk and its Determinants	155
Table 7.2: Magnitude of the Data Departure from Normality	167
Table 7.3: Pearson Correlation Matrix Test	167
Table 7.4: Panel Data Regressions with Fixed Effects Model: Measuring the Determinants of Liquidity Risk Exposures	168
Table 7.5: Estimating the Determinants of Liquidity Risk Exposures through Additional Three Panel Data Regressions with Fixed Effects Model Applying Robust Standard Error	177
Table 7.6: Panel Data Regressions with Random Effects and Endogeneity Test	179

## List of Figures

Figure 6.1: Trends of Liquidity Creation of GCC Banks	124
Figure 6.2: Comparative overall Ratio of Liquidity Creation to Total Assets of Islamic, Conventional and Hybrid Banks in the GCC Region	126
Figure 6.3: The Trends of Liquidity Creation in Bank Types	126
Figure 6.4: the Maximum of Liquidity Creation by the GCC Banks	128
Figure 6.5: The Ratio of Liquidity Creation to Customer Deposits	129
Figure 6.6: The Ratio of Liquidity Creation to Equity	130
Figure 6.7: The Trends of the Credit Risk of the GCC Banks	131
Figure 7.1: Trends of Liquidity Risk Exposures of the GCC Banks over the Sample Period	157
Figure 7.2: Trends of Credit Risk of the GCC Banks over the Sample Period	157
Figure 7.3: Trends of Long-Term Debts of the GCC Banks over the Sample Period	158
Figure 7.4: Trends of Liquid Assets of the GCC Banks over the Sample Period	159
Figure 7.5: Trends of Capital Regulatory Stringency of GCC Banks over the Sample Period	160
Figure 7.6: Overall Total Liquidity Risk of the GCC IB, CB and HB	161
Figure 7.7: Trends of Liquidity Risk of the GCC IB, CB and HB over the Sample Period	162
Figure 7.8: Trends of Credit Risk of the GCC IB, CB and HB over the Sample Period	163
Figure 7.9: Trends of liquid assets of the GCC IB, CB and HB over the Sample Period	164
Figure 7.10: Annual Trends of Long-Term Debt of the GCC IB, CB and HB over the Sample Period	166

## **List of Abbreviations**

BAR	Bank Activity Restrictions
BCP	Basel Code Principles
CAP	Bank Capital Regulations
CB	Conventional Bank
CR	Credit Risk
GCC	Gulf Corporation Council
GDP	Gross domestic product
HB	Hybrid Bank
IB	Islamic Bank
KSA	Kingdom of Saudi Arabia
LA	Liquid Assets
LTD	Long-Term Debt
MES	Market Entry Standards
OSP	Official Supervisory Power
Size	Bank Size
UAE	United Arab Emirates

## **Declaration**

I declare that this thesis is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person, except where due acknowledgement has been made in the text. I confirm that none of the materials presented in this thesis has previously been submitted for a degree in this or any other institution.

### **Statement of Copyright**

The copyright of this thesis rests with the author. No quotation from it should be published without the author's prior written consent and information derived from it should be acknowledged.

## Acknowledgements

It is an amazing feeling to recall the whole process of writing this doctoral thesis. Indeed, it has been a challenging journey, yet full of joys and knowledge that have been brought to me by numerous people and the most wonderful thing is to acknowledge their help and support throughout my PhD research.

First and foremost, I would like to express my sincere gratitude to my supervisors, Professor Rob Dixon and Professor Mehmet Asutay for their huge support and guidance during my PhD journey.

Professor Asutay, words cannot express my appreciation for all your kindness and efforts you have shown me. You are the person who I always found as the spring for help, hope and support. I learnt how to be patient and passionate about knowledge through your way of life and guidance. I saw you as a brilliant supervisor, caring brother and the greatest friend, and for all of this I call you my lifetime inspiration.

Professor Dixon, you have been always a great source of knowledge to me. I found you not only a great supervisor, but also the big brother who has been continuously providing unflagging support and advice that have lightened the path of my PhD. I learnt from you how to be efficient and practical and for all of these I am extremely thankful.

My dearest and sweetest Mother, Father and siblings, despite being very far from you during my PhD studies, your love and support were my motivation to continue walking towards the success. I love you all and I hope one day we will be together and have a great time and fun again.

My loving wife, Elena, I am extremely blessed to have you in my life, as without your love and constant support my PhD journey would absolutely not have been possible and for this I am forever grateful.

I would like to extend my heartfelt thanks and appreciation to the Islamic Research and Training Institute (IRTI) a member of the Islamic Development Bank Group (IDB) for providing me with the scholarship. I would also like to take this opportunity to thank all Scholarship Committee members for their kindness and facilitating all the support. I am also grateful of Durham University Business School for the financial support towards my first year tuition fees and easing my hardship. To all of you, thanks for unwavering belief in me and I promise to contribute more in the body of knowledge during my life.

Finally, it is time to mention my wonderful friends and colleagues, as without their friendship this journey would be so boring. My dear friends, I am very lucky to have you all and thank you very much for your motivation and kindness. I would also like to thank all Durham University, Durham University Business School staff members and especially the doctoral office for all help and support during my PhD programme.

*To all of you, I am forever grateful and may God bless you all.*

**CHAPTER ONE**  
**INTRODUCTION**

## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.1. BACKGROUND**

The theory of banking suggests that one of the key functions that banks conduct is the transformation of the maturities (Distinguin et al., 2013). Through such a function, banks finance their illiquid risky assets by liquid liabilities, which leads to liquidity creation. By creating liquidity, banks channel the deposited savings into real investments that, in turn, promote economic activity whereby economic growth is achieved (Deep and Schaefer, 2004; Berger and Bouwman, 2009a; Diamond, 2007; Diamond and Dybvig, 1983; Bryant, 1980). However, banks may face early liquidation of illiquid assets to meet their financial obligations as a result of a large amount of unexpected withdrawals that cause liquidity risk (Berger and Bouwman, 2009a: 3783). Accordingly, if it happens, liquidity risk may cause an interruption in the economy due to early liquidation of productive investments (Diamond and Dybvig, 1983). The liquidity transformation, therefore, is an extremely important function that needs to be optimised but not maximised. In this context, it is important to note that despite that the liquidity-related issues have been an ongoing concern to managers as well as fund providers, the recent financial crisis has increased the banks' anxieties towards their liquidity positions (Weiß, 2013: 3334; Acharya and Naqvi, 2012: 349; Horvath et al., 2012; Sadka, 2011: 144; Jasiene et al., 2012: 190).

Liquidity is created when a bank finances long-term illiquid investments or loans with liquid short-term liabilities (Diamond and Dybvig, 1983; Berger and Bouwman, 2009a). Banks also create liquidity through increasing the off-balance-sheet activities such as loan commitments and similar claims of liquid funds (Berger and Bouwman, 2009a; Holmstrom and Tirole, 1998; Kashyap et al., 2002). According to Diamond and Rajan (2000, 2001), Gorton and Winton (2000) and Berger and Bouwman (2009a) the variations in the banks' capital structure on the liabilities side have dramatic effects on their liquidity creation function. Deep and Schaefer (2004) and Berger and Bouwman (2009a) state that banks act as key players in originating actual economic activities by

transforming liquid funds, such as deposits on the liabilities side, into illiquid assets (illiquid investments) and hence promote economic growth. However, it is important to highlight that by being high liquidity creators, banks may also face illiquidity, which may happen when fund providers, mainly depositors, claim their positions simultaneously and untimely by a large amount causing a 'bank run' (Diamond and Rajan, 2001; Berger and Bouwman, 2009a).

As intermediary institutions, banks hold large amounts of short-term liabilities to finance long-term assets (Saunders and Cornett, 2006: 470). However, due to the nature of the short-term liabilities contracts, the holders (mainly depositors) of these types of accounts have the right to claim their funds back at any given time. Accordingly, liquidity risk occurs on the liability side when account holders withdraw their funds (deposits) simultaneously at a time when bank cannot match such large and sudden demands. In such a case, in an attempt to manage risk, banks tend to supply the withdrawals by selling their liquid assets or borrowing funds from the money market. In the process of liquidating, although most of the assets are tradeable and transformable into cash, converting some of the assets can be costly when they are sold only at low prices (Saunders and Cornett, 2006: 470) that, consequently, may lead to insolvency risk. In addition, banks are exposed to liquidity risk, on the asset side, as a result of excessive practices of off-balance-sheet activities such as loan commitments. These types of contracts entitle banks' customers to claim loans from banks on demand. When the demand of loan commitments occurs, the bank must supply funds with immediacy. This leads to an urgent need for more liquidity that banks have to provide either by selling their liquid assets or seeking for further liquidity from the market (Saunders and Cornett, 2006: 470). Liquidity risk, therefore, occurs when a bank is unable to cover its financial obligations when they fall due, without unbearable costs (BCBS, 2008). Accordingly, the absence of good forecasting models to predict liquidity risk is a key factor that leads to unexpected mismatching in banks' balance sheets, which ends up with the bank facing liquidity risk (Cucinelli, 2013: 51).

Accordingly, it can be stated that, while, liquidity refers to the banks' ability to meet their financial obligations (Duttweiler, 2009: 1 and Chorafas, 2009: 216), liquidity creation can be defined as the transformation of short-term liquid liabilities into illiquid assets by channeling funds into investments (Diamond and Dybvig, 1983; Berger and

Bouwman, 2009a) and, accordingly, liquidity risk can be defined as the disability of banks to meet their financial duties in a timely manner (BCBS, 2008).

Dealing with liquidity-related issues is an essential area in the financial system, the emergence of Islamic banking as an alternative system, which operates based on Islamic financial principles that are derived from Islamic law (*Shari'ah*), have different implications in relation to liquidity creation and liquidity risk exposures compared to conventional and hybrid banks (conventional banks with Islamic windows). Similar to other banks in terms of functions, Islamic banks are believed to play an important intermediary role in facilitating the transformation of savings from the public for the purpose of reinvesting them in the community through channelling the accumulated funds to entrepreneurs and financing activities that are expected to develop a comprehensive economic sector by abiding by the religious sensitivities of individual Muslims. By conducting their financial operations within the norms of Islam and parameters of Islamic finance, Islamic banks have to ensure that every financial contract must refer to a tangible, identifiable underlying asset (Cox and Thomas, 2005: 171). Accordingly, due to the unique nature of the Islamic financial principles, products and operations, Islamic banks are perceived to be key contributors in promoting economic growth (Aggwal and Yousef, 2000: 94; Khan, 2010) through creating productive and effective financial activities, generating vacancies, and fostering social welfare (Khan, 2010: 808). In addition, as an essential feature, based on the substance of the objectives of Islamic financial law, it is more desirable that Islamic banks emphasise the equity/profit-loss-sharing-based financing activities, that are mainly illiquid investments, rather than debt/sale-based modes of financing activities. Based on such normative and theoretical frames, it is perceived that Islamic banks should positively contribute to the creation of higher levels of liquidity than their conventional and hybrid counterparts. However, due to this distinctive nature, Islamic banks are exposed to more complexity in managing their assets and liabilities. This implies that Islamic banks are expected to face a wider financing gap and, hence, greater exposures to liquidity risk than conventional banks and hybrid banks. This importantly becomes an issue as the tools and instruments of managing such risks are further restricted in the case of Islamic banking due to the attachment to norms and parameters of Islamic finance.

## **1.2. THE MOTIVATION**

The main motivation of this study stems from the important role of the liquidity creation function of banks through using liquid liabilities to fund their illiquid business activities, which in turn promote the economic growth. As a result, banks may face a liquidity risk that causes early liquidation of productive investments and, hence, leads to a disruption in economic activities. It can, thus, be stated that liquidity transformation is a double-sided critical issue that needs a careful exploration.

Moreover, another key motivation of conducting this study is to investigate whether the unique nature of Islamic financial principles under which Islamic banks operate have different implications on liquidity creation behaviour compared to conventional and hybrid banks, in order to investigate the impact of such a banking system on the economic growth through financing illiquid assets (investments) by liquid liabilities (mainly deposits), in other words, to examine which type of banks transform more funds into productive investments.

A further motivation of this study is to investigate whether or not Islamic banks are exposed to higher degrees of liquidity risk compared to the conventional and hybrid banks. Considering the importance of understanding the liquidity creation and liquidity risk to economy, it is crucial to explore the determinants of liquidity creation and the key factors that expose banks to liquidity risk. Furthermore, although the Gulf Cooperation Council (GCC) region is considered as a hub for Islamic banks, where 34.11 per cent of global Islamic banking assets are located (IFSB, 2013: 9), its banks' liquidity behaviour and position remains unexplored in general and in a comparative manner between Islamic, conventional and hybrid banks in particular, which stands as a key incentive to undertake this study.

## **1.3. RESEARCH AIMS, OBJECTIVES AND QUESTIONS**

Based on the background and motivations presented above, this research aims to explore and examine the liquidity creation of Islamic banks and their exposures to liquidity risk in comparison with conventional and hybrid banks in the case of the GCC region. The research, furthermore, critically investigates the potential factors that affect the liquidity creation and the key determinants of liquidity risk exposures in the case of the GCC Islamic, conventional and hybrid banks.

Accordingly, this study attempts to fulfil the following objectives:

- (i) to explore the related literature in establishing a theoretical framework of liquidity creation and liquidity risk exposure from conventional and Islamic finance perspective;
- (ii) to construct a model to measure liquidity creation to examine the amount of liquidity that Islamic banks create compared to conventional and hybrid banks in the case of the GCC region;
- (iii) to construct a model to measure liquidity risk exposures to investigate the degree and level of liquidity risk that Islamic banks are exposed to in comparison with conventional and hybrid banks in the case of the GCC region;
- (iv) to develop a panel data regressions model to estimate the key determinants of liquidity creation in the case of the sampled GCC Islamic, conventional and hybrid banks in a comparative manner;
- (v) to develop panel data regressions to estimate the key determinants of liquidity risk exposure in the case of the sampled GCC Islamic, conventional and hybrid banks in a comparative manner;

In operationalising the research aims and objectives, the following research questions are addressed:

- (i) What is the meaning of liquidity creation and liquidity risk exposures and how can they be measured?
- (ii) What are the implications of the unique nature of Islamic finance principles, products, and banking operations on liquidity creation and liquidity risk?
- (iii) Do Islamic banks create higher amounts of liquidity and, hence, contribute more towards creating economic activities and promoting economic growth through channelling liquid funds into illiquid assets (investment) than conventional and hybrid banks in the case of the GCC region?
- (iv) Are Islamic banks exposed to higher degrees of liquidity risk than conventional and hybrid banks in the case of the GCC region?

(v) What are the key determinants of liquidity creation in the case of GCC banking sector?

(vi) What are the key determinants of liquidity risk exposures in the case of GCC banking sector?

#### **1.4. THE CONTRIBUTION OF THE RESEARCH**

Despite the significant role of liquidity creation and critical impact of liquidity risk on the economy, these issues remain unexplored within Islamic banking and finance through empirical research. In addition, comparative research on the subject matter between Islamic, conventional and hybrid banks in general and in the case of the GCC region in particular either is not existed or is scarce. Therefore, the key contributions of this study to the existing literature can be argued as follows:

(i) This research develops a theoretical framework related to the implications of Islamic finance principles, products and operations on liquidity creation and liquidity risk;

(ii) It provides empirical evidence, through developing a dynamic panel data regressions model, of the level of liquidity creation of Islamic banks compared to conventional and hybrid banks. Hence, it can be argued that this study statistically tests the assumptions related to the contribution of Islamic bank in promoting the economic growth as a de facto result of transforming the liquid savings into illiquid real investment activities in a comparative manner with conventional and hybrid bank;

(iii) In addition, this research through developing a dynamic panel data regressions model provides statistical evidence of the illiquidity hypothesis of Islamic banks compared to conventional and hybrid banks;

(iv) Given that the hybrid banks present undeniable market size that needs to be explored in relation to liquidity issues, this research provides empirical evidence of different implications of the mixed nature of the hybrid banks on liquidity creation and liquidity risk exposures;

(v) This research, further, measures the key determinants of the liquidity creation function and the liquidity risk exposures and, more specifically, it assesses the impact of the stringency on related banking regulatory and supervisory standards on liquidity

creation function and the liquidity risk exposures in the banking sector in a comparative manner between Islamic, conventional and hybrid banks, which the existing studies have failed to do so;

(vi) Lastly, since the GCC region is considered the home for a dynamic banking sector where Islamic, conventional and hybrid banks operate in parallel under similar economic conditions and banking standards, this research provides empirical analyses of the liquidity creation behaviour of the GCC banks and their exposures to liquidity risk in a comparative manner.

## **1.5. RESEARCH METHODOLOGY**

Since this research starts from the existing theories to develop different hypotheses and test them by using secondary data, it adopts an objective ontological and epistemologically positive position. In addition, as this research quantifies some qualitative information to be used alongside the quantitative banks specific data, this research uses triangulation methods in the form of a combination of qualitative and quantitative methodology. Accordingly, this study is designed as an exploratory as well as explanatory study, as empirical analyses in the case of a case study suggests. Therefore, the research benefits from deductive research strategy. All the above-mentioned research methodologies are explained as follows:

### *Research Philosophy*

Research philosophy refers to the development of knowledge and its nature (Saunders et al., 2009: 107), and it raises certain assumptions that play a vital role in assisting researchers in defining their research strategy and methods (Saunders et al., 2009: 108). Research philosophy can be categorised into ontology and epistemology (Saunders et al., 2009: 108). It should be noted that ontology refers to the nature of reality (Saunders et al., 2009: 110; Hussey and Hussey, 1997: 49) that mirrors two positions, namely objectivism and subjectivism (Saunders et al., 2009: 110). The objectivism is based on the argument that social organisations exist independently from the perceptions, opinions and views of individuals (Saunders et al., 2009: 110). On the other hand, subjectivism studies the social phenomena as a result of individuals' observations and consequent activities (Saunders et al., 2009: 111).

The second philosophical foundation is epistemology, which necessitates the question of ‘what is or should be’ considered as acceptable knowledge in the field of study. It questions whether the social phenomena should be studied in the same manner as the natural sciences (Bryman, 2001: 11). In order to develop a deeper understanding of epistemology, it is important to elaborate three paradigms that explicate such position, namely: positivism, realism and interpretivism (Saunders et al., 2009). Positivism studies social phenomena in the same doctrines, processes and spirit that are applied in the natural sciences (Hussey and Hussey, 1997: 49), while realism, which is associated with scientific approaches, assumes that the reality exists impartially through human being’s understanding. On the other hand, interpretivism, that is considered as an alternative to the positivist paradigm, criticises the application of scientific approaches to the social world and suggest that reality is socially constructed (Bryman, 2001: 13; Saunders et al., 2009: 114).

As regards this research, since it depends on established theories to develop different hypotheses and uses empirical data to examine the liquidity creation and liquidity risk exposures of Islamic banks in comparison with conventional and hybrid banks in the case of the GCC banking sector, it primarily depends on quantifiable observations and pursues for objective reality in investigating such social phenomena. Accordingly, this research adopts an objective ontological and epistemologically positive position, which implies that the research questions fall under different philosophical positions simultaneously that are supported by pragmatism as a position (Saunders et al., 2009: 115-116).

### *Research Methodology*

According to Denzin and Lincoln (2005: 183), in line with research philosophy, research methodology refers to the most appropriate approaches for gaining knowledge, which in social research can be categorised into qualitative and quantitative research. Qualitative research methodology emphasises the quality of objects, procedures and senses that are not quantifiable by referring to opinions, perceptions and understandings (Denzin and Lincoln, 2005: 10). Accordingly, it can be stated that the qualitative researchers describe their work in the light of social constructivism (Denzin and Lincoln, 2005: 13). On the other hand, quantitative approach is empirical-result oriented and the researchers attempt to develop and test hypotheses to detect the theoretically

expected association between examined variables (Ghauri and Gronhaug, 2010: 105). Since this research aims to empirically analyse and measure the determinants of liquidity creation and liquidity risk exposure of the examined banks in the GCC region, this research adopts a quantitative research methodology framework.

### *Research Strategy*

Research strategy can be defined as the knowledge of making a choice of proper philosophical and theoretical research approaches that help to answer the research questions (Kelly, 2011: 19), which can be categorised into deductive and inductive strategy. In the deductive approach, the investigator begins with an abstract and theoretic construction then selects the empirical data to examine the underlined theories and conceptual structure (Hussey and Hussey, 1997: 13), which usually associated with quantitative studies (Kelly, 2011: 44).

As for the inductive research, it refers to the process of composing and proving conceptual abstracts and theories through the empirical data collected from the field (Kelly, 2011: 23; Hussey and Hussey, 1997: 13) and usually involved with qualitative research (Kelly, 2011: 44).

Given that this study adopts an ontological positivist philosophical position, it does not aim at constructing a theory but rather pursues examining the liquidity creation and liquidity risk and tests the developed theoretical hypotheses, the deductive approach is followed.

### *Research Design*

Research design is considered as a key technique in planning the association between conceptual research gaps and feasible empirical research, which outlines the structure for accumulating data and its evaluation process in a structured manner (Ghauri and Gronhaug, 2010: 54). The main research designs are exploratory and explanatory (Ghauri and Gronhaug, 2010: 54; Ghauri and Gronhaug, 2010: 54). Exploratory research design is followed when a researcher does not have a clear familiarity with the research problem and its key characteristic (Saunders et al., 2009: 139; Ghauri and Gronhaug, 2010: 56). On the other hand explanatory research studies phenomena by examining the association between the relevant variables. In addition, the explanatory

researchers may evaluate selected data to different statistical tests to confirm its validity and, hence, to reassure the robustness of the achieved results (Saunders et al., 2009: 141).

In reflecting on the research design for this research, given that liquidity-related issues are considered, to some extent, as new phenomena for banks in general and for Islamic banks in particular, this research aims to explore the related literature to establish testable hypotheses to explain the empirical association between examined variables. Moreover, since this research aims to analyse data with a quantitative nature, this research is regarded as an explanatory study. Furthermore, as the research tests the developed hypotheses using secondary data collected from commercial Islamic, conventional and hybrid banks in the GCC region, this research follows the case study approach by explaining the sources of liquidity creation and liquidity risk in the GCC region. Accordingly, it can be stated that this research is conducted with multi-designed approaches.

Moreover, this study uses quantitative and qualitative methods in collecting and analysing data. While the individual bank balance sheet data are obtained from the Bankscope database, the examined bank regulatory and supervisory data are collected from the World Bank database. Moreover, the macroeconomic variable, GDP data are collected from the International Monetary Fund's (IMF) World Economic Outlook (WEO) database. Furthermore, this research develops two econometric models based on panel regressions and with a fixed effects test to examine the relationship between dependent and independent variables by using the Stata econometrics package to assess the proposed hypotheses. Accordingly, this research, before running the regressions, conducts different statistical checks to examine the validity of the assessed data and examined variables. Furthermore, some other econometric models and tests are conducted to confirm the robustness of the obtained empirical results as detailed in Chapter 5.

## **1.6. OVERVIEW OF THE THESIS**

This study is represented through eight chapters.

*Chapter One: Introduction chapter* presents the background for the research along with motivations. In addition, it provides the research aims, objectives and questions, which

also elaborates the key contributions of this study followed by a description on research methodology. This chapter concludes with an overview of the thesis structure.

*Chapter Two: Theoretical Framework* explains the concepts of the liquidity creation function and its contribution to the economic growth. In addition, it defines the liquidity risk exposure concept in the banking sector and its critical impact on the economic system. In order to provide a context, this chapter explores the theory of Islamic finance and its implications on the banking sector in relation to liquidity creation and liquidity risk exposures with the aim of extending a conceptual framework.

*Chapter Three: Liquidity Creation and Liquidity Risk Literature Review* explains the perceptions of liquidity creation from different aspects, which also provides a critical overview of the key empirical papers measuring liquidity creation and its determinants. Furthermore, this chapter reviews the literature on liquidity risk and its critical impacts on the banking system. It critically outlines the research conducted on liquidity risk from a conventional and Islamic point of view. In addition, this chapter concludes by allocating the gaps related to liquidity creation and liquidity risk in the literature.

*Chapter Four: The Economic, Financial System and Banking Sectors: A Background on the GCC Region* overviews of the economic conditions, financial systems and banking sectors of sampled GCC countries. Accordingly, it presents more details on the relevant issues for each GCC country members including Saudi Arabia, the United Arab Emirates, Kuwait, Bahrain and Qatar.

*Chapter Five: Research Methodology Framework* presents the research methodology and describes the research process. It defines the key characteristics of the research sample and the rationale for sample selection followed by the sources of examined data. The chapter also details the research methods and defines the measurements for each assessed variable. Most importantly, it provides an explanation of the econometric model specification and data analysis techniques. Finally, in conclusion, it highlights the limitations of the research methodology.

*Chapter Six: Exploring Liquidity Creation in the GCC Banking Sector: A Comparative Analysis between Islamic, Conventional and Hybrid Banks* develops hypotheses of expected association between liquidity creation and its determinants in the case of the GCC banking sector. It presents a critical descriptive analysis on the assessed variables.

Furthermore, this chapter provides the empirical results of liquidity creation behaviour of Islamic banks compared to conventional and hybrid banks and the key determinants of such a function in the case of the GCC region. In addition, this chapter provides further sensitivity tests to examine the robustness of the obtained empirical results.

*Chapter Seven: Assessing Liquidity Risk Exposure in the GCC Banking Sector: An Empirical Analysis between Islamic, Conventional and Hybrid Banks*, being the second empirical paper, develops the hypotheses of the predicted relationship between liquidity risk exposures and its key determinants. After describing the ratios and historical trend of the assessed variables, this chapter presents the empirical results of the liquidity exposures of Islamic banks compared to conventional and hybrid banks and the main factors affecting the liquidity risk in the case of the GCC region. Moreover, this chapter conducts further checks to examine the robustness of the achieved empirical results.

*Chapter Eight: Discussion and Conclusion* critically synthesises the research findings and draws the policy implications and recommendations. Furthermore, it highlights the research limitations and potential future research, and brings the research to its conclusion.

**CHAPTER TWO**  
**A THEORETICAL FRAMEWORK**

## **CHAPTER TWO**

### **A THEORETICAL FRAMEWORK**

#### **2.1. INTRODUCTION**

The unique nature of the Islamic banking system implies that Islamic banks and their financing activities should be embedded in the real economy through creating a higher level of liquidity than conventional banks, whereby economic expansion can be facilitated. Yet, it is important to emphasise that the anxiety over liquidity risk is more severe in the case of Islamic banks due to the specific nature of Islamic financial products and activities as well as restricted accessibility of *Shari'ah* compatible money market instruments and Lender-of-Last-Resort (LOLR) facilities (Ahmed, 2011: 60; Dusuki, 2007: 1).

It is crucial, hence, to understand the authentic *Shari'ah* principles and main guidelines of Islamic finance in relation to liquidity creation and liquidity risk exposures. Accordingly, this chapter attempts to formulate an Islamic bank-focused theoretical framework in relation to liquidity creation and liquidity risk exposures through exploring the key features of Islamic financial principles, contracts and instruments that are utilised in Islamic banking industry. First, this chapter presents a conceptual explanation of liquidity creation and liquidity risk exposure in the banking sector. It then illustrates the key restrictions (prohibitions) that Islamic banks need to avoid in their financial activities. Lastly, the most common sources and uses of funds that the majority of Islamic banks operate are elaborated in this chapter.

#### **2.2. THE CONCEPT OF LIQUIDITY CREATION AND LIQUIDITY RISK**

Banks as intermediary financial institutions mainly serve as means to channel the deposited savings into investments. Such a function is mainly conducted by financing long-term illiquid assets in the form of investments or loans with liquidity emerging from short-term liabilities that is mainly acquired through deposits. Through this process banks create liquidity (Diamond and Dybvig, 1983; Berger and Bouwman, 2009a) to respond to the everyday need of liquidity and also for investment purposes. In

other words, according to the theory, banks create liquidity when they hold illiquid assets and provide the public with liquid position funds (Berger and Bouwman, 2009a). In addition, off-balance sheet activities play a crucial role in boosting the amount of liquidity that banks create (Berger and Bouwman, 2009a; Holmstrom and Tirole, 1998; Kashyap et al., 2002). According to Diamond and Rajan (2000, 2001), Gorton and Winton (2000) and Berger and Bouwman (2009a), the fluctuations in the funding structure on the liabilities side of banks may positively or negatively influence the liquidity creation. Through such a function, banks facilitate a platform for transforming the savings from the public into productive investment that positively impacts the economy. The importance of liquidity creation, hence, stems from the positive role that banks play in boosting and strengthening the productive economic activities (Deep and Schaefer, 2004; Berger and Bouwman, 2009a).

According to Diamond and Rajan (2001), liquidity creation is a vital and most critical role of banks. They further argue that, on the assets side, banks generate loans and supply funds to illiquid risky borrowers and finance investments, which enhance the cash cycle and hence promote economic growth. On the liability side, banks provide liquidity to meet their obligations towards depositors. Moreover, on the liability side, banks use demand deposits to meet the liquidity needs of illiquid borrowers, which characterises banks with a high fragile capital structure (Diamond and Rajan, 2001: 288). It is worth noting that banks that are characterised with a fragile capital structure have more potential to create liquidity than banks with less fragile capital structure. It is, therefore, argued that a fragile capital structure increases the incentives of the banks to conduct a wider range of monitoring of the borrowers, which in turn enhances the banks' capacity to generate more loans and extend the existing loans (Berger and Bouwman, 2009a: 3782).

Banks, however, may suffer severely as a consequence of a liquidity creation attitude when depositors demand liquidity at an inopportune time, which may force banks into early liquidation of illiquid assets. In the case of an early liquidation, assets cannot be vended or hired for the par value that they are worth due to the illiquid nature of the assets. Despite that, holding an asset to its maturity is riskless and more profitable, the low price that may lender acquire for the early liquidation makes it risky (Diamond and Rajan, 2001: 288).

Based on the theory of intermediary institutions, therefore, banks are exposed to liquidity risk on both sides of the balance sheet, which may occur on the liability side when account holders withdraw their funds (mainly deposits) simultaneously at inconvenient times such as a bank rush scenario. Due to the nature of liabilities contracts, the fund providers are entitled at any time to demand their money back. In such a case, banks tend to supply the withdrawals by attracting new deposits, selling their liquid assets or borrowing external funds from the money market. However, it is worth mentioning that offering a high level of demand deposits can lead to a bank run as a result of a panic by depositors that provokes them to immediate and unexpected withdrawals. Moreover, despite the fact that most of the assets are tradeable and liquefiable, banks may bear more costs for liquidating some of assets when they are sold at only fire-sale prices (Saunders and Cornett, 2006: 470) that may lead to liquidity risk exposures, which consequently may lead to insolvency risk. On the asset side, banks are exposed to liquidity risk as a result of excessive practices of off-balance sheet activities such as loan commitments. This type of contract entitles banks' customers to claim loans on demand. When the demand of loan commitments occurs, the bank must supply funds with immediacy. This leads to raising an immediate need for more liquidity that banks have to provide (Saunders and Cornett, 2006: 470). Liquidity risk, hence, occurs when a bank is unable to cover its financial obligations on both sides of the balance sheet when they fall due (Basel Committee, 2008: 1). Accordingly, liquidity risk can be defined as the risk of banks' failure to honour their duties in a timely manner (Drehmann and Nikolaou, 2013: 2173).

Liquidity risk might be categorised into two types, namely: funding liquidity risk and market liquidity risk. While market liquidity risk may occur as a result of banks' incapacity to vend their illiquid assets at market price when demanded, funding liquidity risk refers to the banks' disability to cover the liquidity needs of fund providers (BIS, 2008, 2009 and 2010; IFSB, 2012; 31; Haan and End, 2013: 3930). In this regard, it is important to mention that the focus of this research is on the funding liquidity risk.

Most critically, liquidity risk can lead to a bank run, which dramatically can disrupt the economy as a result of early liquidation of productive investments (Diamond and Dybvig, 1983), which negatively impacts the social welfare of the society. Accordingly, it is extremely significant to explore and develop good forecasting models to predict

liquidity risk as key factors to minimise the unexpected mismatches in banks' balance sheets and, thus reduce the likelihood of liquidity risk exposures that banks may face (Cucinelli, 2013: 51).

As the discussion so far indicates, liquidity is a double-sided issue. On the one hand, through a liquidity creation function, banks play a dynamic role in promoting the economic growth by transforming the liquid liabilities into illiquid assets. On the other hand, financing illiquid assets with liquid liability may widen the financing gaps that increase the possibility of banks facing higher degrees of liquidity risk exposures. Accordingly, it can be stated that liquidity creation and liquidity risk exposures are the key issues that need to be well defined and explored in order to promote the banks' liquidity behaviour and position.

### **2.3. THE KEY FEATURES OF ISLAMIC FINANCE IN RELATION TO LIQUIDITY CREATION AND LIQUIDITY RISK EXPOSURE**

The concept of Islamic banking refers to the practice of banking activities in a compliant manner with the axioms and rulings of *Shari'ah* (Islamic law). According to the theory, Islamic banks should play an important intermediary role in facilitating the transformation of the funds from the public for investing them through financing activities. This in turn leads to economic growth, as such conduct of financial operations result in creating productive financial activities, generating vacancies (Khan, 2010: 808), which then is expected to lead to economic growth. Therefore, by fulfilling such objectives, Islamic banks would stand to be as one of the most contributing sectors in the economic sphere.

As part of their operations, on one hand, Islamic banks receive deposits and capital from customers and investors and on the other hand they provide financing to customers and entrepreneurs based on Islamic modes of financing. Unlike conventional banks, Islamic banks do not charge interest, yet different rate of returns are paid to the capital suppliers. Simultaneously, Islamic banks share the profits with their depositors and capital suppliers according to the ratios that are agreed upon in advance. Thus, Islamic banks conduct their business based on unique and specific types of relationships with fund suppliers and entrepreneurs as well as remaining direct investors in the process. It should be noted that such a relationship is governed by Islamic financial law, which

cannot be found in business activities of the conventional banks. However, such a unique nature of Islamic finance has critical implications on the liquidity behaviour and position (liquidity creation and liquidity risk) of Islamic banks that need to be clearly explored to establish a better understanding.

It is crucial to state that the Islamic banking system is a relatively new innovation in the global financial sector, which has been in existence only for the last 40 years. Hence, highlighting the key aspects of the Islamic finance principles that stemmed from Islamic law teachings is crucial to understand the implications of such a system in relation to liquidity creation and liquidity risk exposures. Islamic finance has a number of principles that need to be elaborated in relation to liquidity behaviour and the position of Islamic banks, such as: prohibition of interest (*riba*), excessive uncertainty (*gharar*) and gambling (*maysar*), advocating risk-sharing, promotion of entrepreneurship through participatory financing, impermissibility of the abuse of any party in any financial transaction, protection of property rights, transparency and the inviolability of contractual responsibilities. All of these principles are explained as follows in an attempt to provide the crucial foundation of understanding liquidity creating and liquidity risk exposure issues in Islamic banking.

### **2.3.1. Prohibitions in Islamic Finance**

In understanding the principles of Islamic finance, first the ontological sources have to be referred to, which has positive and negative measures. This section begins with negative measures, namely prohibitions in understanding the implications on liquidity creation and liquidity risks aspects of Islamic banking.

#### **2.3.1.1. Prohibition of *riba* (interest)**

*Riba* is an Arabic word, which literally means ‘increase’ (El-Gamal, 2006: 49) or ‘growth’ (Ahmed, 2011: 30). “Although it is common to associate *riba* with interest, it has much wider implications and can take different forms” (Ahmed, 2011: 30). In financial terms, it refers to any contractual increment in a loan or debt due to the time element (Kahf, 2006: 5).

It should be stated that according to Islamic teaching, *riba* is absolutely prohibited (Ahmed, 2011: 31). Given that the Islamic banking operations are based on the

ontological and epistemological foundations of Islam, as a revealed knowledge, all types of financial activities must be interest free. In other words, it is not allowed to charge interest for the mere use of money. Since money is deliberated as a tool or instrument between commodities in financial transactions, it is believed that taking interest on a loan (financing) is not financially or socially optimal from Islamic law perspective (Ben Arab and Elmelki, 2007: 81); as fixed return is not permissible; implying that return should only be generated through taking risk and participating.

Based on the concept of prohibition of interest, critical differences in relation to liquidity behaviour between Islamic and conventional banks can be highlighted. For instance, the concept of ‘sale/trade-based businesses’ subjects Islamic banks to the natural circumstances of uncertainty and risk, while the interest based business transactions may not. Whilst the capital in interest-free-based Islamic finance activities may increase or decrease according to the profits and losses, in interest-based financial activities the capital grows routinely over time. Moreover, Islamic banks have to deal with real assets that lead to real business activities, while conventional banks deal with money in the form of interest-based loans and, moreover, through buying and selling loans in the market (El-Gamal, 2006:49-57). Accordingly, Islamic banks are not allowed to sell debts at a discount, as a result of elements of exchanging an unequal amount of money. In this context, the sale of debt for debt may take place in the form of forwards, futures and swaps (Ahmed, 2011: 33).

As the relevant literature that developed over many centuries show, the rationale for the prohibition of *riba* is very well elaborated in Islamic law. However, the most fundamental reason in relation to liquidity behaviour is that the money should not generate revenue unless it involves risk or it is associated with human efforts. Since the future is uncertain and it cannot be predicted or guaranteed that the loan/capital can generate adequate returns to pay back the principal with the interest agreed upon (Ben Arab and Elmelki, 2007: 81), applying interest may result in injustice due to the hegemonic nature of fixed return. Hence, based on the concept of ‘prohibition of interest’, it can be stated that Islamic banks by definition aim at embeddedness in terms of creating real economic activities by conducting interest-free modes of financing within the defined framework of Islamic ontology. Accordingly, through such obligation, Islamic banks generate real investments, which are mainly illiquid, by using

the accumulated liquid funds implying that their creation of liquidity has to hit greater levels compared to conventional and hybrid banks and, hence, contribute in enhancing the economy. However, in the case liquidity shortage, Islamic banks are not allowed to borrow the required funds based on interest that are available to conventional banks and, hence, they may struggle to meet their financial obligations in a timely manner. Furthermore, according to Diamond and Rajan (2001: 288), despite the riskless nature of illiquid assets, if they were held to maturity, the low sale price can result in risk exposure resulting in the potential of liquidity needs. Hence, conducting their business operations based on the principle of ‘prohibition of interest’ that direct the financial activities towards illiquid investments linked to tangible assets, would negatively affect the banks in the event of liquidity risk, as with an increase in demand of liquid liabilities, due to ‘being investor at the same time’, Islamic banks would struggle to liquidate their illiquid assets. Even in the case of managing asset liquidation, Islamic banks would face the risk of a high cost of losing the difference between the maturity price and fire sale price, which certainly will widen their financing gap as a result of mismatching between assets and liabilities and hence suggesting more severe liquidity risk exposures.

#### **2.3.1.2. Prohibition of *gharar* (uncertainty)**

*Gharar* is another major prohibition in Islamic finance, which means “uncertainty or hazard caused by lack of clarity regarding the subject matter or the price in a contract or exchange” (Ayub, 2007: 57). Based on Islamic financial principles any kind of sale contract or business that involves *gharar* is not permitted. In legal terminology of jurists, *gharar* “is the sale of a thing which is not present at hand or the sale of a thing whose ‘*aqibah*’ (consequence) is not known or a sale involving hazard in which one does not know whether it will come to be or not” (Ayub, 2007: 58). The *gharar* sale, thus, can be defined as “the sale of probable items whose existence or characteristics are not certain, the risky nature of which makes the transaction akin to gambling” (El-Gamal, 2006: 58). Accordingly, *gharar* can be defined as “trading in risk” (El-Gamal, 2006: 61).

In financial terms, uncertainty is an unavoidable element in business operations, where taking a risk tends to be a term for the eligibility of profit-taking in any business. In this regard it is important to mention that jurists have defined two types of *gharar* (uncertainty): *gharar el-kathir* (excessive uncertainty), which invalidates contracts, and

*gharar qalil* (trivial uncertainty) that is tolerated as an essential evil that is an unavoidable factor in business activities (El-Gamal, 2006: 58; Ayub, 2007: 61).

In order to avoid *gharar* in a contract, it has to fulfil the following principles (Ayub, 2007: 61):

- (i) The financial contracts must not contain extreme uncertainty in relation to the subject matter and its counter value in exchanges;
- (ii) The product must be well defined, determined and distinctly identified in the contract to all parties;
- (iii) Quality and quantity of the subject matter must be specified;
- (iv) A contract must not be unsure or indeterminate, as the entitlements and duties of the contracting parties have to be known to avoid any future abuse; and
- (v) There should be no negligence (*jahl*) or uncertainty about obtainability, existence and deliverability of commodities and the all parties should know the real condition of the commodities.

Based on these conditions, many financial instruments that have been widely used by conventional banks are not permitted for Islamic banks due to *gharar* elements, which includes options and other derivatives (El-Gamal, 2006: 61-62; Khan, 2010: 807). Such limitation of using these kinds of financial instruments, hence forces Islamic banks to trade in asset-based/backed instruments. In turn, such conditions can boost the liquidity-creation ability of Islamic banks through directing the capital into illiquid investments. Consequently, it may lead to increase their embeddedness in terms of involving in real economic activities and positively influencing the economic growth in countries where they operate. However, simultaneously, such orientation may put an Islamic bank in difficulty when liquidity needs occur, where higher levels of complexity and efforts may cause inefficiency to cover their liquidity needs that may increase costs. Moreover, such complexity may also discourage fund suppliers to provide Islamic banks with required liquidity that can widen financing gap, which can impose Islamic banks to higher degrees of liquidity risk compared to conventional and hybrid banks.

### **2.3.1.3. Prohibition of *maisir/qima ̄* (games of chance)**

In Arabic language *maisir* and *qimaar* are semantically used without any distinction. *Maisir* means the possession of any wealth by chance regardless whether it divests the entitlements of others or not, while *qimaar* refers to the game of chance, which means gaining wealth at the other's cost (Ayub, 2088: 61-62). It describes the situation of "a person puts his money or a part of his wealth at stake wherein the amount of money at risk might bring huge sums of money or might be lost or damaged" (Ayub, 2088: 62).

Gambling is considered one type of *gharar*, where the gambler is a risk-taker as he/she is unaware of the outcome at the end of the gambling. Based on such understanding, it can be noticed that a number of financial transactions and products in the conventional banking sector are involved with *maisir* and *qimaar* and, hence, Islamic banks are not allowed to deal or offer them. Such as the insurance models that used in conventional banking which contain elements of *maisir* (El-Gamal, 2006).

By referring *maisir/qimaar* to an action of involving two parties in an antagonistic game played only for the purpose of gaining at the expense of someone else, the accumulated outcome from such a game, hence, is illegitimate. The economic rationality behind this prohibition can be explained by the addictive nature of gambling, which can easily distract someone's consideration from productive business activities and moral behaviour (El-Gamal, 2006: 62). Hence, based on this argument, it can be stated that such a principle positively directs Islamic banks to undertake productive financial activities that directly enhance economic development. This implies that such a restriction would positively increase the liquidity creation function of Islamic banks through channelling funds into illiquid investments. Yet, it may lead to financing gaps as a result of engaging in illiquid asset-based activities that applies more complexity and, hence, higher costs (Beck et al., 2013: 434) that can increase Islamic banks liquidity risk exposures.

### **2.3.2. The Concept of Risk Sharing**

The concept of risk (loss) sharing, as an essential feature of Islamic finance, is considered as a key norm for eligibility of return. This concept is derived from an Islamic financial maxim '*al-kharaj bil daman*' and '*al-ghunum bil ghrum*', that means the entitlement to attain return requires taking responsibility of accompanied risks (El-

Gamal, 2006: 145; Ahmed, 2011: 41). Accordingly, profit must be obtained through bearing the risk and, of course, as compensation of the ownership of the asset, service or usufruct of the asset (Ayub, 2007: 81). In other words, “return should depend on the productive behaviour of the business where funds are used, implying that interest, lotteries, gambling, etc. are prohibited, because return in respect of them either does not accept the business risk or is based on pure luck, chance or hazard” (Ayub, 2007: 81).

Based on this principle, in an Islamic financial transaction, both parties, the investor and the borrower, share the risk as well as the reward (Iqbal and Mirakhor, 2007: 12). Such a mechanism directly persuades Islamic banks as well as entrepreneurs towards a more responsible approach in operating sensible and productive business activities (Khan and Mould, 2008: 6). Accordingly, the risk-sharing maxim implies that Islamic banks by definition have to encouragingly contribute in creating real economic activities and therefore their degree of liquidity creation is hypothetically perceived to be higher than their conventional and hybrid counterpart. However, the concept of risk sharing exposes Islamic banks to additional risks that may cause serious liquidity problems. Moreover, such a concept imposes some equity features to Islamic banks’ deposits that may escalate the ambiguity on depositors’ return and increase the possibility of both expected and unexpected withdrawals that lead to bank runs (Beck et al., 2013: 436), which may cause wider financing gaps and, hence, greater likelihood of exposure to liquidity risk.

### **2.3.3. Asset-Backed/Based Nature of Business Operations**

In the theory of conventional financial intermediaries, banks obtain funds from the public in the form of deposits (and other liabilities) and pay them a certain rate of interest as a return for their investment. On the other side, they lend the accumulated funds to borrowers/entrepreneurs and charge them a fixed rate of interest. Even in the event that commodities are involved in such process, for instance, in financing a lease contract, the conventional banks’ focal concern is funding the purchase process of commodities and not the commodities themselves. In addition, they may execute their financial activities through documents, where a popular citation in conventional banking states that “banks deal in documents not in goods” (Ayub, 2007: 82).

In contrast, based on Islamic financial principles, Islamic banks intermediate through

commodities or documents that represent ownership of assets. For instance, in *murabahah*, the subject of contract is a specific commodity. In this case, Islamic banks directly conduct the purchase process of commodity or delegate it to a *wakeel* (mediator/agent) based on *wakala* (agency) contract at their own discretion or upon a request by a customer. In this case the Islamic banks keep the ownership and bear any risk until it sells the commodity at cost plus a markup. After the sale contract is completed and the buyer makes the final payment, the ownership and all associated risks are transferred to the purchaser (Ayub, 2007: 82-83).

The aforementioned explanations reflect the existence of a direct association between the Islamic banking sector and real economic activities, where Islamic financial law requires that each financial transaction should be tied to a tangible underlying asset (Hakim, 2007: 163). Thus, financial activities of Islamic banks are undoubtedly and directly identified with real economic activity (Iqbal et al., 2010). This implies that liquidity creation of Islamic banks is boosted through increasing asset-associated financing activities. However, such restriction means that Islamic banks are by definition limited to trade in the debt securities market instruments, which can be used to cover their liquidity needs (Tayyebi, 2009: 15-16). In addition, before completion of sale contract, Islamic banks tolerate all risk of the commodity that can increase the financing gaps. Such limitations and restrictions, hence, subject Islamic banks to higher levels of liquidity risk exposure than conventional banks.

#### **2.3.4. Status of Money**

Since money as an intermediary tool plays the most important function in a financial system, it is worth exploring money's status from an Islamic financial perspective and its implications on banks' liquidity behaviour and position. Unlike conventional banks, Islamic banks cannot consider money as a commodity that can be traded (El-Gamal, 2006). Money can be defined as a unit of account to perform as the price that represents the value of commodities, services and any other financial activities (Ayub, 2007: 91). This is why money, since its existence, is needed as a tool of exchange and not for itself, apart from the value of the precious metals that are to be found in real sector production of the currency, such as gold and silver (Choudhury, 2011: 293). Accordingly, Islamic banks are not allowed to generate profits out of pure debt transactions, such as charging interest on loans. Based on Islamic financial values, money serves to assist social and

economic activities of individuals through being a method of exchange (Ayub, 2007: 437). Therefore, generating money out of money is certainly prohibited. For this reason, Islamic banks are compelled to generate profits just by lawful trading activities and investing in real assets. In this, the use of money in a productive way is essential: “The nature of money... in terms of the intrinsic relationship between money as a moral and social necessity linked endogenously with real economic activities” (Choudhury, 2011: 292). Accordingly, in Islamic financial operations, money generates profits only when it is involved in real financial activities where human efforts are employed (Abdul-Rahman, 1999: 2). Based on such a teaching it can be stated that Islamic banks have to link all their operations to real investment. This implies that Islamic banks have potential to increase their liquidity creation since they principally need to be involved in illiquid assets-based financial activities. However, since money is not perceived as a commodity that can be traded (El-Gamal, 2006), Islamic banks have limited access to debt market that can expose them to sever liquidity risk if a shortage occurs (Ahmed, 2011).

### **2.3.5. Islamic Financial Modes for Accumulating Funds**

Since the transformation of funds is the most dynamic function that is considered as the main source of liquidity creation and liquidity-risk exposures, it is crucial to understand the methods that Islamic banks employ to accumulate such funds. Islamic banks, mainly, accumulate funds through three types of deposit accounts: savings accounts, current accounts and investment accounts.

It should, however, be noted that for Islamic banks such a task is rather challenging. While it is critical for banks to maintain a high quality standard in some important issues related to revenues, liquidity, maturity, security and stability, it is very important for Islamic banks to assure the compliance of their business operations with Islamic financial law. For instance, Islamic banks are not permitted to fix any ratio of returns on deposits that may accelerate the uncertainty on depositors’ return and increase the likelihood of withdrawals that lead to bank runs (Beck et al., 2013: 436).

In exploring Islamic financial modes, it is important to note that this section presents the most common Islamic modes of offering deposits that are conducted by the majority of Islamic banks. More importantly, this section highlights the uniqueness of such Islamic

principles in relation to liquidity creation and liquidity risk exposures rather than detailing the technical aspects of such models.

### **2.3.5.1. Current deposit accounts**

Islamic banks offer current deposits on the basis of *wadiah* (trust/safe-keeping) and *qard hasan* (benevolent loan) for the purpose of custody of the clients' deposits (Obaidullah, 2005: 49-50; Ahmed, 2011: 170). Islamic banks, similar to conventional banks, guarantee for such account holders any withdrawals at any time and do not charge any fees for providing the current account. In line with such services, many other facilities are accessible to guarantee high quality services, such as checking facility, automated-teller-machine cards, charge cards, travellers' cheques, telephone banking, branch facility, standing instructions, statement request service, balance query facility, remittances and many other services (Obaidullah, 2005: 49-50).

Based on *wadiah* mechanism, Islamic banks keep the deposits under *amanah* (trust) model. Hence, in the case of utilisation of these deposits, banks tolerate the risk. In such a process, the bank is liable for any loss and has the entitlement of all profits (El-Gamal, 2006: 144). In return, the depositors do not share any revenues as well as any kind of risks. Also, such an account is offered without any conditions in respect of minimum deposits or withdrawals.

Other banks offer the current account based on the *qard hasan* concept (benevolent loan), as they consider these deposits as loans by depositors. According to this model, banks are allowed to use these type of deposits. Based on the *qard hasan* model, any profit or loss accruing exclusively is born by banks. The depositors are not allowed to claim/share any return from the investment of their funds as they are considered as benevolent lenders to the bank; hence, any revenues would be regarded as *riba*/interest (Obaidullah, 2005: 50; El-Gamal, 2006: 41). It should be noted that, in the case where a bank guarantees the deposited fund, then the deposit contract based on *wadiah* is no longer valid. Accordingly, it is believed by many scholars that the most suitable model for such purpose is the *qard hasan* (benevolent loan) model.

As a conclusion, the account holders of the current accounts explicitly agree to certify the utilisation of the fund by the bank. Despite the fact that this category of deposits is the cheapest and most liquid of funds, they are mainly used for the purpose of balancing

the liquidity needs as well as for short-term transactions (Ben Arab and Elmelki, 2008: 82) that boost banks' liquidity creation ability, having the notion that the account holders are entitled to withdraw their money at any time that cause wider financing gaps and also based on *amanah* concept all losses are born by banks, such deposit account can lead to severe exposures of liquidity risk.

#### **2.3.5.2. Saving deposit accounts**

In order to meet the demands of safekeeping of the excess capital, Islamic banks offer savings accounts, the holders of which are not entitled to any returns unless the bank allocates humble profits to them regularly at its ultimate decision based on the return. Such returns are permitted from an Islamic law perspective as long as it is not taken as a condition in the contract. Such types of accounts are offered on different models such as: *wadiah*, *mudarabah* and *qard hasan* (El-Gamal, 2006: 41) as explained below:

(i) Similar to the current account, in a *wadiah amana*-based saving account model, the bank guarantees the safe custody and in return gets the right to use these funds. In this case, the bank request depositors' authorisation to utilise the funds as long as it stays with the bank. All profits go to the bank, except what is given to the depositors as a gift (*hiba*) without documenting it in the contract (Obaidullah, 2005: 51). The bank also ensures the permission of withdrawal of a part or whole of a deposited fund at any time through providing the depositors with withdrawal facilities such as savings pass books, ATMs and other types of services. It is important noting that the gift or reward on deposit is awarded if the fund supplier encounters the minimum deposit required under this account. Such a reward is variable in nature since it is profit-based and is voluntarily conducted by the bank (Obaidullah, 2005: 51).

(ii) Saving *mudarabah* account model: here the depositors are considered as *rabbul mal* (owner of capital), hence the bank has to acquire the authorisation to utilise the capital as *mudarib* (investor). The depositors are allowed to withdraw their capital whenever they wish to do so. The profits are then shared between the bank and depositors according to the predetermined agreement. Profits are calculated on the basis of the minimum balance maintained for a time period (say, a month). Hence, "a minimum balance is required to be maintained in order to qualify for a share in profits" (Obaidullah, 2005: 51-52).

(iii) Saving *qard hasan*-based account model: in this type of account the depositors are considered as lenders to the bank. Such accounts are operated in a similar way to *wadiah*-based accounts explained above. While the depositors are not entitled to any returns, the bank offers a variety of benefits such as non-contractual gifts to the depositors (Obaidullah, 2005: 52). While, in *wadiah and qard hasan*-based saving deposits are free capital, as banks do not have to pay any fixed rates to the holders, all losses are born by banks. Hence, it can be stated that Islamic banks can use such deposit to balance their positions that can enhance the liquidity creation, yet, a heavy reliance on them may cause liquidity risk if large withdrawals occur.

### **2.3.5.3. Investment *mudarabah*-based deposits (time deposits)**

Islamic banks consider investment *mudarabah*-based deposits or time deposits as an essential element in the overall bank deposits that perform a fundamental role in the bank's financial operations. In an attempt not to breach Islamic financial law, Islamic banks offer this product on the basis of *mudarabah* (Dusuki, 2012: 307). In the Islamic banking industry, *mudarabah* is known as Profit-Loss Sharing (PLS) deposits as well as participatory deposits (Obaidullah, 2005: 52).

In an investment deposit account, the client provides the capital as a *rabbul-mal* (the capital supplier) to be invested under the management of the bank as a *mudarib* (investor). Based on Islamic finance regulations in *mudarabah* contract the *mudarib*, which is the bank here, does not guarantee the capital and the profits are distributed according to the pre-determined approved ratios (Dusuki, 2012: 307). Accordingly, if any loss occurs, it is absorbed by the *rabbul-mal* (the depositors). However, if the losses were occurred due to a mismanagement conducted by the bank (*mudarib*), then the bank tolerates the responsibility. Such features are the main characteristics that distinguish Islamic banks' investment deposits from their conventional counterparts'. Hence, in order to maintain the confidence of clients in the Islamic banking sector, Islamic banks need to adequately minimise the risk of losses and enhance their profits. In the investment deposit account, the profit sharing ratio is determined based on a stated minimum period (Obaidullah, 2005: 53). Mostly the profit-sharing ratio is prearranged based on the nature of the deposit account, whether the distribution of profits is considered on a short- or long-term basis. Since the long-term deposit accounts allow for a better chance to utilise the capital for long-term businesses, the holders of this type

deposit gets a higher rates of profits. Whether it is a short or long-term investment deposit account, the depositors have the right to withdraw their deposits whenever they wish to do so. However, one of the main conditions for the depositors to be entitled to the profits is that they have to leave their funds with the bank at least for the period agreed upon. In the case of any withdrawal before the end of the agreed period, the depositor will lose the entitlement of profits. Such a characteristic puts Islamic banks at a higher liquidity risk even if losses are predictable. Therefore, in order to mitigate such a risk, Islamic banks could require submitting a notice of withdrawal before such actions (Ben Arab and Elmelki, 2008: 83).

Moreover, a *mudarabah* deposit is classified into two types of accounts, namely: *mudarabah muqayyada* (restricted *mudarabah*) and *mudarabah mutlaqa* (unrestricted *mudarabah*). While in *mudarabah muqayyada* the fund manager (*mudarib*) is restricted to operating investment according the fund supplier (*rabbul-mal*), the fund manager (*mudarib*) is completely authorised to use the fund based on his/her own knowledge without going back to the fund supplier (*rabbul-mal*) based on the *mudarabah mutlaqa* model (Dusuki, 2012: 307).

Furthermore, under the investment deposit account, three categories of investment deposits are classified as follows:

(i) General Investment Deposit Account:

The general investment deposit account is a common account in the Islamic banking industry under which an investment pool is set up as a fund. It comprises diverse maturities. In further exploring this, “The funds are not tied to any specific investment project but are utilised in different and continuous financing operations of the bank. Profits are calculated and distributed at the end of the accounting period, which is either three months, six months or one year” (Obaidullah, 2005: 54).

(ii). *Special Investment Deposit Account:*

The structure of this account is paralleled to the general investment account. However, in a special investment deposit the account holders have to meet the required minimum of funds to be able to invest in such an account. In some cases the bank just accepts the deposits from government and corporate customers. Usually, the bank negotiates

individually the profit ratio with depositors. This type of product authorises the bank with certain limits of investment such as a specific business that deposits must be invested in and the revenues resulting from this specific project are shared between the bank and clients based on the contractual agreement (Obaidullah, 2005: 54).

*(iii). Limited and Unlimited Period Investment Deposit Account*

All limited period investment deposits are accepted for a restricted period, which is determined by both parties, banks and depositors. The contract comes to the determination at the end of the exact approved period. However, the returns are distributed at the end of the accounting period. In the unlimited period investment, the deposits are not restricted to a certain time and the contract is extended axiomatically. However, giving a notice of three months can terminate it. It is worth mentioning that based on this model, the contract does not allow any withdrawals or further deposits, yet it accepts more than one account from a depositor. The earnings are calculated and shared at the end of the accounting period (Obaidullah, 2005: 54).

Such unique methods of accumulating funds boost the involvement of Islamic banks in real economic activities by using short-term liquid liabilities to finance long-term illiquid assets. These approaches suggest a positive impact on bank liquidity creation. However, the equity features of *mudarabah*-based deposit, where depositors share the risk and, given that Islamic banks are not allowed to guarantee any fixed returns to deposited funds, it may magnify the uncertainty on depositors' returns that may lead to an increase in the possibility of withdrawals that lead to bank runs (Beck et al., 2013: 436). Suggesting more complexity and a higher degree of difficulties that Islamic banks may face in balancing their items on both sides could cause a wider financing gap and, hence, more exposures to liquidity risk than conventional and hybrid banks.

### **2.3.6. Islamic Financial Models of Using Funds**

After acquiring funds based on various models, Islamic banks utilise them in different business activities based on distinctive and complex models. In order to operate in a parallel line with their conventional and hybrid counterparts in a competitive manner, Islamic banks attempt continuously to offer miscellaneous types of financing products that satisfy most financial necessities of the market. These include financing the purchase of properties, business undertaking funding, trade funding, money market

activities, offering card facilities and many other *Shari'ah*-complaint business activities.

Islamic banks uses the accumulated funds based on a variety of financial products; yet, this section focuses only on the major financing products in relation to liquidity creation and liquidity risk exposures. Such financing products can be categorised into two types: equity/profit-loss-sharing-based financing models and debt/sale-based financing models, which are detailed as follows:

### **2.3.6.1. Equity/profit-loss-sharing-based financing models**

Under equity/profit-loss-sharing-based financing models, two types of products are often utilised in the Islamic banking industry, namely *mudarabah* and *musharakah*. In the banking industry these instruments are known as 'trustee project finance' and 'joint venture project finance'. These equity-based financing products are considered as some of the major elements of the uniqueness of the Islamic banks' operations, which are also considered to be the backbone of Islamic financing activities that positively enhance the liquidity creation function that directly boost the Islamic banks' attitude in generating productive real economic activities and, hence, positively contributing to economic growth. However, due to the challenging and complex nature of these products that impose many types of risks including liquidity risk, Islamic banks are not keen to offer them widely. The mentioned products are detailed below:

#### *2.3.6.1.1. Mudarabah (trustee partnership)-based products*

The *mudarabah*-based model (trustee partnership) refers to a contract where a financial agent with capital sets up a partnership with another one who has proficiency in the form of particular skills or entrepreneurship to be utilised into real business activities. Hence, *mudarabah* is based on a principal-agent relationship; where the *rabbul al-maal* (capital supplier) is a sleeping partner and has no interaction in the management. Under *mudarabah* the principal capital is not guaranteed and the rate of return is not fixed. *Mudarabah*-based model is usually used in short- to medium-term products (Ahmed, 2011: 91-92).

In the modern Islamic banking industry, a *mudarabah* contract is utilised between Islamic banks and fund suppliers, in which an Islamic bank acts as a *mudarib* (agent/entrepreneur/fund manager) who is accountable for managing the business and

provides expertise and management for commencing and functioning the business. The profits are distributed according to the prearranged ratios, yet not guaranteed, and the losses are entirely absorbed by the *rabbul maal* (capital provider), unless the losses occurred as a result of mismanagement or negligence in business operations by the bank. Under a *mudarabah* contract, both parties have the right to terminate the contract whenever they wish to do so, unless the business requires a certain minimum period to generate income (Obaidullah, 2005: 60-61).

It should be noted that *mudarabah* is an ancient concept in Islamic financial history that merges the most significant elements of production, namely capital, labour and expertise (Iqbal and Mirakhor, 2007: 103). Hence, it can be stated that *Mudarabah*-based business and financing activities play a key role in boosting banks liquidity creation, where savings or liquid liabilities are channelled into real investments. Therefore, by conducting financial operations based on such a model, Islamic banks directly contribute to creating real economic activities through investing the liquid fund that is accumulated from different sources based on different models into an illiquid asset, which directly increases the liquidity creation of the bank.

Despite the fact that such a type of contract usually does not impose any liquidity risk on liability side, where banks do not pay any fixed rates to the fund suppliers, banks are exposed to liquidity risk when early liquidation occurs. In such a case although the assets are tradable, due to their illiquid nature banks may tolerate some losses as a result of a fire-sale price (Ali, 2012: 3). Moreover, a *mudarabah* contract may lead to liquidity risk indirectly due to merging of other kinds of risks at different stages of the contract process. For instance, a *mudarabah* contract may lead to several risks, such as adverse selection problems and misevaluating the business due to limited banks' existing expertise and techniques in the beginning of the contract. Furthermore, the counterparty risk may occur during and at the end of the contract, including misreporting of profits by the *mudarib* (manger/agent), that may occur as a result of information asymmetry problems (Ahmed, 2011: 92). This in turn could put banks' trustworthiness at question, which may lead to reputation risk that could indirectly cause a major liquidity problem for an Islamic bank as a result of the interrelation between such risks.

### 2.3.6.1.2. *Musharakah (joint venture)-based products*

*Musharakah* is a partnership contract where all partners are required to supply the capital and labour (Ahmed, 2011: 92). Under this type of product, an Islamic bank and the client mutually agree to contribute in providing the capital as well as entrepreneurship expertise to be invested in a business according to the conditions of the agreement. In such a partnership, the profits are distributed based on the prearranged ratios. Both parties absorb the risk of losses based on their contribution ratios of the capital (Ahmed, 2011: 92). Hence, each party acts as a trusted agent for the other party.

At the present time, Islamic banks conduct a unique type of *musharakah*, where fund suppliers are treated as partners during the entire financial year to adjust the returns and losses as well as to prevent the withdrawal risk. *Musharakah* is usually practised in offering housing mortgages based on *musharaka mutanaqisa* (diminishing partnership) where the ownership of the financier diminishes over time as the client buys the house by monthly payments (Iqbal and Mirakhor, 2007: 91-93; Dusuki, 2012: 315). A *musharakah* contract is normally used in long-term finance with a tenure of three years or more (Ahmed, 2011: 93).

It should be noted that the productive nature of *musharakah*-based financing activities generates an essential positive impact on the economic development through channelling liquid funds into tangible illiquid assets. Under such a contract, both investment parties are involved in investing in illiquid assets that can directly increase the level of liquidity creation of the banking industry. Since banks and fund suppliers are considered as partners, in a *musharakah* contract the probability for banks to face liquidity risk is small as no fixed rate of returns are paid on the liability side (Ali, 2012: 3). However, due to the equity-based nature of *musharakah*, banks may face fire-sale costs when banks need to sell their assets at extremely discounted prices when other partners call back their position before their maturity, that causes liquidity risk (Ali, 2012: 3). In addition, due to the illiquid nature of *musharakah* contract Islamic banks may face other types of risks that may trigger a liquidity crisis, such as counter-party risk that occurs as a result of information asymmetry and moral hazard issues that come into existence in the form of providing inaccurate reports in a timely manner on the generated profits by the manager. Moreover, by the end of the contract, if the *musharakah* contract is conducted in a project with a tangible asset, the bank is

vulnerable to asset-price risk and/or counter-party risks (Ahmed, 2011: 93). Based on the argument of the interrelationship between risks in the banking system, occurring such types of risks during *musharakah* contract can indirectly cause liquidity risk (Ali, 2012: 3).

### **2.3.6.2. Debt/sale-based Islamic financing models**

Despite the permissibility of sell/debt-based activities, they are seen to be less desirable by many Muslim scholars compared with equity-based products, where a debt-based model is considered less ethically productive in respect to their less involvement in creating real economic development. This is also due to the fact that Islamic finance is defined through embeddedness in terms of linking financial activity with real economic activity. Nevertheless, Islamic banks rely heavily on debt-based financing products (Khan, 2010) that are considered as the most crucial type of asset in terms of the size and the generation of revenues. However, debt-based contracts are critical causes of the credit risk as well as liquidity gaps as the sales receivable are considered as illiquid as a consequence of restrictions on vending debt (Ahmed, 2011: 60), where they cannot be vended at a price different from the face value in the secondary market (Ali, 2012: 4). The debt-based financing products can be categorised as follows:

#### *2.3.6.2.1. Murabahah (deferred payment)-based products*

*Murabahah* refers to a sale contract wherein the payment is deferred to a certain date in the future with a rate of profit (Ahmed, 2011: 87). Based on a *murabahah* contract, banks purchase and vend the commodity to the customer at a mark-up price. The main condition of validation of a *murabahah*, the contract between the bank and commodity provider must be independent from the contract between the bank and customer (commodity buyer). Moreover, the bank must obtain the ownership of the commodity before signing the contract with the customer (buyer). In addition, the mark-up price and the feature of the commodity, such as quantity and quality, as well as the payment methods must be well defined for both parties (Obaidullah, 2005: 68; Ahmed, 2011: 78).

The subject of *murabahah* contract is a specific commodity and not funding the purchase process of commodities. Hence, through a *murabahah* contract, where real illiquid assets-linked commodities are involved, banks can positively increase the liquidity creation function that definitely contributes to the expansion of the economic

activity. On the other hand, although a *murabahah* contract is widely practised by Islamic banks, it can be a major source of liquidity risk, since *murabahah* receivables cannot be traded with a different price from the fair value due to their debt-based nature that causes illiquidity of the assets when needed (Ahmed, 2011: 60 and Ali, 2012: 4). If the maturity of the liabilities is shorter than the *murabahah*-based contract or when the demand in the deposit market is high, the withdrawal level increases with the purpose of obtaining better returns (Ali, 2012: 4) that leads to a wider financing gap and, hence, greater liquidity risk that banks may face.

Moreover, a *murabahah* contract may lead ultimately to liquidity risk as a result of involving other types of risk, such as default risk as the bank purchases the commodity based on the client's promise. Moreover, any losses occurred before delivering the commodity to the client are absorbed by the bank that leads to market risk (Ahmed, 2011: 88). Consequently, this may lead the bank to suffer from serious liquidity risk due to the interconnection between such risks (Ali, 2012: 4).

#### 2.3.6.2.2. *Salam (deferred delivery sale)-based product*

A *salam* contract is one of the sell-based financing products that have been used in Muslim societies since the sixth century, which is a deferred delivery agreement where the purchased commodity is delivered on a specific date in the future with stipulated conditions for spot payment (Ismail, 2010: 136). As a financial contract, *salam* was initially innovated as a solution for the penurious farmers and traders who were in need of cash to cover their living cost shortages and in exchange they would sell goods on a deferred delivery date.

In a *salam* contract, Islamic banks pay full spot price to the client for a commodity to be delivered on a deferred date in the future. In other words, it is for clients who are in need of short-term cash to cover their liquidity shortages. After receiving the commodity, the bank sells it in the market. Since the spot price that banks paid is expected to be less than the future price at the time of delivery, the difference between the two prices is the profit of the bank.

It is crucial to mention that based on Islamic finance principles 'selling what one does not have' in general is not allowed as it contains elements of *gharar*. However, *salam* is considered an exceptional contract from an Islamic financial law perspective. Hence,

Islamic banks are not permitted to vend *salam* receivable, which is a commodity before the delivery date that cause the illiquidity of the product when liquidity is needed. This in turn can immediately lead to liquidity risk (Ali, 2012: 4).

A *salam*-based financing contract can also indirectly cause liquidity risk as a consequence of other kinds of risks that may occur during the contract, such as credit risk. If the vendor is unable to deliver the specified commodity, “then the liquidity problem of the bank extends beyond the maturity date. Having not received the commodity it cannot sell it in the market to convert it into a liquid asset” (Ali, 2012: 4). Moreover, if the seller delivers the commodity with different specified features, “the litigation risk which was a risk factor before the delivery now becomes a liquidity risk” (Ali, 2012: 5).

In order to avoid liquidity risk or other elements of risks in a *salam* contract, Islamic banks came up with a more complex type of *salam* transaction called ‘parallel *salam*’ with a third party, which is one of the methods to mitigate the price risk. In parallel *salam*, ‘customer 1’ vends a product to the bank on a deferred basis and receives the agreed spot ‘price 1’; the bank then sells the product to ‘customer 2’ on a deferred basis and receives ‘spot price 2’. After the commodity is delivered by ‘customer 1’, the bank delivers it to ‘customer 2’ at the time agreed upon. The difference between ‘price 1’ and ‘price 2’ is the bank’s profits (Obaidullah, 2005, 95-99; Ismail, 2010: 136-137). However, due to the involvement of credit risk and the risk of dispute that eventually leads to liquidity risk, the *salam* contract stays as a source of liquidity risk and, additionally, more complexity exists with having two parallel sales instead of one (Ali, 2012: 5).

It is worth to mention that the *salam* could be conducted in most of the industrial and agricultural goods as well as services. However, *salam* is not permissible in products, which are foodstuffs, such as fruits, that have a limited lifetime. In addition, *salam* does not include currencies or commodities that are vulnerable to *riba* (interest). The deference in exchanging such commodities is not permissible as these types of goods should be fully described in detail in terms of all elements that have an effect on the price (Obaidullah, 2005: 97-98). It can be stated that involvement of commodity in a *salam* contract and due to the mentioned conditions, *salam*-based financing contract in turn leads to an increase in banks transforming their liquid funds into illiquid assets that

enhance their contribution in creating real economic development through the linkage with the real assets or real activities and, hence, suggesting an increase in liquidity creation that Islamic banks conduct.

#### 2.3.6.2.3. *Ijarah (leasing)-based product*

An *ijarah* contract refers to the sale of the usufructs entitlements of tangible assets, in which the possessor of the asset acquires the regular lease payments as long as the lessee can use usufructs (Ahmed, 2011: 90). In an *ijarah* contract, an Islamic bank functions as a *mu'jir* (lessor) and permits the customer as *musta'jir* (lessee) to use a specific asset for a regular rent. The *ijarah* subject (asset) is either owned by bank or the bank purchases it based on a request from the client. The bank can also delegate the task of purchasing to its client as its *wakil* (agent). The ownership of the *ijara* subject remains with the bank, hence, all types of risks associated with ownership of the *ijara* subject (asset) remain with the bank while the liabilities occurring from the use of the assets are to be borne by the *musta'jir* (Ahmed, 2011: 90). At the end of *ijarah* contract the asset is supposed to be regressed back to the bank. However, both parties could agree that the ownership would transfer to the *musta'jir* (client) either through a promise by the bank to give the asset to the client at the end of the contract as a *hiba* (gift) or the client would buy the asset eventually through a binding contract. The *ujra* (rent) in this case will comprise two factors: (a) the rent of the *ijara* subject and (b) the payments towards the acquisition value (Ismail, 2010: 137). During an *ijarah* contract, the client utilises the *ijarah* subject and has all the benefits related to ownership of the *ijarah* subject against payment of prearranged *ujra*. The *ujra* also might be reformed according to the changes and development in the economic and business environments. It is noteworthy to state that all the mentioned associated contracts are independent from the main *ijarah* contract to circumvent any impermissible action of two contracts in one, which is considered as an excessive *gharar* (uncertainty) (Obaidullah, 2005: 79-90). The positive impact of such a contract may come as a result of a direct association with tangible assets that can boost real economic activity of such financial operations and, hence, improve the liquidity creation through financing their investment in illiquid assets by liquid liabilities and accordingly boosting the banking performance in promoting the economic growth.

Yet, in non-binding *ijarah* contracts, the banks may face market risk if the asset is not

leased as the client did not honour his/her promise from the first beginning of the contract (Ahmed, 2011: 91) that directly causes liquidity risk (Ali, 2012: 6). Moreover, since *ijarah* is a debt-based contract, the monthly rent is considered as a debt payable by the customer when it is due. Such nature may, in turn, lead to credit risk during an *ijara* contract. Additionally, at the end of the *ijarah* contract, market risk may occur as a consequence of residual value of the asset, which is not the case if the *ijarah* subject is transferred to the lessee at the end of the *ijara* contract based on *ijarah muntahia bitamlik* (leasing ended with ownership) (Ahmed, 2011: 91). Existing risk elements in an *ijarah* contract may affect the bank's liquidity position. Hence, it may, in severe circumstances, widen the financing gap that increases the possibility of liquidity risk exposures that banks may face.

#### 2.3.6.2.4. *Istisna'* (manufacture-sale)-based product

*Istisna'* (manufacture-sale) is another type of sale-based contract where a product is transacted before it comes into existence (Iqbal and Mirakhor, 2007: 86), which refers to an order to a vendor to manufacture a specific commodity for a buyer. The *istisna'* contract comes to the existence at the time when the manufacturer commences the process of manufacturing the requested commodity. The *istisna'* contract must contain the following conditions to insure its validity:

- (i) the agreed price must be fixed by mutual acceptance from both parties to avoid any uncertainty (*gharar*) in the future;
- (ii) the essential characteristics of the *istisna'* subject must be clearly stated and specified;
- (iii) the *istisna'* contract is bounded to both parties after starting manufacturing of the defined commodity, however, before that, they are permitted to terminate *istisna'* after giving a notice of revocation.

In an *istisna'* contract a manufacturer agrees to deliver an exact commodity at an exact time in the future to the purchaser at a prearranged deferred price to be paid either in full or instalments. The *istisna'* is considered as a unique contract as nothing is exchanged at the time of contracting. Moreover, in *istisna'* the manufacturing process could be done by a third party. Therefore, Islamic banks may delegate the

manufacturing/construction operations to a third party based on parallel *istisna'* (Ahmed, 2011: 89). The revenues that are generated from the difference between the price paid by the customer and price paid to the third party is the bank's profits.

It should be noted that *istisna'* financing is usually practised as an appropriate mode for constructing business or residential constructions, hospitals, roads, aircraft and similar projects (Iqbal and Mirakhor, 2007: 86). Such a direct link with real estate financial activities and its involvement with tangible assets implies that *istisna'* contract plays a crucial role in routing the liquid funds into illiquid assets that will increase the liquidity creation function of banks and, hence positively impact the economic development. On the other hand, since *istisna'* involves manufacturing or constructing against payments that are paid in instalments during the process of the contract, Islamic banks are exposed to market risks and counter-party and/or credit risks. While market risk occurs if the cost of the product increases, the credit risk occurs if the customer (buyer) rejects acceptance of the asset (commodity) or he/she fails in meeting the payment date (Ahmed, 2011: 89). Involvement of such risk elements can have direct or indirect consequences on the Islamic bank's ability to meet its liquidity needs and, hence, cause liquidity risk.

#### **2.4. CONCLUSION**

As the preceding presentation and discussion demonstrates, banks' liquidity behaviour and liquidity position are critical issues, where on the one hand, banks contribute in creating real economic activities through liquidity creation function by converting the liquid liabilities into illiquid assets. On the other hand, functioning as an intermediary between capital suppliers and capital deficiencies banks face wider degrees of a financing gap that increases the likelihood of banks facing higher levels of liquidity risk exposures.

This chapter also shows that Islamic banks operating within the Islamic financial sector framework have unique implications on liquidity creation and liquidity risk exposures, which stem from the Islamic law. As a result of the unique nature of the financial products and procedures that Islamic banks have to operate accordingly, it is assumed that they are in a position to create more liquidity than conventional and hybrid banks. It is worth mentioning that conventional and hybrid banks are also expected to create

liquidity, yet not up to the level that Islamic banks may reach due to their unique particularities. Moreover, due to such a distinctive style of operations and complexity of the Islamic financial products, Islamic banks face higher levels of liquidity risk exposures. Accordingly, it can be concluded that liquidity creation and liquidity risk exposures can be considered as key issues that need to be well defined and their key determinants need to be explored in order to enhance the banking liquidity behaviour and position that positively impact on the role of banks in enhancing the economy.

**CHAPTER THREE**  
**LIQUIDITY CREATION AND LIQUIDITY RISK**  
**LITERATURE REVIEW**

**CHAPTER THREE**  
**LIQUIDITY CREATION AND LIQUIDITY RISK**  
**LITERATURE REVIEW**

**3.1. INTRODUCTION**

The previous chapter focused on providing a theoretical framework in understanding the implications of Islamic finance principles on liquidity creation and liquidity risk of Islamic banks. Building on that, this chapter reviews the literature on liquidity creation and liquidity risk by providing a conceptual understanding of liquidity creation whereby banks can contribute to economic growth through transforming liquid liabilities into illiquid assets. In doing so, this chapter highlights the key papers that measure the liquidity creation function in the banking sector and its key determinants. In addition, this chapter overviews the related literature on liquidity risk exposure and its critical impact in the banking industry. Moreover, it outlines main related researches on liquidity risk from conventional and Islamic perspectives.

This chapter, thus, commences by reviewing the related literature on liquidity creation followed by literature associated with liquidity risk and then it concludes with highlighting the observed literature gaps.

**3.2. EXPLORING LIQUIDITY CREATION: A LITERATURE REVIEW**

Despite the importance of the liquidity creation function in the banking sector, the literature on such a dynamic topic remains scarce (Berger and Bouman, 2009a). Diamond and Dybvig's (1983) research is considered as one of pioneering studies in elaborating the role of banks as liquidity providers, who focused on modelling equilibrium to enhance the banks' ability to provide liquidity and maintain their solvency simultaneously. According to Diamond and Dybvig (1983), banks create liquidity through financing illiquid assets (loans/investments) with liquid liabilities (deposits). Through such a function, banks play a dynamic role in promoting the real economic activities. However, it may lead to a bank run due to a high level of abrupt withdrawals. In their model, Diamond and Dybvig (1983) argue that banks through

offering demand deposits promote the effectiveness of the market by forming a risk-sharing environment among all customers, where banks use the new deposits to offset withdrawals of other deposits. However, offering demand deposits can lead to ‘bank run’ as a result of a panic by depositors that give them an incentive to make immediate and unexpected withdrawals. Bank runs have a dramatically negative impact on social welfare due to the disruption that they may cause in the economy as a result of early liquidation of productive investments or resulting in diminishing net worth of such projects. In order to avoid and prevent bank runs, the authors suggest that suspension of converting illiquid assets or withdrawals and deposit insurance by the government are most effective methods. In addition, they propose a framework for optimal contracts with stochastic withdrawals that can be practised as a vital strategy to conduct a crucial intermediary role as well as preventing banks runs.

However, according to Postlewaite and Vives (1987) and Bhattacharya et al. (1998), the popular critique of Diamond and Dybvig’s (1983) model is that it lacks a ‘trigger mechanism’ as it assumes that the bank runs are ‘sunspot’ phenomena that may occur without the effects of other economic variables. Such an argument, however, was not supported by the historical events, as in the case of US banking sector before implementing the deposit insurance scheme (Bhattacharya et al., 1998). Gorton (1988: 222) states that “banking panics during the US National Banking Era were systematic responses by depositors to changing perceptions of risk, based on the arrival of new information rather than random events”. This suggests that the adverse information concerning the banks' returns acted as a key trigger on bank runs (Bhattacharya et al., 1998: 752). Bhattacharya et al. (1998), Bryant (1980: 339) and Gorton (1988) argue that when their future return is lower than their current withdrawal rights, the fund providers may cause a bank run if they decide to withdraw their deposits, implying that the significant role that asymmetric information may play in bank runs. Furthermore, an information-based run can further cause panic in the banking system as a whole if the liquidity shocks were interconnected across banks (Bhattacharya et al., 1998: 752). In addition, with regard to Diamond and Dybvig’s (1983) suspension of deposits convertibility proposal, despite providing a shield against the depositors panic, can cause dramatic increases in the bank’s costs. Moreover, while deposit insurance protects banks against the runs as suggested by Diamond and Dybvig (1983), it may cause a negative impact on social welfare as a result of high taxes that governments may place

on other sectors to cover the liquidity needs (Bhattacharya et al., 1998: 752).

In this regard it is important to highlight the basic theory of money creation/supply, which argues that there are four key players that determine the supply of money, namely: central banks, banks, depositors and borrowers. Based on this theory, money is created by banking systems as a whole, including the four players, and not by one single bank at a time (Mishkin, 2001: 408). The reserve requirements set by central banks, the commercial banks' decision to hold excess reserves, the depositors' decision to hold their funds and the borrowers' decision to borrow money are they key factors that affect the money creation process (Mishkin, 2001: 413).

With regard to the reserve requirements set by the central bank, it is worth mentioning the 100 per cent reserve suggested by Fisher (1936), which was initially proposed to eliminate the function of commercial banks in creating or destroying money and leave such a task for central banks (Allen, 1993: 712). Regarding the money creation behaviour of commercial banks, which is the core focus of this research, their decision toward holding excessive reserves is a critical component of the money creation process as argued by Mishkin (2001: 413).

Accordingly, it is important to highlight that this research focuses on the commercial banks' money creation behaviour and does not examine the impact of reserve requirements set by the central bank or the depositors' and borrowers' decision impact on the money creation. Furthermore, it is also worth mentioning that this research focuses on the operational side of money/liquidity creation as it examines the amount of liquid liabilities that commercial banks transfer to long-term illiquid assets at a time, rather than discussing the theoretical base of the money creation as proposed by Mishkin (2001) and Fisher (1936) that argues the money multiplying function of the whole banking system, including the four players as discussed earlier.

In terms of empirical research that measures the liquidity creation, there have been two key papers that took a pioneering role in developing measurements for liquidity creation. The first research was conducted by Deep and Schaefer (2004), and the second was by Berger and Bouwman (2009a). Later on, a few papers were published by following mainly Berger and Bouwman's (2009a) and also Deep and Schaefer's (2004) approach to examine the liquidity creation of banks from different perspectives. In such attempts,

some determinants such as capital and risk measurements as well as other control variables were considered in the respective examined models. These studies were conducted on developed, emerging, and transforming economies, which provided different results.

In line with such modelling, a critical review of some prior research that explored the determinants and implications of liquidity creation on creating real economic activities and on the economic growth of the countries where they operate is elaborated in this section.

Deep and Schaefer (2004), for example, measure the liquidity transformation based on the amount of long-term assets that have been financed by short-term liabilities, in which they were used as an indicator of the banks' contribution to economic production. Deep and Schaefer (2004) consider all assets and liability that mature within one year or can be converted into cash readily as liquid. In their view, liquidity means the 'moneyness' of the assets and liabilities implying an ability of converting them into cash or equivalents within a certain period of time when demanded. Therefore, the factors that define the 'liquidityness' of an asset or liability are the 'nature' and 'maturity' (Deep and Schaefer, 2004: 8-9). Deep and Schaefer (2004: 6), therefore, argue that the increased provision of loan commitments and other off-balance sheet items cannot be interpreted as a liquidity transformation due to their contingent nature. Through their measure of liquidity transformation (creation), the authors gauge the amount of net liquidity that banks transform from liquid liabilities to illiquid assets. Therefore, the higher the ratio, the greater liquidity amount the bank transfers from short-term liabilities to long-term assets and, hence, the higher amount of liquidity is created.

By applying their measurement to data from the largest 200 of the US banks over the period 1997-2001, Deep and Schaefer (2004) conclude that the US banks do not appear to create much liquidity where the liquidity transformation is only about 20 per cent of total assets on average, which is considered as relatively low. To substantiate their results, they run some tests to examine the determinants of liquidity transformation of banks covered in the sample by examining the relationship between the liquidity transformation and deposit insurance. Their overall empirical results show that the magnitude of the impact of the deposit insurance is limited on enhancing the banks'

liquidity creation/transformation, which suggests that the “insured deposits do not replace uninsured liabilities rather than expand the deposit base or loans” (Deep and Schaefer, 2004: 34). In addition, they assessed the association between the liquidity transformation and the credit risk and they found a significant negative impact caused by credit risk on liquidity transformation. Furthermore, they state that the negative impact of credit risk on liquidity transformation is 85 per cent stronger than the positive impact of deposit insurance on liquidity transformation. Thus, Deep and Schaefer (2004: 32) conclude that the effect of deposit insurance on liquidity transformation essentially appears on the liability side, while the influence of the credit risk on liquidity transformation emerges solely on the asset side.

In further exploring the measurement of the liquidity creation function of banks, Berger and Bouwman’s (2009a) model is considered as the most recognised comprehensive model. The core contribution of their paper is that they develop four measures of liquidity creation by using a three-step approach. In the first step, according to the ease, cost and time consumption of the banks to meet their obligations towards depositors, they classify all bank assets as liquid, semiliquid, or illiquid. In a similar manner, they classify the bank liabilities and equities as liquid, semiliquid, or illiquid. In addition, the authors treat the off-balance sheet activities in the same way as the on-balance activities. In the second step, they assign weights to the activities classified in the first step. The positive weights were assigned to illiquid assets and liquid liabilities, which are constructed through the theory of liquidity creation that suggests banks create liquidity when they finance their illiquid asset by liquid liabilities (Berger and Bouwman, 2009: 3794). In the third step, they combined all the items of on- and off-balance sheet as classified in the first step and weighted in the second step in different methods to develop four measures for liquidity creation. Accordingly, each of the four measures are multiplied by the given weight  $\frac{1}{2}$ , 0 or  $-\frac{1}{2}$  with classified activities as liquid, semiliquid and illiquid. Berger and Bouwman (2009a) stated that the liquidity transformation measurement that was developed by Deep and Schaefer (2004) is an instinctive step forward. However, they argue that it is not adequately comprehensive measurement.

Berger and Bouwman (2009a) highlight a few key differences between their approach and Deep and Schaefer’s approach (2004). Firstly, Berger and Bouwman's (2009a) model includes all commercial banks and compares findings for large and small banks

rather than including only the largest banks. Secondly, in their preferred measure of ‘cat fat’, they classify loans by category rather than maturity. Thirdly, in their preferred measures they include off-balance-sheet activities. Berger and Bouwman (2009a) found that liquidity creation of the US banks considerably increases overtime, as they show that liquidity creation represents 39 per cent of the industry’s total assets in 2003. Moreover, they found a positive association between liquidity creation and market-to-book ratio as well as the price-earnings ratio. Furthermore, their results indicated a positive relationship between liquidity creation and bank capital for large banks, not significant for medium banks, and negative for small banks. In addition, based on other measures that exclude off-balance-sheet items, while they could not find a significant relationship between liquidity creation and bank capital in the case of large- and medium-sized banks, they found a negative and significant relationship in the case of small banks.

It should be noted that Berger and Bouwman (2009b) conducted another research to examine the association between monetary policy and aggregate liquidity creation of sample banks in the US market. In this paper they attempted to assess the amount of liquidity that had been created by the US banks during five financial crises in the US over 25 years. They specifically focused on two banking crises: the credit crunch in the beginning of 1990s and the recent subprime lending crisis that began in the second half of 2007. They covered three other financial crises, which mainly had direct impacts on the financial market, namely: the 1987 stock market crash, the Russian debt crisis plus the long-term capital management meltdown in 1998, and the bursting of the dot.com bubble plus the September 11 terrorist attack (Berger and Bouwman, 2009b: 2). They measured liquidity creation based on measurements developed by Berger and Bouwman (2009a). The authors aimed at evaluating the impact of financial crises on liquidity creation and whether the nature of the crises has any positive or negative influence on the levels of liquidity that is created. Furthermore, Berger and Bouwman (2009b) examined the impact of bank capital ratio pre-crisis on the competition and financial performance of the individual banks during each financial crisis. Taking into consideration that throughout a financial crisis, the levels of risks got critically elevated and the capital aptitude of risk-absorption become paramount, they raise a debate whether the highly-capitalised banks create more liquidity as a consequence of the low cost of capital and whether such high levels of liquidity creation have a positive impact

on the banks' financial performance.

Berger and Bouwman's (2009b) empirical results show that the nature of financial crisis (bank related crisis and market related crisis) has a different impact on the banks' behaviour toward liquidity creation. They elaborate that crises related to the banking sector had a positive impact on liquidity creation of the US banks, while the market-related financial crises had negatively affected the liquidity creation of the US banking sector. Based on their results, they state that the recent financial crisis (the subprime mortgage crisis of 2007-2009) had positively affected the liquidity creation, which could be as a result of low restrictions on lending standards that increased banks' incentives to boost their lending and off-balance-sheet activities. They state that despite the fact that the fragile structure of the banks' capital may enhance banks' ability to increase the liquidity creation, they raise a critical debate of the likelihood of a reverse effect of liquidity creation in terms of high levels of liquidity creation may in return cause a financial fragility in the banking sector.

In further detailing, Berger and Bouwman's (2009b) research results proved that banks with large size promote liquidity creation during both banking crises. Yet, this was not the case during the market related to financial crisis. Unlike large banks, less-capitalised banks promoted their liquidity creation during all financial crises without any differences between financial market-related crises and banking financial crises. In terms of bank capital impact prior to the financial crisis on liquidity creation, Berger and Bouwman (2009b) detected a positive relationship between size and the banks' financial performance before and after the financial crisis. However, in normal times, the banks' capital did not play a vital role in promoting the banks' profitability. They concluded by suggesting that high levels of capital enhance the large banks' financial performance during the banking financial crisis. However, a high ratio of capital promotes the small banks' capability to enhance their financial performance during banking crisis and crises related directly to the financial market as well as in normal times.

In pursuit of further research on liquidity creation, a few papers were conducted by following mainly Berger and Bouwman (2009a) and others followed Deep and Schaefer's (2004) approach. Fungacova et al. (2010), for example, examined the impact of introducing a deposit insurance scheme on the relationship between bank capital and

liquidity creation. Their work can be considered as an extension to the debate that was raised by Berger and Bouwman (2009a) through investigating how a deposit insurance scheme influences such a relationship. As Russia has operated its deposit insurance scheme since 2004, they found it to be a unique natural experiment to be taken as a case study for their research. They attempted to investigate whether the introduction of a deposit insurance scheme could negatively affect the negative relationship between the bank capital and liquidity creation or not. By determining such an argument, they expected their research could enable the decision-makers to come up with adequate regulations for capital requirements to enhance the financial stability and promote the banks' liquidity creation. In their research, Fungacova et al. (2010), unlike Berger and Bouwman (2009a), attempted to explore the impact of bank ownership on the relationship between bank capital and liquidity creation. They compared between three types of banks based on the ownership: state controlled banks, domestic private banks and foreign owned banks. Their sample covered Russian banks for the period before and after implementing the deposit insurance scheme from 1999 to 2007. By adopting Berger and Bouwman's (2009a) approach, Fungacova et al. (2010) based on their empirical results, stated that the relationship between the bank capital and liquidity creation of Russian banks is negative and statistically significant, as they found that introducing the deposit insurance scheme has had a limited impact on such a relationship. In evaluating their empirical findings, they observed slight positive changes by implementing a deposit insurance scheme on the relationship between bank capital and liquidity creation. Furthermore, they observed that the relationship fluctuates in relation to size and ownership, as their results showed a significant negative association between bank capital and liquidity creation for small and medium banks and for private domestic banks. However, their results proved that such a relationship is insignificant for large banks, foreign banks, as well as for state-owned banks. Fungacova et al. (2010), hence, concluded their research by supporting the theory of the 'financial fragility/crowding-out', which states that well-capitalised banks have a less fragile capital structure that leads to less incentive for liquidity creation. The authors, further, stated that despite the positive impact of capital requirements, implementing high restrictions on banks' capital requirements could negatively influence the banks ability for liquidity creation.

In respect to regulatory intervention and capital injections, Berger et al. (2011)

examined the influence of regulatory intervention “such as restrictions on lending, dividend payouts, and dismissal of managers” (Berger et al., 2011: 1) and capital support on risk-taking behaviour and liquidity creation in the banking sector. For this purpose a dataset is used from Deutsche Bundesbank (the German Central Bank) covering the entire German banks over 10 years (1999-2009) across the globe. In order to examine such an association, Berger et al. (2011) regressed the variations in banks’ risk taking behaviour and levels of liquidity creation on regulatory intervention capital support measured through dummy variables. Based on their short-run analyses, Berger et al. (2011) empirically proved that regulatory intervention and capital support statistically and economically associated with risk-taking attitude and liquidity creation of banks significantly. However, according to their long-run analyses, the results showed that risk taking and liquidity behaviour of banks were not affected by prior to such actions, i.e. regulatory intervention and capital support. More precisely, their results indicated significant changes on risk-taking and liquidity creation immediately after regulatory intervention and capital support have taken place by banks. Despite the importance of the role of regulatory intervention and capital support in reducing the risk-taking behaviour, Berger et al. (2011) detected a negative impact of such actions on banks liquidity creation aptitude. In order to check the robustness of their data, Berger et al. (2011) used an instrumental variable method to control for potential endogeneity problems. They concluded their paper by alerting the importance of such an association on the banking sector particularly and on the economic system generally that needs to be observed very closely.

In the same vein, Pana et al. (2010), used the annual data from ‘Reports of Conditions and Income’ completed by the US federally-regulated commercial banks. The sample comprised 189 mergers announced covering the period between the second half of 1997 and the end of 2004. They mainly put emphasis on evaluating the short-term increases on the amount of liquidity that been created by commercial bank mergers throughout the active period of the merger movement in the US banking sector. Pana et al. (2010), thus, empirically showed that the capital structure on both sides of the balance sheet and diversification of risk in relation to bank mergers have a dramatic and strong positive impact on the amount of liquidity that examined banks created. In reflecting on their findings, Pana et al. (2010: 750) stated that “before the merger, small acquirers create a significantly higher level of liquidity, at a fraction of gross total assets, than their targets.

The group of large acquirers created a comparable level of liquidity with those of their targets". They further found that greater level of deposit insurance of the acquiring bank before the merger enhanced the banks' capacity to create higher levels of liquidity. Regardless to the acquirer's size, the volume of equity funds of the acquiring banks played a vital role in boosting liquidity creation after mergers took place. However, the authors stated that due to the low level of competition in the market, the reductions in the amount of liquidity creation of banks with no recent merger and acquisition may negatively influence the short-term growth of liquidity creation of the merger participants. Furthermore, they stated that during the economic booms the liquidity creation might deteriorate due to the difficulties in evaluating the asset, equity, liability and off-balance-sheet items as a result of merger reformation procedure. Consequently, Pana et al. (2010) concluded by raising the need for further research to be conducted in the long-term to examine the association between liquidity creation and deposit insurance in relation to bank mergers.

In an attempt to examine the determinants of the liquidity creation of savings banks in Germany, Rauch et al. (2011) conducted an empirical evaluation using data from German savings banks for the period between 1997 and 2006. In order to measure the size of liquidity creation of German savings banks, Rauch et al. (2011) used the liquidity creation measures of Berger and Bouwman (2009a). In addition, they followed the Deep and Schaefer (2004) approach in evaluating the liquidity transformation gap to indicate the amount of maturity transformation that German savings banks conducted to create liquidity. In exploring their empirical analysis, they conducted a multivariate regressions analysis to identify factors that may have impacted banks' ability to create liquidity.

In their regressions analysis, Rauch et al. (2011) used different types of elements from banks' specific variables such as performance, risk and size proxies. In addition, they included macroeconomic variables such as monetary policy to the regressions model in order to examine the potential influence of such policies on the German savings banks' capacity of creating liquidity throughout their operational activities. Based on their empirical results, they stated that the liquidity creation of German savings banks increased by 50 per cent, where the liquidity creation increased from 120 billion Euros in 1997 to 182 billion Euros in 2006. Simultaneously, the liquidity transformation gap

increased, however, not to as high a degree as liquidity creation. German saving banks scored 15 per cent in increasing the liquidity transformation as the ratio increased from 0.128 in 1997 to 0.147 in 2006. Their results showed that the German savings banks created higher levels of liquidity than private and federal banks. Moreover, they stated that savings banks created the highest levels of liquidity in respect to their size. In terms of liquidity transformation, German savings banks were found to be transforming larger amount of maturities with a ratio of 0.137 in comparison to private banks, with only 0.051 and federal banks with 0.087. From their regressions analysis, Rauch et al. (2011) found a significant positive association between the economic growth and liquidity creation of German savings banks. They also found a direct positive relationship between interest rate and liquidity creation. Yet, this was not the case with bank size, where no significant impact of bank size on liquidity creation was found. As a result of restricted standards on the savings banks that created a high level of protection, such banks are not required to reserve high levels of a liquidity buffer against sudden customers' default. Hence, they expected that saving banks would create a large amount of liquidity. Moreover, saving banks conduct strict monitoring policies, which in return enables them to predict any credit risk. Hence, such a position allows savings banks to increase their loan activities that directly and positively influence the liquidity creation. However, Rauch et al. (2011) did not find any significant statistical association between liquidity creation and banking competition, and therefore they concluded their paper by stating that savings banks contribute to economic growth by creating high levels of liquidity through offering financial services to the public in regions where they operate.

Following Berger and Bouwman's (2009a) approach in measuring liquidity creation, Horvath et al. (2012) used data from the Czech Republic banking industry covering 11 years from 2000 to 2010 to examine the association between liquidity creation and bank capital. Based on their explorations, they claimed to be providing empirical evidence of a negative impact of bank capital on liquidity creation. Moreover, their results indicated the existence of a negative causality relationship between liquidity creation and bank capital. Based on such results, they suggested that well-structured capital would hinder banks' incentives to create high levels of liquidity creation. This evidences the existence of a trade-off between the financial solvency and liquidity creation function in the banking sector. Hence, the authors recommended that restricted regulations on bank capital cause a reduction to liquidity creation for small banks. They also added that

conducting higher levels of liquidity creation leads to a deterioration of banks' financial solvency. In their conclusion, Horvath et al., (2012) suggested that liquidity creation is a vital topic in the banking sector and needs to be looked at very closely when regulating banks policies.

In evaluating the impact of bank competition on liquidity creation, Horvath et al.'s (2013) study was based on a dataset of the Czech banking sector for the period of 2002 to 2010. Their main objective was to examine the influence that bank competition may have on the liquidity creation function of Czech banks, for which they run econometric models to test the impact of also other variables on liquidity creation, such as earning volatility, credit risk, non-performing loans, capital, inflation and unemployment rate. It should be noted that in measuring liquidity creation, Horvath et al.'s (2013) econometric model was based on Berger and Bouwman's (2009a) approach. According to a descriptive analysis of their data, a steady increase of liquidity creation was found during the period in question. Their core empirical results showed that bank competition negatively impacted the liquidity creation of Czech banks. Horvath et al. (2013) considered this as a consequence of the increase in fragility of banks capital structure, as fragility is increased by a reduction in banks' profitability during high levels of competition. Hence, banks' attempt to decrease their lending activities on the asset side and deposits on the liabilities side. In return, it is found that such behaviour directly affects negatively the banks attitude towards liquidity creation. Furthermore, they suggested that a reduction in the market power decreases incentives for banks to expand their lending activities that positively impact the liquidity creation. Moreover, Horvath et al. (2013) found that credit risk negatively affected the liquidity creation. At the conclusion, they recorded that bank competition is considered as one of the critical determinants of the liquidity creation, in which they considered the existence of a trade-off between the positive impact of bank competition on the customer welfare and the negative impact of bank competition on liquidity creation. Lastly, Horvath et al. (2013) stated the existence of a critical need for considering the liquidity creation function when regulating bank competition policies.

With regard to the GCC region, Al-Khoury (2012) used data from 43 GCC banks over the period between 1998 and 2008 to examine the impact of bank capital, government ownership and other micro- and macroeconomic variables on liquidity creation, thereby

following Deep and Schaefer (2004), he measured liquidity creation. Based on empirical results, Al-Khoury (2012) indicated that bank capital has a positive and significant impact on liquidity creation, who argued that such positive impact is due to risk absorption that a high level of capital may provide to the banks. In addition, the results showed a negative and significant association between return on assets as proxy for bank profitability and liquidity creation that may suggest a high level of expenses that occur to the bank or due to an increase in loan losses. In addition, Al-Khoury, (2012) statistically proved a positive and significant influence of bank size and lag of liquidity creation on liquidity creation. However, the author did not detect any significant relationship between macroeconomic variables and liquidity creation. The author attributed these findings to the economic nature of GCC region's financial markets, which is classified as "a bank-based economy where banks control most of the financial flows and possess most of the financial assets. The capital markets, however, are still undeveloped" (Al-Khoury, 2012: 119). Likewise, the study found that government ownership has a negative and insignificant effect on liquidity creation.

In summarising, the review of the existing body of knowledge on liquidity creation literature indicates that liquidity creation has been explored by different researchers who mainly followed Berger and Bouwman (2009a) and Deep and Schaefer (2004). However, it can be confidently stated that the literature on liquidity creation remains very scarce in comparison to the importance of such a function for banks as facilitators of raising necessary funding of financial activity through channelling liquid short-term funds on the liabilities side (deposits) into long-term illiquid assets (loans/investments) that helps in transforming saving funds into productive investments. Furthermore, it can be noticed that the literature on liquidity creation of Islamic banks compared to conventional and hybrid banks remains unexplored, which provides a rationale for conducting the research as presented in this study. Furthermore, the existing literature neglects the impact of banking regulation and supervisory standards, which were set by Basel Committee, on liquidity creation. The related literature is also limited in assessing the impact of the stringency policy on banking regulations, which has been highlighted through a survey conducted by the World Bank on 117 countries, as a key determinant of liquidity creation that needs to be empirically examined.

### **3.3. EXPLORING LIQUIDITY RISK: A LITERATURE SURVEY**

Since liquidity provision is the focal purpose of the banking sector (Holmstrom and Tirole, 2000: 296) banks by definition are exposed to liquidity risk. Hence, the key task of risk managers in the banks and other financial institutions is to mitigate the effects of such risk (Jasiene et al., 2012: 189). In the banking industry, therefore, liquidity risk and its management are critical factors that impact the financial stability, profitability, costumers' assurance and the decisions that the banks undertake. Moreover, liquidity risk is one of serious elements that trigger other risks, which negatively affect the business operations of banks. Therefore, despite that banks face different types of risks, liquidity risk remains as the most critical risk that can eventually lead to insolvency risk (Jasiene et al., 2012: 186).

Liquidity risk has been defined in the literature from different perspectives yet in a similar manner. Diamond (1991: 709), for example, states that liquidity risk refers to the risk of losing expected revenues that investors face as a result of early excessive withdrawals by fund suppliers. In addition, Papavassiliou (2013: 184) defines liquidity risk as the risk of failing to buy or sell assets at the market price when required. Furthermore, other authors classify liquidity risk into two types of risks namely: funding liquidity risk and market liquidity risk. While market liquidity risk occurs as inability of banks to sell their illiquid assets at market price within short notice, funding liquidity risk signifies the disability of banks to cover the liquidity needs of funds providers (BIS, 2008, 2009 and 2010; IFSB, 2012: 31; Haan and End, 2013: 3930). In this regard, it is significant to state that the focus of this research is the funding liquidity risk. In parallel lines, funding liquidity risk is defined as the inability of banks to settle their obligations in timely manners (The European Central Bank, 2009; Drehmann and Nikolaou, 2013: 2173). Giannotti et al. (2010: 99) state that liquidity risk is the possibility that a bank during a particular period of time becomes unable to honour its duties with immediacy. Hence, liquidity is the ability of a bank to meet the financing demands of increases in assets and meet its financial obligations as they become due without incurring intolerable costs (Giannotti et al., 2010: 99); thus failure to meet this results in liquidity risk exposure.

According to Drehmann and Nikolaou (2013: 2174) "liquidity risk arises because revenues and outlays are not synchronised". Parallel to this statement, it is argued that

due to the main function that banks undertake in financing long-term assets by short-term liabilities, liquidity risk is an inherent characteristic of banks and, hence, inevitable (Haan and End, 2013: 3930; Eichberger and Summer, 2005: 550; Carletti et al., 2007: 1069; Distinguin et al., 2013: 3295). Such a critical function leads to market and funding liquidity risk (Diamond and Dybvig, 1983). It should be noted that the criticality of liquidity risk also stems from its implications on portfolio diversification strategies and investment activities, as it also plays a vital role in asset prices (Papavassiliou, 2013: 184).

The trajectories of trends in everyday financial markets have different outcomes for liquidity risk. For example, during the stress time the liquidation of the assets is more costly as liquidity is less (Martinez et al., 2005: 82); economic recessions have shown that lenders demand higher levels of liquidity that leads banks to liquidate their assets at a lower price. The unexpected withdrawals, by increasing liquidity risk exposure, consequently lead to instability of the entire banking system (Freixas et al., 2000: 614). Under such circumstances, predominantly, banks bear losses for the less or illiquid assets. Accordingly, such an environment may incentivise banks to invest in liquid and short-term financial activities (Acharya et al., 2013: 259).

Despite liquid assets being considered as a solid shield against liquidity shortages, holding high levels of liquid assets incentivises banks to increase their lending activities, which leads to an increase in their financing gaps and negatively impacts their stability, which is associated with banking insolvency (Wagner, 2007: 121; Haan and End, 2013: 3933). In a similar argument, some empirical research evidence shows that when banks enjoy a substantial access to assets sale markets, undertaking risky investments is expected (Wagner, 2007: 122), as banks' loans or financing activities are known to be illiquid and risky. However, with the recent developments and sophistications in the financial markets, banks are provided with different types of instruments that facilitate a variety of options to transfer risk through an easy access to assets sale markets (Wagner, 2007: 122; Holmstrom and Tirole, 2000: 296).

In exploring the sources of liquidity risk, it should be stated that mainly banks depend on equity capital and deposits to finance their lending and investment activities (Silva and Divino, 2013: 266). However, the low level of bank profitability may lead to some fund providers withdrawing their capital at inconvenient times. For Islamic banks, this

is even more critical as in their case the deposits hold equity features, which are based on a risk-sharing concept that may escalate the ambiguity on depositors' return, which may increase the withdrawals. In addition, the complexity in Islamic banking products and operations increases costs and thus lowers the efficiency of Islamic banks and expose them to higher degrees of risk (Beck et al., 2013: 436). In such a process, the creditors panic, which in turn causes liquidity risk that may trigger insolvency risk. In order to survive from such a critical situation and honour their obligations, banks use their reserves and liquid assets. In extreme scenarios, in responding to a high demand of deposit withdrawal, banks liquidate their loans at high costs as a result of the fire-sale price (Wagner, 2007: 122; Silva and Divino, 2013: 266). In further exploring this, Holmstrom and Tirole (2000: 295) suggest that long-term debts can also play a vital role in allowing banks to cover their liquidity shocks. Moreover, the interbank market enables transfer of risk from banks with low levels of equity capital to banks with higher levels of equity capital (Eichberger and Summer, 2005: 553).

In this regard, it is worth mentioning that the central banks play a significant role in the financial market as they act as government authorities to promote economic stability through managing the monetary policy by which they, beside other objectives, control the money creation and distribution as well as managing the interest rate (Mishkin, 2001: 367). The central banks' control over money creation is mainly practised through setting the reserve requirements that significantly affect the monetary base, which is considered as a key factor in money supply. Also, through managing the interest rate, central banks control the financial activities of banks as well as the costumers. Accordingly, the central banks play a significant role in preventing banking panics and act as lenders of last resort. During a banking panic, as a result of high deposit withdrawals, banks hold excessive reserves and reduce their loan/financing activities to prevent the insolvency risk, which in turn, enhances the financial stability, yet reduces money supply (Mishkin, 2001), which decreases the liquidity creation of the banking sector. Accordingly, it can be stated that central banks play an important role in affecting the banks liquidity risk management. Besides central banks, banks regulatory and supervisory agencies have an important role in overseeing the banks' operations and activities to prevent or reduce problems of asymmetric information, adverse selection and moral hazard. The responsibilities of banks' regulatory and supervisory bodies includes regulating the governments safety net through deposit insurance, restrictions on banks activities,

capital requirements, bank supervision, information disclosure requirements, customer protection and restrictions on banking competition (Mishkin, 2001; Barth et al., 2004). Although such regulatory and supervisory monitoring and restrictions enhance the financial stability of the banking sector, high supervisory restrictions may lead to an increase of banks' incentives in undertaking risky activities as argued by Mishkin (2001) and Barth et al. (2004).

Accordingly, it can be stated that liquidity risk has always been in the top priority of regulatory bodies, as it is believed that enhancing banks' ability to have an adequate access to the assets trade market and also developing banking market segmentation through enhancing the diversity of the market players and products may improve liquidity position and makes banks less exposed to such systematic risk (Wagner, 2007: 122). To reduce the possibilities of banks' exposures to liquidity risk, banking regulators may promote financial stability and efficiency by adopting new regulations and standards (Silva and Divino, 2013: 266). Within this context, the capital adequacy has been the main concern of the policy and discussion makers and banking regulators (Eichberger and Summer, 2005: 547). Capital adequacy refers to the amount of capital that banks have to hold, which determines the amount of their loans that must be covered by their equity to prevent them from taking on excessive debt and avoid them becoming insolvent. This implies that banks, by fulfilling the capital adequacy, must limit their lending activities according to the implemented constraint (Eichberger and Summer, 2005: 550). In turn, this may minimise the banks' financing gap and hence reduce the probabilities of liquidity risk that banks may face. Accordingly, it can be argued that a negative association between capital adequacy and liquidity risk is expected.

Hence, in response to the recent financial crisis, in December 2010, the Basel III issued new principles and guidelines on liquidity risk management, where two new liquidity ratios are introduced; namely, the liquidity coverage ratio (LCR) and the net stable funding ratio (NSFR) (BCBS, 2010; Haan and End, 2013: 3930; Silva and Divino, 2013: 266). The LCR proposes that banks hold a sufficient level of high-quality assets against the net outflow of liquidity expected in stress conditions during a 30-day period. More precisely, adequately high levels of liquid assets should safeguard the banks to survive a severe stress situation lasting for one month (Haan and End, 2013: 3930). With regard

to the net stable funding ratio (NSFR), it refers to “the ratio of the existing long-term liabilities to the required long-term liabilities, the latter amount established on the basis of the available long-term assets” (Jasiene et al., 2012: 191). The purpose of NSFR's function is to synchronise the maturities of long-term positions on both the assets and liabilities sides (BCBS, 2010; Jasiene et al., 2012: 190; Silva and Divino, 2013: 266). It is important to state that these two ratios have still not been enforced on all banks yet and it is proposed to be implemented gradually between 2015 and 2019 (Haan and End, 2013: 3930; Silva and Divino, 2013: 266). However, despite the extensive literature on capital adequacy, its impact on liquidity risk exposure remains unexplained (Eichberger and Summer, 2005: 547). According to Eichberger and Summer (2005: 550) “If the capital adequacy constraint is binding, then a bank must restrict its supply of credit in order to fulfil the constraint”. However, the mechanism linking the capital adequacy and systemic risk usually remains unexplained (Eichberger and Summer, 2005: 548).

It can be stated that although liquidity risk in the banking sector is not a very fresh topic, a systematic literature has not focused adequately on approaches of measuring liquidity risk exposures. In the banking-related empirical studies that examine liquidity position indicators, they used balance sheet ratios based on accounting data (Matz, 2008: 4; Distinguin et al., 2013: 3300), such as loans to deposits ratio (Iannotta et al., 2007: 2132; Bourke, 1989: 72; Molyneux and Thornton, 1994: 439; Demirguc-Kunt *et al.*, 2004: 603; Klomp and Haan, 2012: 3198). Saunders and Cornett (2006: 476) state that the ratio of loans to deposits, borrowed funds to total assets and loan commitments to assets are also widely utilised to proxy liquidity risk. Moreover, other researches measured liquidity risk through ratio of loans to total assets (Demirguc-Kunt and Huizinga, 1999: 35; Demirguc-Kunt and Huizinga, 1999; Athanagolou *et al.*, 2006: 9), loans to customer and short term funding ratios (Pasiouras and Kosmidou, 2007: 227; Kosmidou, 2008: 150; Naceur and Kandil, 2009: 77). However, it is argued that depending on such ratios in measuring liquidity risk could be insufficient (Matz, 2008: 4; Distinguin et al., 2013: 3300).

In addition, Basel III Liquidity Ratios (2010) have been recently taken as proxy of liquidity risk, such as net stable funding ratio (NSFR) (Giannotti et al., 2010: 102; Distinguin et al., 2013: 3317; Cucinelli, 2013: 54) and liquidity coverage ratio (LCR) (Baldan et al., 2012: 34; Haan and End, 2013: 3932; Cucinelli, 2013: 54). Furthermore,

Saunders and Cornett (2006) propose proxy liquidity risk based on financing gap, which is used in this research to measure the likelihood of banks' inability to meet their financial obligations in a timely fashion.

The existing literature assessed liquidity risk as a determinant of bank performance (Iannotta et al., 2007; Bordeleau and Graham, 2010; Al-Khouri, 2011; Demirguc-Kunt et al., 2013; Demirguc-Kunt et al., 2004; Brouke, 1989; Molyneux and Thornon, 1992; Barth et al., 2003; Pasiouras and Kosmidou, 2007; Athanasoglou et al., 2008; Kosmidou, 2008; Naceur and Kandil, 2009; Surroca et al., 2010). However, the existing empirical research that examines the determinants of liquidity risk remains relatively scarce.

In reviewing the empirical literature, Drehmann and Nikolaou (2013), for example, measure funding liquidity risk based on the costs that banks tolerate when bidding at central banks auctions in order to obtain the needed liquidity to meet their obligations. The more aggressive bidding, the higher the funding liquidity risk that banks face. Accordingly, Drehmann and Nikolaou (2013) defined funding liquidity risk as inability of banks to meet their financial duties in a timely manner. The authors run their regressions on highly frequent data set of 175 main refinancing operations, conducted by the European Central Bank during the period between June 2005 and October 2008 with 1068 banks, that took part at least once in any of these auctions. The authors empirically showed that the examined banks in the eurozone have constant and low degrees of liquidity risk. Their results confirm the positive impact of the recent financial crisis on liquidity risk of the examined banks. Furthermore, they detected a positive association between market liquidity and funding liquidity risk as a result of the interrelationship between market illiquidity and higher degrees of funding liquidity risk that banks exposed to. However, based on the regression results, the authors found such an association is significant only during the financial crisis.

With regards to the GCC banking sector, Al-Khouri (2011) examined the impact of GCC bank-specific risk characteristics, and the overall banking conditions on the financial performance of 43 commercial banks over the period of 1998 and 2008. The fixed effects regressions analysis results indicated that liquidity risk alongside with credit and capital risks are the key determinants of the GCC banks' return on assets as a proxy for bank profitability. However, the empirical results show that among other types of risks, liquidity risk is the only determinant of bank profitability as measured by

return on equity. Such results suggest the importance of measuring liquidity risk and detecting its key determinants in general and in the case of the GCC banks in particular.

Despite liquidity risk exposure remaining as one of the most challenging issues within the Islamic banking industry, it is quite striking that the existing literature lacks empirical studies that focus on liquidity risk exposure measurement and its determinants. Notwithstanding such reality, some researchers identified different sources of liquidity risk in Islamic banking industry. For example, Khan and Ahmed (2001) and Ahmed (2011: 60) state that one of the fundamental reasons of the liquidity risk in Islamic banking is limited accessibility of the *Shari'ah*-compatible money market and the slow development of financial instruments which prevent Islamic banks raising external funds when needed. It is also argued that due to the predominance of debt-based assets (such as *murabahah* as a debt-based contract occupies about 97.5 per cent of Islamic financial transactions in Malaysia, see Asutay, 2007 and 2012), Islamic banks face difficulties in liquidating them when needed due to the restrictions on sale of debt (Ahmed, 2011: 60). In addition, most available conventional instruments that are used for liquidity management are interest-based and Islamic banks are not permitted to deal with them. It is also argued that due to the unique characteristics of some Islamic financial instruments, Islamic banks face additional exposures to liquidity risk. For instance, the inability to trade *murabahah* or *bay' al salam*, which can be traded only at par value (Iqbal and Mirakhour, 2007).

Furthermore, with regard to the liability side, Islamic banks depend heavily on current accounts, which are demand deposits and can be withdrawn at any time that may lead to a bank run (Iqbal and Mirakhour, 2007). A small number of Islamic banks compared to their conventional counterparts and different interpretations of *Shari'ah* teachings (Islamic financial law) can be other critical sources of liquidity risk. For example, the contract of *bay' al-dayn* (sale of debt) is allowed and commonly practiced in Malaysian financial markets. This type of contract is not permitted by the mainstream *Shari'ah* scholars outside Malaysia who maintain the argument that debt can be traded only at face value. If trade is not at face value, it involves an element of *riba* (interest). Therefore, *Shariah* scholars need to become engaged in finding solutions for such issues (Greuning and Iqbal, 2008).

In further reflecting on liquidity risk exposure in Islamic banks, Abdullah (2011: 15)

states that Islamic banks lack an integrated and sophisticated payment and settlement scheme to ensure that all payment transactions are made according to *Shari'ah*. Differences in standardisation of documentation, product, process and accounting criteria impose different degrees of liquidity risk in Islamic banks (Abdullah, 2011: 14). Moreover, the equity feature of Islamic banks' deposits and the concept of risk-sharing may escalate the uncertainty on depositors' return and increase the possibility of both expected and unexpected withdrawals that lead to bank runs. Furthermore, the complex nature of Islamic banking products and operations may lead to an increase in costs and thus lower efficiency of Islamic banks that may lead to liquidity risk. Such unique nature may increase operational risk including legal and compliance risks. "Finally, the restrictions of Islamic banks to certain asset classes, the limited use of hedging instruments and the lack of high-quality liquid assets such as *Shari'ah*-compliant government bonds can also increase the riskiness of Sharia-compliant financial institutions" (Beck et al., 2013: 436).

Other efforts have been made to theoretically discuss the liquidity risk exposure and management practices of Islamic banks. For instance, Ismal (2008) emphasises the importance of developing an adequate liquidity risk management derived from Islamic finance principles to reassure the Islamic banks' solvency and maintain their productivity. He explained the challenges facing Islamic banks and elaborated on some of the Islamic financial instruments that can be used to cover their liquidity shortages. In addition, Ismal (2010) surveys the *Shari'ah* understanding of depositors and their investment behaviour in the Indonesian market, exploring the liquidity behaviour of depositors as a crucial factor of liquidity risk management. Moreover, the research investigates potential causes of liquidity problems and Islamic banking liquidity instruments to mitigate such risk. Ismal (2010) found three purposes that rationalise the depositors' behaviour of Islamic banks, namely: (i) religious, with an aim to promote the project financing of Islamic banks; (ii) profit orientation to boost their return and the third: (iii) transaction purposes to withdraw their funds when demanded. Accordingly, he suggested that in order to meet the depositors' satisfaction, Islamic banks are required to conduct their operations in a professional as well as complaint manner with Islamic finance principles. However, in attempting to satisfy the depositors' returns expectations, Islamic banks may face liquidity risk. Based on such results, Ismal (2010) suggested that Islamic banks and other stakeholders (such as governments) need to

invest more in Islamic finance education to enhance the understanding of Islamic finance and hence promote the Islamic banking industry. Ismal (2010), further, stated that Islamic banks need to enhance their management system to balance between their positions on asset and liability sides, which can promote their liquidity position.

In overviewing a global perspective of liquidity management in institutions offering Islamic financial services in terms of infrastructure bodies as well as legal framework, Abdullah (2011) investigates the challenges and issues which impact the efficiency of liquidity management practice. According to Abdullah (2011) the major challenge in managing liquidity is developing an internationally recognised procedure through establishing global regulation. He identified further challenges related to *Shari'ah*-compliant liquidity management systems and short-term financial products, developing an international Islamic financial market and infrastructures bodies. In addition, Abdullah (2011) highlighted the importance of having healthy criteria related to documentation, product structure, accounting standards, legal and regulatory structures, unified payment and settlement techniques. An integrated liquidity monitoring and supervision system is also considered one of the key challenges to enhance liquidity management of Islamic banks. Abdullah (2011) concluded by suggesting the importance of education in enhancing the awareness and understanding of Islamic finance as well as developing an international Islamic liquidity market are key factors towards promoting the liquidity management in the Islamic banking industry.

In an attempt to further examine issues related to liquidity risk in Islamic banking, Ali (2012) studied the potential liquidity risk attached to different Islamic financial products offered in the market. In order to define the liquidity position, he further assesses the liquidity ratios of the Islamic financial market. By assessing data from the Islamic banking sector of 18 countries over a period from 2000 to 2009, Ali (2012) found a downward trend of the ratio of liquid assets to total assets of the examined sample before and after the recent financial crisis. However, after 2009 it began to improve. In addition, he found the financing-to-deposit ratio was increased between 2006 and 2009. With regard to the maturity gap, Ali (2012) found the average maturity gap of up to three months assets and liabilities of the examined banks stayed negative, which suggests lack of short-term instruments in the Islamic banking market. Furthermore, the results showed that Islamic banks hold higher levels of liquid assets than conventional

banks. However, by measuring liquidity risk based on the ratio of financing/loan to deposits, the results showed that Islamic banks face higher degrees of liquidity risk than conventional banks of the examined sample. Ali (2012) further explored the common challenges, such as the underdeveloped Islamic inter-bank market and other issues related to liquidity management, such as developing comprehensive standards. In addition, he highlighted the significance of Islamic financial principles in managing liquidity risk.

To conclude, through reviewing liquidity risk related literature, it can be confidently noticed that the literature suffers from a shortage of research that focuses on measuring liquidity risk exposures and assessing its determinants in the banking sector in general and in Islamic banks in particular. Furthermore, the literature lacks in providing empirical evidence of assessing liquidity exposures of Islamic banks in a comparative manner with conventional and hybrid banks. This, therefore, makes this study rather timely and rationalises its conduct.

### **3.4. CONCLUSION**

Despite the importance of banks' liquidity creation function in promoting the economic growth through increasing real investment activities and the critical impact of liquidity risk exposures in interrupting the productive investments, it can be confidently stated that the related literature, theoretical and empirical, remains limited.

More precisely, the existing literature has ignored examining the liquidity creation behaviour and liquidity risk exposures of Islamic banks compared to conventional and hybrid banks. Furthermore, it can be obviously noticed that the association between liquidity creation and stringency on banking regulatory and supervisory standards remains unexplored. Moreover, the existing literature lacks measuring the determinants of liquidity risk exposures in general and in the case of the GCC region in particular.

Hence, this research aims to fill these observed gaps by exploring the liquidity creation behaviour of Islamic banks and their exposures to liquidity risk in a comparative manner with conventional and hybrid banks. Lastly, this research contributes to the existing literature by investigating the key determinants of liquidity creation and liquidity risk with a particular reference to the banking regulatory and supervisory standards.

It is worth mentioning that the literature presented in this chapter provides the theoretical and empirical foundation for the conduct of this research, as operationalised in the research methodology chapter.

**CHAPTER FOUR**  
**THE ECONOMIC, FINANCIAL SYSTEM AND BANKING SECTORS:**  
**A BACKGROUND ON THE GCC REGION**

**CHAPTER FOUR**  
**THE ECONOMIC, FINANCIAL SYSTEM AND BANKING SECTORS:**  
**A BACKGROUND ON THE GCC REGION**

**4.1. INTRODUCTION**

To have a better understanding of the nature of the sampled banks and the conditions under which they operate, it is important to have an overview of the economic conditions, financial systems and banking sectors of sampled GCC countries. Accordingly, this chapter presents an overall background on the economic conditions and features, financial systems and markets, banking sectors of the GCC region by focusing on Saudi Arabia, the United Arab Emirates (UAE), Kuwait, Bahrain and Qatar with the objective of providing a context within which to locate and give further and contextualised meaning to the empirical findings presented in Chapters 6 and 7.

**4.2. BACKGROUND ON THE GCC COUNTRIES**

The Gulf Cooperation Council (GCC), which, as an entity, was founded in May 1981 to enhance the external security but also develop economic cooperation between the six neighbouring Arab countries, namely Kingdom of Saudi Arabia, United Arab Emirates (UAE), State of Kuwait, Kingdom of Bahrain, Sultanate of Oman and State of Qatar (World Bank, 2010). However, it should be noted that Sultanate of Oman is excluded from the research sample, as during the sampled period, Islamic banks did not exist in Oman.

The economic characteristics of the GCC country members share a number of historical and cultural commonalities (Al-Hassan *et al.*, 2010: 4; World Bank, 2010: 2). Given that all GCC countries are heavily dependent on the oil sector (Al-Khoury, 2011: 75), they are similarly exposed to the impact of the oil price changes in the international market, which also suggests that the strengths and weaknesses of their financial systems are similar (Al-Hassan *et al.*, 2010: 4). The GCC countries' revenues, as a result, are mainly generated from the production of oil. However, the core focus has recently been placed on the development of the physical and social infrastructure of the private sector

with the objective of diversifying the economy (World Bank, 2010: 1). According to the World Bank's statistics, the total nominal GDP of the GCC economies is constantly increasing: it has more than doubled since 2001, where huge fiscal and current account excesses have been accrued in recent years (World Bank, 2010: 2). Another distinctive feature of the economies of the GCC countries is their reliance on foreign workers together with having a young and swiftly-increasing labour force with a sizeable public sector (World Bank, 2010: 2).

In relation to the nature of economies, it should be mentioned that all the GCC countries are characterised by open economies, where free trade and investment activities exist through unrestricted mobilisation of capital, which is directly or indirectly tied to the US dollar exchange rate, as the currencies of each of the GCC countries are pegged to the US dollar. Yet it is worth mentioning, as an indication for openness, the magnitude of the international trade varies between the GCC countries based on the total export and import ratios to the GDP size that ranges between 73% in the case of Kuwait and 158% in the case of the UAE (World Bank, 2010: 2).

Despite making some attempts to diversify their economies, oil and gas remain the major export commodities for the GCC countries. In recent years, the GCC countries have demonstrated undeniable progress in diversifying their exports, especially from 1995 to 2007. The UAE in particular has improved its share remarkably in manufacturing products, with 22.5 per cent of the total GCC exports, which represents more than double the size of other GCC countries' export contribution. However, Kuwait was found to be at the lowest level of manufacturing production with a share of 5 per cent of the total GCC exports (World Bank, 2010).

In terms of the political and social characteristics, the GCC country members share a similar approach, as all of them are ruled by traditional monarchies, where the governments control the economic activities.

Kuwait and Bahrain have relatively open political systems, including a written constitution, a parliamentary electoral system, and a free press. Though the formal structures of the other four members are less well developed, these countries have made progress in strengthening political pluralism and participation in recent years (World Bank, 2010: 2).

In this context, one of the unique features of GCC countries is "the dichotomy between political development, where institutions remain quite traditional, and economic

ambitions, which can be benchmarked against the most sophisticated economies in the world” (World Bank, 2010: 2). This implies that while democracy is mostly not the nature of the political system in the region, yet economic progress has been rather successful in the region.

According to the IMF (2013a), the GCC economic growth has been increasing rapidly and the level of employment has recorded an improvement compared with other emerging markets. One of the crucial factors of such improvement is the high level of the GCC government spending, which has boosted the domestic demand, but also appeared in the form of Foreign Direct Investment (FDI) in many countries. The emphasis on developing construction, wholesale and retail trade, and transportation, with a main objective to create employment opportunities for low-skilled, low-productivity workers, have shown a remarkable contribution in the growth of GDP in the GCC region. However, the financial and manufacturing sectors’ contribution seems not to have had a significant impact on the employment of high-skilled labour in the most of the GCC countries (IMF, 2013a: 6), while in particular financial sector seem to becoming an essential sector of economic growth. It should also be noted that the increase in the government spending is also a response to the social pressures, which resulted in the GCC governments increasing their spending by 20 per cent (IMF, 2012a: 8).

The overall real GDP growth of the GCC countries was 7.5 per cent in 2011, which has been the highest score recorded since 2003. Such improvement came as a result of the 10 per cent increase in oil production in all GCC countries, except Bahrain, due to the social unrest that took place in 2011.

The financial sector of the GCC countries is led by the banking sector that is mainly controlled by local investors (Al-Hassan et al., 2010 and Al-Khoury, 2011: 74). The leading five banks, which are owned by domestic investors, represent 50 to 80 per cent of total banking sector assets in the GCC region. In this context, it is worth mentioning that the Islamic banking sector has been growing rapidly and plays a significant role in the GCC financial markets. The GCC Islamic banks account for 24 per cent of the GCC region’s banking system assets on average (Al-Hassan et al., 2010). As Table 4.1 shows, the sampled GCC countries are ranked among top ten countries in terms of *Shari’ah*-compliant assets, where Saudi Arabia ranked as the second from 2009 to 2011 and as

the third in 2012, UAE as the fourth, Kuwait as the fifth, Bahrain as the sixth and Qatar as the seventh in the period between 2009 and 2012, respectively.

**Table 4.1: Top Ten Countries by *Shari'ah*-Compliant Assets (US\$M)**

Rank	Country	<i>Shari'ah</i> -Compliant Assets (US\$M)	Rank	Country	<i>Shari'ah</i> -Compliant Assets (US\$M)	Rank	Country	<i>Shari'ah</i> -Compliant Assets (US\$M)	Rank	Country	<i>Shari'ah</i> -Compliant Assets (US\$M)
2009			2010			2011			2012		
1	Iran	293,165.80	1	Iran	314,897.40	1	Iran	387,952.57	1	Iran	465,574.92
2	Saudi Arabia	127,896.10	2	Saudi Arabia	138,238.50	2	Saudi Arabia	150,945.43	2	Malaysia	221,025.52
3	Malaysia	86,288.20	3	Malaysia	102,639.40	3	Malaysia	133,406.38	3	Saudi Arabia	185,223.00
4	UAE	84,036.50	4	UAE	85,622.60	4	UAE	94,126.66	4	UAE	89,309.38
5	Kuwait	67,630.20	5	Kuwait	69,088.80	5	Kuwait	79,647.85	5	Kuwait	78,587.25
6	Bahrain	46,159.40	6	Bahrain	44,858.30	6	Bahrain	78,857.47	6	Bahrain	62,171.53
7	Qatar	27,515.40	7	Qatar	34,676.00	7	Qatar	52,322.38	7	Qatar	45,301.30
8	UK	19,410.50	8	Turkey	22,561.30	8	Turkey	28,015.20	8	Turkey	29,292.86
9	Turkey	17,827.50	9	UK	18,949.00	9	UK	19,041.79	9	UK	18,605.43
10	Bangladesh	7453.3	10	Bangladesh	9,365.50	10	Sudan	12,139.45	10	Indonesia	15,963.97

Source: Asutay et al. (2013: 8)

With regard to the non-bank financial institutions, while they have shown a prompt development in recent years, they have limited presence in the GCC financial sector, which is mostly owned by banks (World Bank, 2010: 12 and Al-Hassan et al., 2010). The GCC bank credit and to some extent the equities, dominate the debt securities markets. Regarding the bond markets, it remains weak and small, and investing in the secondary bond markets also remains underdeveloped, especially due to the recent restrictions on outstanding debt by the GCC governments. It can be stated that the absence of sophisticated participants with long-term investment horizons in the GCC financial markets is one of the key challenges that faces the development of the domestic debt market. However, since the realisation of Islamic finance, the GCC banks have widely issued *sukuk* (Islamic bonds). Given such conditions, the stock market capitalisation ranges from 12 per cent of GDP in Oman to 106 per cent in Kuwait and averages between 40 and 80 per cent in other GCC countries. Across the GCC countries, bank assets account for more than 100 per cent of GDP and exceed the stock market capitalisation. Regarding other non-bank financial institutions such as insurance, capital markets and pension funds they remain limited in the size and are rigid in their business activities (The World Bank, 2010: 13).

Having stated that the GCC financial markets are mainly controlled by the governments, strict monitoring policies and entry regulations are applied (Al-Khoury, 2011: 75). However, the financial markets of the GCC countries fluctuate in regulatory regimes and in the level of openness to foreign investors. The

... rules and regulations differ with regard to reserve requirements, open foreign exchange positions, payment of dividends and remittance of profits, controls on lending to nonresidents, and foreign borrowing by individual banks. Although some restrictions were relaxed within the GCC, many apply regardless of the source of the inflows, thereby hampering regional as well as global integration (World Bank, 2010: 12).

In order to improve the efficiency of their financial industry, the GCC countries have moved toward applying the best practices in financial regulations and corporate governance, including the implementation of Basel standards and the establishment of independent regulatory bodies for the capital market. Based on the World Bank (2010: 13), five stock exchanges have been established in Bahrain, Kuwait, Qatar, Dubai, and Abu Dhabi. Since 2009, as a result of the recent financial crisis, the capital adequacy ratios has risen in the most of the GCC countries and exceed the recommended minimum international standards (IMF, 2012a: 17).

The GCC banking sectors share some common features, such as the dominance of domestic investors that limit the foreign participants from inflowing into the GCC banking market. Through heavy reliance on the traditional approaches of conducting their business activities by mainly having loans and deposits on their balance sheet, the GCC banks have minimised the exposures to financial risk that may occur by using highly multifaceted financial products such as derivatives. The GCC banking sector has demonstrated to be well capitalised even during the financial crisis of 2007-2009. The GCC banks' resilience to the financial crisis can be considered as a great testimony to such features (Al-Hassan et al., 2010: 4).

However, according to Al-Hassan et al. (2010: 4),

while credit growth was essentially funded by a relatively stable domestic deposit base, more volatile external funding became increasingly important. The 2008–09 global recession put an end to the boom by diminishing oil revenues, reversing short-term capital inflows to the GCC region, and straining the rollover of private sector external debt.

Such a statement means that the GCC banking sector was not totally immune to the financial crisis and underlines the influence that it had on the GCC countries'

economies.

### **4.3. COUNTRY-BASED BACKGROUND OF THE GCC REGION**

After overviewing the economies, financial and banking sectors in the GCC region, it is important to present some country-based background of the sampled GCC countries including Kingdom of Saudi Arabia, the United Arab Emirates, State of Kuwait, Kingdom of Bahrain and State of Qatar to have a more detailed and informative understanding of the nature of the economic, and financial markets conditions under which the sampled banks operate.

#### **4.3.1. Kingdom of Saudi Arabia**

The oil sector remains the main driver of the economy of the Kingdom of Saudi Arabia, despite the fact that Saudi authorities have decreased the association between the oil price and the level of government fiscal spending through taking important strategies towards economic diversification. The overall real GDP of Saudi Arabia was estimated to reach 7.1 in 2011 with an increase of 8 per cent in the non-oil sector to be recorded as the highest level since 1981. The private sector growth reached 8.5 per cent in 2011 that was powered, in particularly, by the construction and manufacturing industries (IMF, 2012b).

The Saudi financial sector is dominated by the banking sector, which stands to be highly capitalised and liquid and with an improvement in its profitability (IMF, 2013b). The commercial banks are leading the Saudi banking market, where 23 licensed banks existed by the end of 2010. However, only 20 of them were active; 12 of them are Saudi banks with 98 per cent of the total Saudi banking assets, and hold more than half of the financial market assets as well as 85 per cent of the Saudi GDP (IMF, 2013b: 4). Regarding the Saudi banking industry concentration, the seven largest banks hold 85 per cent of the total Saudi banking assets and the share of the three largest banks represents about 45 per cent; the other four banks hold about 5 per cent each. The major shareholders of these banks are governments and rich families having links with some major international banks (IMF, 2013b: 5).

In December 2010, the solvency ratio of the Saudi banking sector scored above 17 per cent, which was lower compared to 2007, where the solvency ratio reached about 21 per cent. Such a decline in the capital adequacy came as result of the new operational risk

charge, which followed the Basel II implementation and increases in the asset growth with slower growth of banks' own resources (IMF, 2013b). However, the banking credit increased after that in 2010 by 5 per cent. As mentioned earlier, the Saudi banks mainly hold loans on their asset side with 54 per cent of the total banks' balance sheet by the end of 2010. With regards to the liquidity position, Saudi banks were found to hold a sufficient amount of liquidity. Although the recent financial crisis did not have a severe impact on Saudi banks, it had negatively affected their profitability, with 2 per cent of return on assets and 13.6 per cent of return on equity in December 2010, compared with 2.8 per cent and 22.3 per cent respectively, in December 2007 (IMF, 2013b: 5).

Saudi authorities have shown their interest in broader Islamic financial market by encouraging the issuance of *sukuk* to finance the infrastructure development (Dar et al., 2014: 91). The commercial banks also provide Islamic financial products, yet are seen to be “mainly ‘plain vanilla’ (for example installment sales) and primarily involve credit risk, and do not require sophisticated supervisory approaches” (IMF, 2013b: 5).

#### **4.3.2. United Arab Emirates (UAE)**

As any other GCC countries, the UAE economy is mainly driven by the oil revenue. However, in a broader meaning, the increases in oil price, the capital inflows and the UAE's political stability positively promoted the economic growth in 2012. For example, the GDP growth of the UAE recorded an increase of 5.2 per cent and the non-oil sector growth was expanded by 3.8 per cent in 2012. The surplus of the external current accounts grew by 17 per cent of the GDP, which was mainly supported by the non-hydrocarbon exports. Furthermore, an acceleration of 4.3 per cent in non-oil growth was estimated to be obtained by the end of 2013 as a result of the booming expansions in the construction and real estate as well as in the tourism sector. The inflation reached only 0.7 per cent in 2012, and was anticipated to increase moderately in 2013 (IMF, 2013c).

Given that the tourism is considered as a key player in the non-oil sector, Dubai has focused on expanding the real estate sector and recently announced proposals for numerous new megaprojects in real estate and tourism that will be achieved by its Government-Related Entities (GRE).

Dubai's GREs are increasingly regaining access to external financing in an environment

of ample global liquidity, while their debt continues to be high. While GRE debt restructurings related to the 2009 crisis are nearing completion, several large maturities are now drawing closer, including on restructured debt, between 2014 and 2018 (IMF, 2013c: 1).

The UAE banks stay as key drivers of the financial sector with well established capital and adequate liquidity cushions that strengthened by the substantial deposit growth (IMF, 2014a). The number of banks reached 52 in 2011 with 37 private banks and 16 state owned banks. Among private banks only 7 are domestic banks and 30 are foreign banks. Overall, the number of Islamic banks reached 8 with 15.6 per cent of the total UAE banks assets by 2011 (IMF, 2012c: 39).

The loan to private sector has started to recover after the financial crisis in 2013. The banks continued providing loans to government and public enterprises by 6 per cent of their total capital during 2013. The loan quality began to recover, as the ratio of non-performing loans decreased, yet remains high in particular amongst Dubai banks (IMF, 2014a). The capital adequacy ratio recorded 18.5 in March 2014 and the Central Bank of the UAE, after conducting a stress test, stated that the domestic banking sector is capable of absorbing critical capital and liquidity shortages (IMF, 2014a).

Furthermore, the UAE has shown a strong interest in Islamic finance, where the Vice President of the UAE has announced that the UAE will be the world's number one centre for Islamic economy and in December 2013 the ruler of Dubai issued law No. 13 to establish the Dubai Islamic Economic Development Centre with an objective to make Dubai the hub for *sukuk* and Islamic financial services, a leading market in *halal* products and services and the international legislation for regulations of the Islamic finance industry (Dar et al., 2014: 94).

#### **4.3.3. Kingdom of Bahrain**

The recent rebound in the hydrocarbons sector has positively enhanced the GDP growth of Bahrain by 5.3 per cent in 2013 (IMF, 2014b), while the non-oil sector showed a modest growth, which could be a consequence of weakness in the investment activities and also the delay in approving the budget for 2013-2014. The transport and tourism sectors are in a steady growth and are leading the non-oil sector. In addition, unemployment continued to stay at a low level in general, reaching 4.2 per cent by the end of February 2014. While the inflation rate increased by 4 per cent by the end of

2013 implying the increases in housing prices, it had fallen in March 2014 to 2.3 per cent. The credit grew moderately by 6.6 per cent at the end of 2013 compared to 6.2 in 2012. However, the deposits showed a better growth rate by 9 per cent at the end of 2013 compared to 4.6 per cent in 2012 (IMF, 2014b).

The Bahraini banking sector continued to show a solvent demonstration supported by good capitalisation and low level of non-performing loans. While Islamic banks have shown a good performance (Al-Hassan, 2010: 22), they have been facing high levels of non-performing loans due to their exposures to the domestic and regional real estate prices by 2013. The year of 2013 was seen to be a consolidation year for Islamic banks in Bahrain. In order to protect their capital, the Bahraini authorities pushed for the concentration of Islamic banks. It is observed that Bahrain has been gradually losing its leading position in the Islamic financial market, especially after Dubai has announced its strategy to be not only an international hub for Islamic finance, but also the centre for global Islamic economy. However, this does not mean that the role of Bahrain in the Islamic finance industry has ended, as the multifaceted financial bodies of Bahrain remain very crucial for the Islamic finance sector, such as the Liquidity Management Centre that was established to provide the liquidity needs to the market (Dar et al., 2014: 77) as well as the standards making body, AAOIFI.

The Bahrain financial sector has been affected by the recent financial turmoil, however, its stock market index grew by 17 per cent in 2013 and by 7 per cent by the end of March 2014 (IMF, 2014b). Although the retail-banking sector in Bahrain is the largest in the region, it has been severely affected by the recent financial crisis in the region in 2008 and 2009 (Al-Hassan, 2010: 6). It should be noted that Bahrain has very flexible regulations related to the foreign ownership in the banking sector compared to other GCC countries (Al-Hassan, 2010: 6).

Overall, while the Bahraini economy has depicted a modest growth, the public debt was found to be high. Currently, the crucial challenge is for the Bahraini authorities to balance the financial stability and to alleviate the government's debt. The long-term focus plan of Bahrain is to decrease the reliance on oil revenue and achieve a sustainable economic growth (IMF, 2014b).

#### 4.3.4. State of Qatar

Following the successful completion of the 20-year investment plan in commercialising the natural gas resources in 2011, Qatar has expanded its infrastructure investment programme in the non-hydrocarbon sector in order to promote the economic diversification and also to make the required arrangement for the FIFA 2022 World Cup (IMF, 2014c: 3). Led by the new Emir and guided by the Qatar National Vision 2030 and National Development Strategy 2011–16, Qatar authorities continue pursuing a development and diversification plan, which is financed by US\$160 billion of budget-financed investment projects, over 2014–2021, and enhanced by further US\$50 billion from some public ventures (IMF, 2014c: 3). The real GDP growth of Qatar reached 6.6 per cent in 2012, which was mainly supported by the non-hydrocarbon sector with a growth rate of 9 per cent. Moreover, the overall inflation rate remained low and stable at 2 per cent in 2012. While the overall fiscal surplus stayed high at 8.1 per cent of GDP in 2012 and 2013, the external current accounts were estimated to have a high surplus with a rate of 29.8 per cent of GDP in 2012 (IMF, 2013d: 4). It is worth mentioning that Qatar recorded the highest level of income per capita among other GCC countries with a rate of US\$98,000 and lowest level of unemployment with a rate of 0.6% in 2011 (IMF, 2013d: 4).

According to statistics, credit growth has increased from 17 per cent in 2010 to 28 per cent in 2011 and to 32 per cent in September 2012. While the private sector credit increased by 19 per cent in 2011, which was mostly boosted by loans to the real estate sector, its growth rate declined to 12.5 per cent in the first three quarters of 2012 (IMF, 2013d: 7-8). It is worth mentioning that Qatar demonstrated a healthy economic performance even during the recent financial crisis of 2007-2009 (IMF, 2013d: 4).

With regard to the banking system, which is leading the financial sector, it continued to be profitable with an average return on assets of 2.5 per cent in June 2012 and remained solvent with a capital adequacy ratio (CAR) of commercial banks that increased from 16.1 per cent in 2010 to 21.1 per cent in June 2012. Regarding the non-performing loans (NPLs) ratio, it dropped from 2.0 per cent in 2011 to 1.7 per cent in 2012, indicating the improvement of the loan quality in the Qatar banking sector (IMF, 2013d: 15).

Furthermore, Qatar has shown great support to the expansion of the Islamic finance

industry. In January 2013, Qatar Exchange and Al Rayan Investment launched the QE Al Rayan Islamic Index to facilitate *Shari'ah* compliant traded funds. In addition, in 2013 the Qatar authorities signed a US\$ 580 million Islamic finance facility to build Doha Metro to be completed by 2019. In addition, in 2012 the Qatar government also signed a Memorandum of Understanding with the Islamic Development Bank, a multilateral lender and Dallah Barakah Group to establish a mega-Islamic Bank with a capital of US\$ 1 billion. Moreover, the Qatar market has also witnessed a flourishing expansion in the *takaful* industry, led by Alkhaliji Takaful, which recently signed to be a third party administrator to the state-owned National Health Insurance Company. Such expansion can be rationalised by the supporting regulations for the Islamic finance industry that has been issued by the Qatar authorities. In fact, as is stated by one of the studies, that the Qatar Financial Centre is considered the most Islamic finance-friendly tax system (Dar et al., 2014: 90).

#### **4.3.5. State of Kuwait**

The economy of Kuwait, similar to other GCC countries, is dominated by the oil sector that has the sixth largest reserves in the world with 102 billion barrel with a production capacity of 90 years. The Kuwaiti nationals present 32 per cent of the total population that accounts for 3.8 million. While the government personnel are remarkably Kuwaitis at 70 per cent, 95 per cent are non-Kuwaitis in the private sector.

The income per capita recorded US\$ 48,000 with an unemployment rate of 3 per cent in 2012 (IMF, 2013e: 4). The large rate of salaries in the government sector has attracted more Kuwaitis than the private sector. The inflation rate remained stable at 3 per cent per year in September 2013, and the current account surplus was expected to stay high at 39 per cent of GDP in 2013 (IMF, 2013e: 6). The government spending was expected to rise by 3 per cent as a result of the increase in employment rate, subsidies, social benefits and capital spending that was mainly increased as a response to the political unrest in the region, and is expected to increase by 47 per cent in 2013-2014 compared to 2012-2013 (IMF, 2013e: 6).

In 2010, the Kuwaiti government launched a four-year plan guided by a strategic vision for 2035, which focuses on expanding the investment in infrastructure, health, and education, and strengthening the co-participation of the private sector by creating public

shareholding corporations with the objective to diversify the economy by transforming Kuwait into a regional financial and trade hub (IMF, 2012d: 1-2). However, the financial crisis of 2007-2009 has negatively impacted the growth of the non-oil sector and due to the delay in implanting the economic reforms, the public investment has lagged behind the average performance of other GCC countries. Nevertheless, as a consequence of the increase in the public wages, the non-oil sector was expected to increase by 3 per cent by the end of 2012 (IMF, 2013e: 4).

It should be noted that the Kuwaiti banking sector stays robust and solvent with stable profitability, which is comprehensively regulated by the central bank. In October 2012, the Kuwaiti central bank decreased its discount rate by 2 per cent, which negatively affected the weighted average deposit and lending activities by 1.53 per cent and 4.63 per cent respectively at the end of June 2013, compared to 1.60 per cent and 4.86 per cent of the same activities in October 2012. As for the bank's credit, the ratio increased by 6.2 per cent year on year and the liquidity buffers continued increasing due to the increases in deposits annual growth by 9 per cent by June 2013 (IMF, 2013e: 6).

Regarding the Islamic finance, in February 2013 the Kuwait Capital Market Authority paid special attention to the Islamic financial institutions to reassure that they employ qualified personnel and conduct their business operations with full transparency. The Kuwait Finance House remains as the Kuwait's leading Islamic bank, which was granted an Independent Assurance Certificate by Ernst and Young in July 2013 (Dar et al., 2014: 83). Furthermore, Warba Bank has started to facilitate *qard hasan* free of profit payments and administration fees to Kuwaitis and the nationals from other GCC countries working in Kuwait (Dar et al., 2014: 84). Accordingly, it can be stated that such proactive policies by the government, attention and ethical financial activities suggests that Islamic finance is in a flourishing position in the Kuwaiti financial market.

#### **4.4. CONCLUSION**

Through reviewing the economic, financial and banking sectors of the overall GCC region and looking at the sampled GCC countries individually, it can be argued that their economies are mainly driven by the oil sector and their financial sectors are dominated by the banking sectors, which are well-capitalised. Although the GCC banks were not severely impacted by the financial crisis, they were not immune and it caused a

decrease in their profitability. Having said that, the GCC banks remained solvent and hold adequate liquidity, it is expected that they would show a high level of contribution to the economic growth by creating a high level of liquidity through financing their illiquid assets with liquid liabilities, and, hence, promote the creation of real economic activities.

**CHAPTER FIVE**  
**RESEARCH METHODOLOGY FRAMEWORK**

## **CHAPTER FIVE**

### **RESEARCH METHODOLOGY FRAMEWORK**

#### **5.1. INTRODUCTION**

This chapter provides and explains the research methodology framework as well as the underlying econometric modelling used in this research. This chapter should, therefore, be considered as a backbone of the research process of this study, as it aims at explaining the nature of this research and the process of defining and selecting the research methods and techniques to fulfil the research aims and objectives.

This chapter starts with the explanation of research methods for data collection and analysis. Most importantly, this chapter provides the aspects of empirical modelling including the econometric model specification and data analysis techniques are explained, where data validation tests, panel data regressions models and sensitivity tests are defined, which are used to conduct the research. After that, this chapter describes of the sample characteristics and the rationale of sample selection, which is followed by the sources of examined data. The research methods and the definition of variables are provided in detail in the following section. Finally, the limitations of the research methodology and conclusion are provided.

#### **5.2. RESEARCH METHODS FOR DATA COLLECTION AND ANALYSIS**

Research methods help to define the scope and nature of the data that are required to be collected and the means of analysing them (Bryman, 2001: 29) with the objective of responding to the research aims and questions (Ghauri and Gronhaug, 2010: 104). In other words, research methods provide guidance to researchers to choose the research instruments that standardise data collection and its interpretation (Kelly, 2011: 27). The research method refers to “data collection through historical review and analysis, surveys, field experiments and case studies” (Ghauri and Gronhaug, 2010: 104). “It can involve a specific instrument, such as a self-completion questionnaire or a structured interview schedule, or participant observation whereby the researcher listens to and watches others” (Bryman, 2001: 29).

Given the existence of different research methodologies, the research methods are classified into qualitative and quantitative methods and their combination is referred to as triangulation (mixed methods). It is important to mention that the suitability of methods depends on the adopted research questions and problems (Ghauri and Gronhaug, 2010: 104).

The qualitative research methods “allow the researcher to discover how the social world is constructed by the people studied” (Kelly, 2011: 27). Since qualitative research methods focus on understanding the nature of the association between the investigator and the research subject, this suggests its subjective and exploratory orientation. Hence, it requires data collection and analysis methods that involve views and perceptions of the respondents, which mainly depends on immeasurable techniques such as interviews and case studies and mainly with tiny figures (Ghauri and Gronhaug, 2010: 104).

The quantitative research methods, on the other hand, can be labelled as a logical and analytical approach that mainly focuses on examination and verification of the relationship between examined variables (Ghauri and Gronhaug, 2010: 104). A quantitative research methods thus “often takes cross-sectional snapshots of the social world” (Kelly, 2011: 28) at very specific periods. Therefore, it mainly relies on collecting data for large samples from social surveys in the form of primary data and public databases in the form of secondary data (Kelly, 2011: 28). The researchers following quantitative methods normally measure the conceptual abstract to examine hypotheses and refine theory through interpreting the causal relationship between variables and generalising the outcomes in which complex multivariate analysis is required (Kelly, 2011: 28). Hence, quantitative research methods require transparency in data collection techniques and methods of analysis, suggesting that the “replication of studies is relatively straightforward” (Kelly, 2011: 28).

It is significant to mention that the distinction between qualitative and quantitative research methods “is not the question of quantification, but also a reflection of different perspectives on knowledge and research objectives” (Ghauri and Gronhaug, 2010: 104). Hence, in some cases, researchers may quantify qualitative data suggesting that qualitative and quantitative methods may not be detached utterly (Ghauri and Gronhaug, 2010: 104).

With respect to this research, since the developed hypotheses are tested based on analysing the collected empirical data from the Bankscope database and also quantifying some qualitative information such as bank type and the banking regulations to examine the determinants of liquidity creation and liquidity risk exposures of Islamic banks in comparison with conventional and hybrid banks in the case of the GCC region, this research uses mixed (quantitative and qualitative) method in data collection and analysis.

### **5.3. ASPECTS OF EMPIRICAL MODELLING**

After identifying the detailed nature of the research process in collecting and analysing data, this section aims to provide a detailed understanding of the empirical process of assessing the liquidity creation and liquidity risk exposures and their key determinants in the case of the GCC region in a comparative manner between Islamic, conventional and hybrid banks. This section, hence, presents the specification of the developed econometric models, the sample selection process, source and characteristics of the examined data, definition and measurement of the examined variables and the econometric procedures for data analysis.

#### **5.3.1. Econometric Model Specification**

This section elaborates the econometric modelling used in conducting empirical analysis in first model (Chapter 6) and the second model (Chapter 7) with the objective of testing the developed hypotheses through estimating the relationship between assessed variables.

##### **5.3.1.1. Econometric specification of the first empirical model**

In order to examine the relationship between the liquidity creation as dependent variable and bank industry type, bank regulatory and supervisory, bank specific, and macroeconomic variables as independent variables, the panel regressions model in equation 5.1 is developed and estimated through fixed effects test with robust standard error:

$$LC_{bit} = \alpha + \beta_1 CB_{bit} + \beta_2 HB_{bit} + \beta_3 OSP_{it} + \beta_4 MES_{it} + \beta_5 BAR_{it} + \beta_6 CAP_{it} + \beta_7 CR_{bit} + \beta_8 SIZE_{bit} + \beta_9 GDP_{it} + \acute{\epsilon} \quad \text{Eq. (5.1)}$$

where:

$LC_{bit}$  is the amount liquidity creation that bank  $b$  in country  $i$  during the period  $t$  performs;

$\alpha$  : the intercept;

$\beta_1 \dots \beta_n$  : the regression coefficients;

$\varepsilon$  : the error term;

$CB_{bit}$  denotes for conventional banks. It is a binary dummy variable with a value of '1' if the bank is fully conventional and '0' otherwise;

$HB_{bit}$  signifies the hybrid banks (i.e. the conventional banks that offer Islamic financial services through Islamic windows). It is a binary dummy variable with a value of '1' if the bank is fully conventional and '0' otherwise. It is worth mentioning that since Islamic bank variable is represented by the intercept value as explained in measuring the bank type variable through dummy variables, hence, the Islamic bank dummy variable is excluded from the equation.

$OSP_{it}$  stands for the official supervisory power that bank  $b$  operate under in the country  $i$  during the period  $t$ ;

$MES_{it}$  stands for the market entry standards that bank  $b$  operate under in the country  $i$  during the period  $t$ ;

$BAR_{it}$  stands for the bank activity regulatory that bank  $b$  operate under in the country  $i$  during the period  $t$ ;

$CAP_{it}$  stands for the bank capital regulatory that bank  $b$  operates under in the country  $i$  during the period  $t$ ;

$CR_{bit}$  refers to the credit risk of bank  $b$  in country  $i$  during the period  $t$ ;

$SIZE_{bit}$  refers to the size of the bank  $b$  in the country  $i$  during the period  $t$ ;

$GDP_{it}$  refers to the economic growth of the country  $i$  during the period  $t$  that bank  $b$  operates in.

The definition of the examined variables are elaborated in Table 5.1.

**Table 5.1. Definitions of the Examined Variables of the First Empirical Model**

Variable name	Variable abbreviation	Variable description
Liquidity Creation	LC	Liquidity creation measures the amount of liquidity that banks create by financing their illiquid assets with liquid liabilities
Conventional Banks	CB	It is measured by a dummy variable that takes a value of '1' if the bank is fully conventional and '0' otherwise.
Hybrid Banks	HB	It is measured by a dummy variable that takes a value of '1' if the bank is hybrid and '0' otherwise.
Official supervisory power	OSP	OSP index refers to whether the official supervisory body has the authority to take any action against the bank management and consists of 14 variables. The index equals the total score of variable scaled by the total number of variables.
Market Entry Standards	MES	The index measures different degrees of regulation that the bank operates under and consists of 12 variables. The index equals the total score of variables scaled by the total number of variables.
Bank activity Restrictions	BAR	The index includes the information on the range of restrictions that banks are required to obey in regard to their business undertakings in the securities market, insurance underwriting and real estate activities. It consists of three variables. The index equals the total score of variables scaled by the total number of variables.
Bank capital regulation	CAP	The index measures the capital requirement and standards and consists of nine variables. The index equals the total score of variables scaled by the total number of variables.
Credit Risk	CR	Credit risk is measured by the ratio of loan loss provision to gross loans.
Bank size	SIZE	Bank size is measured by the log of total assets.
Economic growth	GDP	GDP is measured by the percentage change in real gross domestic product (GDP), constant prices.

### 5.3.1.2. Econometric specification of the second empirical model

In order to investigate the association between the liquidity risk exposures as dependent variable and bank industry type, bank capital regulation, bank specific variables and macroeconomic variables as independent variables, the following panel regressions model in equation 5.2 is developed and estimated through fixed effects test with robust standard error:

$$LRE_{bit} = \alpha + \beta_1 CB_{bit} + \beta_2 HB_{bit} + \beta_3 CAP_{bit} + \beta_4 LA_{bit} + \beta_5 CR_{it} + \beta_6 LTD_{it} + \beta_7 SIZE_{bit} + \beta_8 GDP_{it} + \epsilon \quad \text{Eq. (5.2)}$$

where:

$LRE_{bit}$  is the level of liquidity risk exposures that bank  $b$  in country  $i$  during the period  $t$  face;

$\alpha$  : the intercept;

$\beta_1 \dots \beta_n$  : the regression coefficients;

$\varepsilon$  : the error term;

$CB_{bit}$  denotes for conventional banks. It is a binary dummy variable with a value of '1' if the bank is fully conventional and '0' otherwise;

$HB_{bit}$  signifies the hybrid banks (i.e. the conventional banks that offer Islamic financial services). It is a binary dummy variable with a value of '1' if the bank is fully conventional and '0' otherwise. Since Islamic bank variable is represented by the intercept value, the Islamic bank dummy variable is excluded from the equation.

$CAP_{it}$  stands for the bank capital regulatory stringency that bank  $b$  operates under in the country  $i$  during the period  $t$ ;

$LA_{it}$  indicates the ratio of liquid assets to total assets ratio of bank  $b$  in country  $i$  during the period  $t$ ;

$CR_{bit}$  refers to the credit risk of bank  $b$  in country  $i$  during the period  $t$ ;

$LTD_{bit}$  stands for the long-term debt-to-total-assets ratio of bank  $b$  in country  $i$  during the period  $t$ ;

$SIZE_{bit}$  refers to the size of the bank  $b$  in the country  $i$  during the period  $t$ ;

$GDP_{it}$  refers to the economic growth of the country  $i$  during the period  $t$  that bank  $b$  operates in.

Table 5.2. displays the definitions of dependent and independent variables of the second empirical model.

**Table 5.2. Definitions of the Examined Variables of the Second Empirical Model**

Variable name	Variable abbreviation	Variable description
Liquidity Risk Exposure	LRE	Liquidity risk exposure is measured by the financing gap that measures the possibility of banks being unable to meet their financial obligations in a timely manner.
Conventional Banks	CB	It is measured by a dummy variable that takes a value of '1' if the bank is fully conventional and '0' otherwise.
Hybrid Banks	HB	It is measured by a dummy variable that takes a value of '1' if the bank is hybrid and '0' otherwise.
Bank capital regulation	CAP	The index measures the capital requirement and standards and consists of nine variables. The index equals the total score of variables scaled by the total number of variables.
Credit Risk	CR	Credit risk is measured by the ratio of loan loss provision to gross loans.
Long-Term Debt	LTD	Long-term debt ratio is divided by total assets.
Liquid Assets	LA	Ratio of liquid assets to total assets.
Bank size	SIZE	Bank size is measured by the log of total assets.
The economic growth	GDP	GDP is measured by the percentage change in real gross domestic product (GDP), constant prices.

### 5.3.2. Sample Selection Process

Given the research questions developed by this study, an adequate sample has to be formulated to be analysed in a comparative manner with the objective of obtaining sufficient and meaningful outcomes. In order to do so, the examined banks need to fulfil the standards of comparison analysis, in terms of the economic structure of the countries they operate in, the financial policies, banking regulations, and the nature of banking operations. Accordingly, the GCC commercial banks are chosen to be examined in order to test the developed hypotheses.

The main reason for sample selection is the quantitative nature of the examined empirical data, as panel data regressions analysis is employed to explore the association between explained and explanatory variables. Such a method needs a considerably large number of the observations, as a small population may lead to inconsistent outcomes (Baltagi, 2005: 53, 151, 194). In addition, due to the small number of Islamic banks compared to conventional banks, the GCC region stands to provide sufficient sample to obtain sizable data where the GCC Islamic banks assets represent 34.11 per cent of global Islamic banking assets (IFSB, 2013: 9).

The sampled banks in this study are the commercial banking sector in the GCC region including: the Kingdom of Saudi Arabia, United Arab Emirates, Kingdom of Bahrain, State of Qatar and State of Kuwait. It should be noted that Sultanate of Oman is

excluded from the sample, as during the period in the question Islamic banks did not exist in Oman. The total number of banks in the sample is 58 commercial banks. The sample consists of Islamic, conventional and hybrid banks (conventional banks with Islamic windows). Since this research aims to explore the implication of the unique nature of the Islamic financial principles on Islamic banks' liquidity creation and liquidity risk, and considering a comparative approach will provide more meaningful understanding of the obtained findings, the sample of this research consists of Islamic banks and conventional banks to test the developed hypothesis in a comparative manner. Moreover, the hybrid banks are taken into consideration as counterparts in the comparative study to examine whether such a mixed nature of doing banking has different implications on liquidity behaviour and position from fully-fledged Islamic and conventional banks. It should also be noted that this type of bank has undeniable market size that needs to be explored in relation to liquidity issues.

In order to have a robust outcome, the data period covers 20 years from 1992 to 2011. It is important to mention that in selection of the examined period, controlling for the potential impact of the financial crisis of 2007-2009 on liquidity creation and liquidity risk is taken into consideration. The number of observations with unbalanced panel data is 677 observations. Table 5.3 depicts the details of the sampled banks suggesting equality of the sample distribution, to some extent, between Islamic (IB), conventional (CB) and hybrid banks (HB) in across the GCC banking sector.

**Table 5.3: Distribution of Sampled GCC Banks (Numbers and Percentages)**

Country	IS	IS %	CB	CB %	HB	HB %	Total	Total %
UAE	4	21.053	10	50	4	21.053	18	31.034
Bahrain	7	36.842	3	15	3	15.789	13	22.414
KSA	3	15.789	0	0	8	42.105	11	18.966
Kuwait	3	15.789	6	30	0	0	9	15.517
Qatar	2	10.526	1	5	4	21.053	7	12.069
Total	19	32.759	20	34.483	19	32.759	58	100

*Source of the Bank Type Classification: Banker 2007-2013 and Al-Hassan et al., (2010).*

It is important to mention that the number of the sampled banks is purely based on the data availability from the Bankscope database. As for the period covered, the observations commence in 1992, as most of the Islamic banks in the region were established from 1992 onwards, which is the date of internationalisation of Islamic banks.

### **5.3.3. The Sources and Characteristics of the Sampled Data**

In order to establish the reliability of the examined data, it is important to elaborate on the approaches and sources followed in the collection process. With regard to bank-specific variables, following Agoraki et al. (2011: 43), Naceur and Omran, (2011: 7), Poon and Firth (2005), the individual bank balance sheet data and income statements are obtained from Bankscope provided by Fitch/IBCA/Bureau Van Dijk. Following Naceur and Omran, (2011: 7), this research uses the unconsolidated financial statements and consolidated statements when the unconsolidated statements are not accessible, with confirmation that each bank is contained only once in the dataset.

It should be noted that the approach of using data from Bankscope has three advantages: (i) the Bankscope database provides substantial information of about 90 per cent of total bank assets in every country; (ii) Bankscope structures all financial statements according to global accounting and reporting standards and (iii) Bankscope dataset is globally recognised and used by some of the chief rating agencies such as Fitch Group (Poon and Firth, 2005; Naceur and Omran, 2011: 7).

In addition, following Barth et al. (2004), Fernandez and Gonzalez (2005), Pasiouras, et al. (2006: 413-414), Agoraki et al. (2011: 42), Klomp and Hann (2012: 3200), the bank regulatory and supervisory data are collected from the World Bank survey data, which was conducted by Barth et al. (2000, 2004 and 2008) in conjunction with the Basel Core Principles (BCPs) (Klomp and Hann, 2012: 3201) that was set by the Basel Committee on Banking Supervision in cooperation with the World Bank and the International Monetary Fund (IMF). The World Bank survey data contains comprehensive and inclusive evidence on bank regulation and supervision for more than 107 countries between 1999 and 2008. Furthermore, following Agoraki et al. (2011: 43), since the bank regulatory and supervisory database is constructed through three surveys at only three points in time (2000, 2004 and 2008), the obtained information from first survey covers the bank observations over the period from 1992 to 2000, the obtained information from the second survey covers the bank observations over the period from 2001 to 2003, and the obtained information from the third survey covers the bank observations over the period from 2004 to 2011.

Moreover, following Fernandez and Gonzalez (2005), Dinger and Hagen (2009),

Naceur and Omran (2011: 7), the macroeconomic variable (GDP) data are obtained from International Monetary Fund's (IMF) World Economic Outlook (WEO) database.

#### **5.3.4. Definitions and Measurements of the Dependent and Independent Variables**

This section provides the definitions of the selected variables and the adopted methods of measuring them. It is important to note that the variables are classified based on econometric nature: 'dependent variables' and 'independent variables' and independent variables are classified into: 'bank type dummy variables', 'bank regulatory variables', 'bank specific variables' and 'macroeconomic variables'. Such classification is adopted due to some mutually used variables in both empirical models (see: Chapter 6 and Chapter 7). To reassure the clarity throughout this research, each variable is referred to its associated model either first empirical model, second empirical model or both.

##### **5.3.4.1. Definition and measurement of the dependent variables**

This section presents the definitions and descriptions of dependent variables.

###### *5.3.4.1.1. Measuring liquidity creation*

The liquidity creation is used as dependent variable in the first empirical model (Chapter 6) to assess the liquidity creation of Islamic banks compared to conventional and hybrid banks and to investigate its relationship with independent variables as key determinants. Following Berger and Bouwman (2009a), this research classifies all bank activities as liquid, semiliquid, or illiquid. However, due to data limitation, this research adopts only the fourth measurement of liquidity creation developed by Berger and Bouwman (2009a), which is based on on-balance sheet items that classify the loans by maturity and excludes the off-balance activities as modelled by Distinguin et al. (2013: 2395). Constructing liquidity creation measurement in such a way is limited to the availability of the required data, as the accessible data of the GCC banks, which are obtained from the Bankscope database, do not classify loans based on categories and also do not state the required off-balance activities to be included. Taking into consideration such a limitation regarding data, the research constructs liquidity creation measured through three steps that were developed by Berger and Bowman (2009a). The construction of the liquidity measure is explained as follows:

*In the first step*, based on ease, cost, and time for banks to obtain liquid funds to cover demands of clients, all assets classified as liquid, semiliquid, or illiquid. Likewise, based on ease, cost, and time for clients to acquire liquid funds from the bank, bank liabilities and equity are classified as liquid, semiliquid, or illiquid as shown in Table 5.4. Within each category, all items with shorter maturity are considered to be more liquid than items with longer maturity due to their quick self-liquidation without extra efforts or expenses (Berger and Bouwman, 2009a: 3790). Such classification of all the bank activities is based on category and maturity. However, this is not the case for loans, as loans are classified by maturity due to the data limitations. Hence, on the assets side, all loans with short-term of up to one year are regarded as semiliquid and all loans with long-term maturities over one year are regarded as illiquid assets. Cash and amounts due from other institutions, all trading securities (regardless to their maturities) and trading assets are defined to be liquid assets. While, on the liabilities side, all items that can be easily withdrawn by depositors without bearing cost as a penalty, such as transaction deposits, saving deposits and trading liabilities (this research excludes overnight federal funds purchased due to inapplicability and unavailability of an equivalent item) are classified as liquid items. However, all deposits, which can be withdrawn with somewhat more difficulty or with a penalty, are considered to be semiliquid, and include time deposits regardless of maturities (other borrowed money is excluded due to data limitation). Moreover, other liabilities, where costumers do not have an easy access to withdraw them such as subordinated debt, are regarded as illiquid. Likewise, equities are treated as illiquid liabilities where the investors cannot withdraw or demand liquid funds from a bank and also due to their long maturity nature. Although the equities are traded publicly and sold easily, the investors rescue money form the capital market not from the bank itself, hence, the liquidity is created by the capital market and not by the banks (Berger and Bouwman, 2009a).

*In the second step*, following Berger and Bouwman (2009a), this research assigns weights to the activities classified in the first step as presented in table 5.4. These given weights are based on the theory of liquidity creation. According to the theory, banks create liquidity when they hold illiquid items in place of nonbank public items and provide the public with liquid items. Therefore, positive weights are applied to illiquid assets and liquid liabilities. On the other hand, the negative weights are applied to liquid assets and illiquid liabilities as well as equity. Accordingly, it can be stated that when

banks use liquid liabilities (such as current deposits) to finance illiquid assets (such as business loans with a maturity more than one year), liquidity is created, and when illiquid liabilities or equity are used to finance liquid assets (such as trading securities), liquidity is destroyed.

The size of the weights are based on simple dollar-for-dollar adding-up restrictions, subsequently, a bank creates \$1 of liquidity when it transforms \$1 of illiquid assets into \$1 of liquid liabilities. Likewise, a bank destroys \$1 of liquidity when it transforms \$1 of liquid assets into \$1 of illiquid liabilities. Accordingly, a weight of  $+\frac{1}{2}$  is assigned to both illiquid assets and liquid liabilities, and a weight of  $-\frac{1}{2}$  is assigned to both liquid assets and illiquid liabilities. Therefore, when a bank uses a dollar of liquid liabilities to finance a dollar of illiquid assets, liquidity creation equals:  $\frac{1}{2} \times \$1 + \frac{1}{2} \times \$1 = \$1$ . In such a case, a bank creates maximum (\$1) of liquidity. “Intuitively, the weight of  $\frac{1}{2}$  applies to both illiquid assets and liquid liabilities, since the amount of liquidity generated is only half determined by the source or use of the fund alone – both are needed to create liquidity” (Berger and Bouwman, 2009a: 3795). In a similar manner, when a bank transfers a dollar of illiquid liabilities or equity to finance a dollar of liquid assets, liquidity creation can be calculated as follows:  $-\frac{1}{2} \times \$1 + -\frac{1}{2} \times \$1 = -\$1$ , where the maximum liquidity destroyed. Based on these weights, liquidity is not created when liquid liabilities are used to finance liquid assets or when illiquid assets are financed by illiquid liabilities or equity, where items are almost similar level of liquid or illiquid on both sides of balance sheet.

In relation to the semiliquid assets and liabilities, a weight of 0 value is assigned to semiliquid activities based on the hypothesis that semiliquid activities are situated in a middle position between liquid and illiquid activities. Accordingly, if a bank use time deposits to finance a loan or a lease less than or equal to one year, a zero value of liquidity amount would be created, since due to ease, cost and time, depositors need to withdraw their time deposits, which is equivalent to the ease, cost and time that banks manage to securitise or sell the loan or lease equal to or less than one year (see Table 5.4).

*In the third step*, following Berger and Bouwman (2009a), all bank activities that are categorised in first step and weighted in the second step are combined in the third step to build the liquidity creation measure. The measure is established based on classifying

loans by maturities and excluding off-balance-sheet activities due to the data limitation as mentioned earlier. The weights of  $+\frac{1}{2}$ ,  $-\frac{1}{2}$ , or 0, respectively, are multiplied by the dollar amounts of the corresponding bank activities and the weighted dollar amounts added to calculate the total dollar value of liquidity creation at a specific bank (Berger and Bouwman, 2009a).

**Table 5.4: Liquidity Classification of Bank Activities and Construction of Liquidity Creation Measure**

Step 1 and 2: Assets Side		
Illiquid Asset (Weight= $+\frac{1}{2}$ )	Semiliquid Assets (Weight = 0)	Liquid Assets (Weight = $-\frac{1}{2}$ )
All loans and leases with a maturity $>1$ year	All loans and leases with maturity $\leq 1$ year	Cash and amounts due from other institutions, Trading Securities (regardless of maturity), Trading Assets
Step 1 and 2: Liabilities and Equity		
Liquid Liabilities (Weight= $+\frac{1}{2}$ )	Semiliquid Liabilities (Weight = 0)	Illiquid Liabilities (Weight = $-\frac{1}{2}$ )
Current Deposits Saving Deposits Trading Liabilities Overnight Federal Funds (Excluded)	Time Deposits Other Borrowed Money (not available)	Bank's liability on bankers acceptances (not available) Subordinated Debts Other Liability with maturity $> 1$ year Equity
Step 3: all bank activities that classified in first step and weighted in the second step are combined to build the liquidity creation measure.		
$+\frac{1}{2}$ x illiquid assets	0 x semiliquid assets	$-\frac{1}{2}$ x Liquid Assets
$+\frac{1}{2}$ x liquid liabilities	0 x semiliquid liabilities	$-\frac{1}{2}$ x illiquid liabilities
		$-\frac{1}{2}$ x equity

*Source:* Berger and Bouwman (2009a) with the author's modification

Consequently, following Berger and Bouwman (2009a), the liquidity creation ( $LC$ ) measure is formulated in equation (5.3):

$$LC = \frac{(\frac{1}{2} \times ILA + 0 \times SLA - \frac{1}{2} \times LA) + (\frac{1}{2} \times LL + 0 \times SLL - \frac{1}{2} \times ILL - \frac{1}{2} \times EQ)}{GTA} \quad \text{Eq. (5.3)}$$

where:

$ILA$  denotes illiquid assets that include all loans and leases with a maturity  $> 1$  year;

$SLA$  stands for semiliquid assets that include all loans with maturity  $\leq 1$  year;

$LA$  refers to liquid assets, which is composed of cash and due from other financial institutions, trading securities and trading assets (in this study the overnight federal funds sold are excluded);

$LL$  refers to liquid liabilities that include funds that can be easily withdrawn by customers without bearing any penalty, such as transaction deposits, saving deposits and

trading liabilities (overnight federal funds are excluded as they are not applicable and equivalent items are unavailable);

*SLL* denotes the semiliquid liabilities. All deposits that can be withdrawn slightly with more difficulty or with a penalty are considered semiliquid, which include time deposits regardless of maturities (other borrowed money is excluded due to data limitation);

*ILL* stands for illiquid liabilities that include long-term liabilities that cannot be withdrawn easily or quickly such as subordinated debt;

*EQ* refers to equity. Equity treated as illiquid liabilities where the investors cannot demand liquid funds from the bank and due to the very long maturity. Although the equities are traded publicly and sold easily, the investors rescue money from the capital market not from the bank itself, hence, the liquidity is created by the capital market not by the bank (Berger and Bouwman, 2009a).

*GTA* refers to gross total assets.

Overall, the higher the liquidity creation ratio the higher transformation of liquid liability into illiquid assets that banks conduct. A zero value of liquidity creation ratio indicates that a null value of liquidity that banks create. However, when a negative value of ratio is scored, it means that illiquid liabilities or equity are used to finance liquid assets and, hence, in such case banks destroy liquidity.

#### *5.3.4.1.2. Measuring liquidity risk exposures*

Liquidity risk exposure as a measure is used as the dependent variable in the second model (Chapter 7) to assess liquidity risk exposure of Islamic banks compared to conventional and hybrid banks and examine its association with the assessed independent variables.

It should be noted that most banking-related empirical studies that examine liquidity position indicators use balance sheet ratios based on accounting data (Matz, 2008: 4 and Distinguin et al., 2013: 3300), such as loan-to-deposit ratios (Iannotta et al., 2007: 2132; Bourke, 1989: 72; Molyneux and Thornton, 1994: 439; Demirguc-Kunt et al., 2004: 603 and Klomp and Haan, 2012: 3198). In addition, the ratio of loans to deposits, borrowed funds to total assets and loan commitments to assets are utilised to proxy for liquidity

risk. For example, the higher ratios of loans to deposits and borrowed funds to total assets indicate the more reliance of the bank on the short-term money market fund rather than on its core deposits to fund increased demand on loans. Likewise, the greater ratio of loan commitments to assets implies the greater need for liquidity to supply the unpredicted growing demand of the loans. Hence, the higher levels of such ratios, the greater degrees of liquidity risk exposure that a bank may face (Saunders and Cornett, 2006: 476). Moreover, other researches measured liquidity risk depending on ratios of loans to total assets (Dermiguc-Kunt and Huizinga, 1999: 35; Athanagolou et al., 2006: 9), loans to customer and short term funding ratios (Pasiouras and Kosmidou, 2007: 227; Kosmidou, 2008: 150; Naceur and Kandil, 2009: 77). However, it is argued that depending on such ratios in measuring liquidity risk could be insufficient (Matz, 2008: 4; Distinguin et al., 2013: 3300).

Other researchers use Basel III liquidity ratios (2010) to proxy for liquidity risk, namely, net stable funding ratio (NSFR) (Giannotti et al., 2010: 102; Distinguin et al., 2013: 3317; Cucinelli, 2013: 54) and liquidity coverage ratio (LCR) (Baldan et al., 2012: 34; Haan and End, 2013: 3932; Cucinelli, 2013: 54). While NSFR is the ratio of the available amount of stable funding to the required amount of stable funding, the liquidity coverage ratio refers to the value of the stock of high-quality liquid assets that should at least equate to the total net cash outflows for a month (BCBS, 2010). In other words, “the LCR standard aims to ensure that a bank maintains an adequate level of unencumbered, high-quality liquid assets that can be converted into cash to meet its liquidity needs for a 30 calendar day time horizon, in a significantly severe liquidity stress scenario specified by the supervisors” (Baldan et al., 2012: 34). These ratios could accurately indicate a bank liquidity position. However, due to lack of access to the required frequent (daily/monthly) data of LCR and unavailability of a detailed breakdown of required items of NFSR in standard databases in the case of the GCC banks, this research disregards these ratios as proxy for liquidity risk.

Since banks hold large amount of funds as short-term liabilities in the form of deposits to finance long-term assets, banks are exposed to liquidity risk. Banks may experience liquidity risk on the liability side when inconvenient withdrawals occur that can cause solvency risk. On the asset side, banks are exposed to liquidity risk due to excessive practices of off-balance-sheet activities. Usually deposits are kept on average for long

periods to some extent (Saunders and Cornett, 2006: 477). Accordingly, the bank managers do concern themselves about the average positions of banks deposits, which form the core basis of funds that finance the average amount of banks' lending activities. Therefore, following Saunders and Cornett (2006: 477-78), this research measures liquidity risk exposure based on the 'financing gap' method, which according to Saunders and Cornett (2006: 478) is defined as the difference between average bank loans and average bank core deposits. According to Saunders and Cornett (2004: 376), the core deposits include demand deposits, money market deposit accounts, negotiable order of withdrawal or NOW accounts, money market deposits accounts, other saving accounts and retail certificates of deposits (CDs). In addition, to have a meaningful analysis, the financing gap is standardised by the average total assets. Accordingly, the research develops the following financing gap ratio, formula expressed in equation (5.4):

$$FGR = \frac{AL-ACD}{ATA} \quad \text{Eq. (5.4)}$$

where:

*FGR* refers to financing gap ratio;

*AL* refers to average loans;

*ACD* refers to average core deposits;

*ATA* refers to average total assets.

Accordingly, the higher value of financing gap ratio indicates the greater degrees of liquidity risk that the bank is exposed to (Saunders and Cornett, 2006: 477).

#### **5.3.4.2. Measuring independent variables**

This section presents the definitions, descriptions and measurement of independent variables.

##### *5.3.4.2.1. Bank Type: Islamic banks (IB), conventional banks (CB), and hybrid banks (HB)*

Bank type as an independent variable is used in both of the empirical models (Chapter 6

and Chapter 7). Since the main focus of this research is to examine the liquidity creation and liquidity risk exposures of Islamic banks compared to conventional and hybrid banks (conventional banks with Islamic windows), it is important to control for bank types as the key independent variables in the first and second econometric models. The most effective way to represent the bank type in both econometric models is through the dummy variable approach. When the independent variables have a qualitative nature such as group categories (in this research it is banking industry type, i.e. Islamic, conventional and hybrid banks), the dummy variable can be used to represent the effects of these explanatory variables in the regressions analysis (Maddala, 1992: 306). Accordingly, the effect of Islamic banks type on liquidity creation and liquidity risk is captured by a dummy variable that equals to 1 if the bank is a fully-fledged Islamic bank and 0 otherwise. The same method is applied to conventional and hybrid banks. This research, therefore, uses three dummy variables, IB, CB and HB to represent Islamic, conventional and hybrid banks respectively. The coefficient of the each dummy variable measures the differences between intercept terms. For three dummies the equation (5.5) is developed:

$$\begin{cases} \alpha_1 + \beta\chi + \mu & \text{for group 1} \\ \alpha_2 + \beta\chi + \mu & \text{for group 2} \\ \alpha_3 + \beta\chi + \mu & \text{for group 3} \end{cases} \quad \text{Eq. (5.5)}$$

where, in this research, group1, 2 and 3 represent Islamic banks (IB), conventional banks (CB) and hybrid banks (HB) respectively.

These can be written as (Maddala, 1992: 307):

$$y = \alpha + (\alpha_2 - \alpha_1)D_1 + (\alpha_3 - \alpha_1) D_2 + \beta x + \mu \quad \text{Eq. (5.6)}$$

where:

$$D_1 \begin{cases} 1 & \text{for CB} \\ 0 & \text{for IB and HB} \end{cases}$$

$$D_2 \begin{cases} 1 & \text{for HB} \\ 0 & \text{for IB and CB} \end{cases}$$

By substituting the values of  $D_1$  and  $D_2$  in (1), the values of  $\alpha_1$ ,  $\alpha_2$  and  $\alpha_3$  are obtained. Since there is a constant term in the regression equation, the number of defined dummies should be lessened by one and, hence only two dummies are included in the regressions equations (5.1 and 5.2). The excluded dummy is taken as the base banking type industry. In this case, the constant term is taken as the intercept for the base

banking type industry and coefficient of other two dummies measure differences in intercepts as can be understood from equation (5.6).

In this research, the constant term measures the intercept for Islamic banks, the coefficient of  $D_1$  measures the intercept for conventional banks and the coefficient of  $D_2$  measures the intercept for hybrid banks. The Islamic banks dummy is excluded and taken as a base industry in the regressions equations (5.1 and 5.2) for three reasons. First, the inclusion of all three dummies leads to multicollinearity which will either prevent the econometric package to run the regression or will omit one of the dummy variables mechanically (Maddala, 1992: 308). The second reason is to keep control of choosing the base dummy to the researcher rather than to the econometric package that would randomly omit one of the dummy variables. The third reason, excluding the Islamic bank dummy and taking it as the base for other two dummies, conventional and hybrid banks, is in line with the aim of this study in examining the liquidity creation and liquidity risk of Islamic banks compared to conventional and hybrid banks.

#### *5.3.4.2.2. Banking regulatory and supervisory standards*

Following Barth et al. (2004), Fernandez and Gonzalez (2005), Pasiouras, et al. (2006: 413-414), Agoraki et al. (2011: 42), and Klomp and Hann (2012: 3200), the banking regulatory and supervisory standards are measured through constructing indices based on a survey conducted by the World Bank. In all indices, each variable is represented by a question that is answered by the highest financial authorities of the selected countries in the GCC region (Bahrain Monetary Agency, Central Bank of Kuwait (CBK), Qatar Central Bank, Minister of Finance on the recommendation of the Saudi Arabia Monetary Agency (SAMA) and after receiving approval from the Council of Ministers and Central Bank of the UAE). It is important to note that, in order to have more meaningful results, all indices are converted into ratios by scaling the total score of each index by the number of the variables. These variables are taken into consideration due to their important impact on banks risk-taking activities, hence, to measure such impact on liquidity behaviour and position in the case of GCC banks.

##### *5.3.4.2.2.1. Official Supervisory Power (OSP)*

The Official Supervisory Power is used in the first empirical and model in Chapter 6, which is calculated an index as depicted in 5.5. It measures the power of supervisory

authorities in making decision against the banks' management. Following Barth et al. (2004: 213), Fernandez and Gonzalez (2005: 475), Pasiouras et al. (2006: 425), Agoraki et al. (2011) and Klomp and Hann (2012: 3201), the OSP index is measured based on a survey conducted by the World Bank. The index consists of 14 variables and the total score of the index is scaled by the total number of variables. The variables definitions and the index calculation methods are explained in table 5.5.

**Table 5.5: Official Supervisory Power Index (OSP)**

Variable	Definition	Quantification	World Bank Guide Questions
Official supervisory power	Whether the supervisory authorities have the authority to take specific actions to prevent and correct problems.	WBG 5.5 + 5.6 + 5.7 + 6.1 + 10.4 + 11.2 + 11.3.1 + 11.3.2 + 11.3.3 + 11.6 + 11.7 + 11.9.1 + 11.9.2 + 11.9.3	5.5 Does the supervisory agency have the right to meet with external auditors to discuss their report without the approval of the bank? Yes/No 5.6 Are auditors required by law to communicate directly to the supervisory agency any presumed involvement of bank directors or senior managers in illicit activities, fraud, or insider abuse? Yes/No 5.7 Can supervisors take legal action against external auditors for negligence? Yes/No 6.1 Can the supervisory authority force a bank to change its internal organisational structure? Yes/No 10.4 Are off-balance-sheet items disclosed to supervisors? Yes/No 11.2 Can the supervisory agency order the bank's directors or management to constitute provisions to cover actual or potential losses? Yes/No 11.3 Can the supervisory agency suspend the directors' decision to distribute: 11.3.1 Dividends? Yes/No 11.3.2 Bonuses? Yes/No 11.3.3 Management fees? Yes/No 11.6 Can the supervisory agency legally declare — such that this declaration supersedes the rights of bank shareholders — that a bank is insolvent? Yes/No 11.7 Does the Banking Law give authority to the supervisory agency to intervene — that is, suspend some or all ownership rights — of a problem bank? Yes/No 11.9 Regarding bank restructuring and reorganisation, can the supervisory agency or any other government agency do the following: ? Yes/No 11.9.1 Supersede shareholder rights? Yes/No 11.9.2 Remove and replace management? Yes/No 11.9.3 Remove and replace directors? Yes/No
		Yes = 1; No = 0	
OSP index	= The sum of variable/14		Higher values indicating greater power.

*Source:* Barth et al. (2004) (with author's modification).

#### 5.3.4.2.2.2. Banking Market Entry Standards (MES)

The entry regulations variable is used in the first empirical model, namely in Chapter 6, and measured as an index and constructed based on 12 variables. Banking market entry regulations evaluate the degree of competition in the banking industry of the selected countries in the question. Banking entry regulations refers to whether any restrictions are applied to the ownership structure of domestic banks by foreign banks and whether any restrictions are imposed on foreign banks to enter the domestic banking market. Moreover, such regulations measure the legal requirements for conquering a licence to operate as a bank. It also evaluates the percentage of denied applications of foreign and domestic banks to enter the market (Barth et al., 2004: 215). Following Barth et al.

(2004: 213), Pasiouras et al. (2006: 425), Agoraki et al. (2011) and Klomp and Hann (2012: 3201), the entry regulations index is measured based on a survey conducted by the World Bank. The definitions of variables and the index calculation methods are explained in table 5.6.

**Table 5.6: Market Entry Standards Index (MES)**

Variable	Definition	Source and Quantification	World Bank Guide Questions
a. Entry into banking requirements	Whether various types of legal submissions are required to obtain a banking licence.	World Band Guide $ENTR = (1.8.1 + 1.8.2 + 1.8.3 + 1.8.4 + 1.8.5 + 1.8.6 + 1.8.7 + 1.8.8)/8$ Yes = 1; No = 0	1.8 Which of the following are legally required to be submitted before issuance of the banking licence? 1.8.1 Draft by-laws? Yes/No 1.8.2 Intended organisation chart? Yes/No 1.8.3 Financial projections for first three years? Yes/No 1.8.4 Financial information on main potential shareholders? Yes/No 1.8.5 Background/experience of future directors? Yes/No 1.8.6 Background/experience of future managers? Yes/No 1.8.7 Sources of funds to be disbursed in the capitalisation of new banks? Yes/No 1.8.8 Market differentiation intended for the new bank? Yes/No
b. Fraction of entry applications denied	The degree to which applications to enter banking are denied.	World Band Guide $(1.9.1+1.10.1)/(1.9+1.10)$ (Pure number)	1.9 In the past five years, how many applications for commercial banking licences have been received from domestic entities? 1.9.1 How many of those applications have been denied? 1.10 In the past five years, how many applications for commercial banking licences have been received from foreign entities? 1.10.1 How many of those applications have been denied?
MES index	= Sum of (a) + (b)/2		Higher values indicate greater stringency.

*Source:* Barth et al. (2004) (with author's modification).

#### 5.3.4.2.2.3. Bank Activities Restrictions (BAR)

The bank activity regulation variable is used in the empirical model in Chapter 6, and is measured as an index as illustrated in table 5.7. As depicted in table 5.7, the bank activities restrictions index indicates the level of limitations on banks' activities. It evaluates the banks' capacity to engage in securities underwriting, brokering, dealing, and all sorts of the mutual fund activity. It also assesses the banks' involvement in insurance underwriting and selling as well as bank undertaking real estate investment, development, and management. This variable is constructed as an index that consists of three variables. Each variable may take values between 0 and 4 with higher values indicating higher restrictions. Bank activity restrictions are measured by considering whether securities, insurance, and real estate activities are unrestricted (which takes the value of 1), permitted (which takes the value of 2), restricted (which takes the value of 3) or prohibited (which takes the value of 4). The overall index is measured by the sum of overall value activities scaled by number of activities (Barth et al., 2004). Following Barth et al. (2004: 213), Fernandez and Gonzalez (2005: 475), Pasiouras et al. (2006: 425), Agoraki et al. (2011), and Klomp and Hann (2012: 3201), the bank activities

restriction index is constructed through a survey conducted by the World Bank. The definitions of these variables and the index calculation methods are explained in table 5.7.

**Table 5.7: Bank Activity Restrictions Index (BAR)**

Variable	Definition	Source and Quantification	World Bank Guide Questions
(a) Securities activities	The extent to which banks may engage in underwriting, brokering and dealing in securities, and all aspects of the mutual fund industry.	World Bank Guide 4.1 (higher values, more restrictive) Unrestricted = 1: full range of activities can be conducted directly in the bank; Permitted = 2: full range of activities can be conducted, but some or all must be conducted in subsidiaries; Restricted = 3: less than full range of activities can be conducted in the bank or subsidiaries; and Prohibited = 4: the activity cannot be conducted in either the bank or subsidiaries.	4.1 What is the level of regulatory restrictiveness for bank participation in securities activities (the ability of banks to engage in the business of securities underwriting, brokering, dealing, and all aspects of the mutual fund industry)?
(b) Insurance activities	The extent to which banks may engage in insurance underwriting and selling.	World Bank Guide 4.2 (higher values, more restrictive) Unrestricted = 1: full range of activities can be conducted directly in the bank; Permitted = 2: full range of activities can be conducted, but some or all must be conducted in subsidiaries; Restricted = 3: less than full range of activities can be conducted in the bank or subsidiaries; and Prohibited = 4: the activity cannot be conducted in either the bank or subsidiaries.	4.2 What is the level of regulatory restrictiveness for bank participation in insurance activities (the ability of banks to engage in insurance underwriting and selling)?
(c) Real estate activities	The extent to which banks may engage in real estate investment, development and management.	World Bank Guide 4.2 (higher values, more restrictive) Unrestricted = 1: full range of activities can be conducted directly in the bank; Permitted = 2: full range of activities can be conducted, but some or all must be conducted in subsidiaries; Restricted = 3: less than full range of activities can be conducted in the bank or subsidiaries; and Prohibited = 4: the activity cannot be conducted in either the bank or subsidiaries.	4.3 What is the level of regulatory restrictiveness for bank participation in real estate activities (the ability of banks to engage in real estate investment, development, and management)?
BAR index	$= (a)+(b)+(c)/3$	Higher values, more restrictive	

Source: Barth et al. (2004) (with author's modification)

#### 5.3.4.2.2.4. Capital Requirement Regulations (CAP)

Capital requirements regulations is used in both empirical models in Chapters 6 and 7, and measured based on an index as shown in table 5.8. As depicted in table 5.8, the capital regulation requirements index is developed through nine variables. Following Barth et al. (2004: 213), Fernandez and Gonzalez (2005: 475), Pasiouras et al. (2006: 425), Agoraki et al. (2011) and Klomp and Hann (2012: 3201), the capital regulation requirements index is measured through a survey conducted by the World Bank.

The CAP index reflects the degree of stringency on the capital regulations to assess whether certain risk issues, such as credit risk and liquidity risk, in-line with the Basel guidelines, are considered in gauging the capital requirements. Besides, it measures whether certain market value losses are deducted before fixing the minimum of capital requirements. Moreover, it refers also to the extent by which the sources of funds that are used as capital are required to be proved officially by supervisory and regulatory

bodies (Barth et al., 2004; Klomp and Haan, 2012: 3201). The variables definitions and the index calculation methods of CAP are explained in table 5.8.

**Table 5.8: Capital Requirement Regulations Index (CAP)**

Variable	Definition	Quantification	World Bank Guide Questions
(a) Overall capital stringency	Whether the capital requirement reflects certain risk elements and deducts certain market value losses from capital before minimum capital adequacy is determined.	World Bank Guide Overall capital stringency = 3.1.1 + 3.3 + 3.9.1 + 3.9.2 + 3.9.3 + (1 if 3.6 < 0.75) Yes = 1; No = 0	3.1.1 Is the minimum capital-asset ratio requirement risk weighted in-line with the Basel guidelines? Yes/No 3.3 Does the minimum ratio vary as a function of market risk? Yes/No 3.9.1 Are market value of loan losses not realised in accounting books deducted? Yes/No 3.9.2 Are unrealised losses in securities portfolios deducted? Yes/No 3.9.3 Are unrealised foreign exchange losses deducted? Yes/No 3.6 What fraction of revaluation gains is allowed as part of capital?
(b) Initial capital stringency	Whether certain funds may be used to initially capitalise a bank and whether they are officially verified.	Initial capital stringency = 1.5 + 1.6 + 1.7 1.5: Yes = 1, No = 0 1.6 and 1.7: Yes = 0, No = 1.	1.5 Are the sources of funds to be used as capital verified by the regulatory/supervisory authorities? Yes/No 1.6 Can the initial disbursement or subsequent injections of capital be done with assets other than cash or government securities? Yes/No 1.7 Can initial disbursement of capital be done with borrowed funds? Yes/No
CAP index		= (a)+(b)/2	Higher values indicate greater stringency.

*Source:* Barth et al. (2004) (with author's modification).

### 5.3.4.3. Measuring bank specific variables

This section aims to detail the measurements of bank specific variables that used as independent variables in this study.

#### 5.3.4.3.1. Credit risk (CR):

Credit risk is used in the first and second empirical model analysed in Chapters 6 and 7, respectively, which is measured by ratio of loan loss provision to gross loans (Klomp and Haan, 2012: 3198; Bouvatier and Lepetit, 2008: 521; Athanasoglou, 2008; Dietrich and Wanzenried, 2011: 311). The ratio is formulated in equation 5.7:

$$LLP = \frac{\text{loan loss provision}}{\text{gross loans}} \quad \text{Eq. (5.7)}$$

Dinger and Hagen (2009: 499) state that the ratio of loan loss provision to gross loans is widely used as a measurement of the riskiness of banks' business activities. According to Berger and Bouwman (2009a), it is important to carefully control for bank risk as the main reason for banks to hold capital is to absorb risk. "The inclusion of risk measure helps to isolate the role of capital in supporting the liquidity creation function of banks from the role of capital in supporting banks' function as risk transformers" (Berger and

Bouwman, 2009a: 3812). In addition, since high levels of loan loss provisions reflect the deterioration of credit quality, it is important to examine its interaction with liquidity risk.

#### 5.3.4.3.2. Long-term debt (LTD)

Long-term debt variable is used in the second empirical model, namely in Chapter 7, which is calculated as long-term debt scaled by total assets (Waddock and Graves, 1997; Kapopoulos and Lazaretou, 2007 and Barnett and Salomon, 2012). The ratio is shown in equation 5.8:

$$LTD = \frac{\text{long-term debt}}{\text{total assets}} \quad \text{Eq. (5.8)}$$

Long-term debt funding is the sum of senior debt maturing after one year as well as preference shares and hybrid capital accounted for as debt (as defined by Bankscope). This indicator is used, as long-term debt is considered one of the critical components of the banks' capital structure (Gill et al., 2011: 4; and Bhagat et al., 2011: 1582). It should be noted that the higher level of debt is positively associated with credit risk (Berríos, 2013: 107), as debt levels imply lower equity ratio (Berríos, 2013: 107). The high levels of external debt imply inability of the need to raise the required internal funds and hence, it is important to proxy for such a variable to test its impact on liquidity risk exposures.

#### 5.3.4.3.3. Liquid assets (LA)

Liquid assets ratio is used in the empirical model in Chapter 7, and is measured as the ratio of liquid assets to total assets (Iannotta et al., 2007: 2132; Bourke, 1989: 72; Demirguc-Kunt et al., 2004: 603 and Klomp and Haan, 2012: 3198). The ratio is calculated in equation 5.9:

$$LA = \frac{\text{liquid assets}}{\text{total assets}} \quad \text{Eq. (5.9)}$$

This ratio is used to control for differences in bank liquid assets (Demirguc-Kunt et al., 2004: 603) as liquid assets are considered to be as 'net defensive position' against liquidity risks (Davis, 2088: 114). It enhances banks' capability to fund any liquidity scarcity by holding an adequate ratio of liquid assets (Gatev and Strahan, 2006: 867). Due to the interrelationship of liquid assets with the banks' behaviour towards liquidity

position, it is taken into consideration to examine its impact on liquidity risk.

#### 5.3.4.3.4. Bank size (*SIZE*)

This variable is used both in the first and second empirical models, namely in Chapters 6 and 7 to estimate the impact of total assets on banks liquidity behaviour and position. Following Claessens et al. (2002) and Gorton and Schmid (2000), this study measures the bank size by the logarithm of total assets.

The size is calculated in equation 5.10:

$$y = \text{Log}_b(x) \quad \text{Eq. (5.10)}$$

where:  $y$  refers to size,  $b$  is the base that equals 10 and  $x$  is total assets.

According to Brooks (2008: 608), logarithm (log) transformation is utilised for three reasons: (i) to standardise the data in order to make the variance more constant; (ii) to “make a positively skewed distribution closer to a normal distribution” (Brooks, 2008: 608); and lastly (iii) “to make a non-linear, multiplicative association between variables into a linear, additive one” (Brooks, 2008: 608).

#### 5.3.4.4. Measuring economic growth (GDP)

GDP is used in both first and second empirical models (Chapter 6 and 7) to measure the impact of economic growth on the liquidity creation and liquidity risk of the GCC banking sector. Following Bernanke and Gertler (1989), Distinguin et al. (2013: 3303), Kiyotaki and Moore (1997) and Naceur and Omran (2011: 6), this research measures economic growth by the percentage change in the GDP at constant prices. Since real GDP is adjusted for inflation, controlling for real GDP is meaningful and relevant to liquidity creation and liquidity risk, as it indicates the changes in physical production that gives a clearer sign of the strength of the economy than nominal GDP. Moreover, real GDP provides brighter indicators for business cycles than nominal GDP. In addition, nominal GDP involves both quantity and changes in price, which may lead to disregard the changes in physical production in the economy. Hence, real GDP offers a better gauge of the economic growth and performance inclusively.

### **5.3.5. Econometric Procedures for Data Analysis**

This section explains all econometric methods and techniques that have been used in this research, mainly in first and second empirical models in Chapters 6 and 7, to assess the determinants of liquidity creation and liquidity risk exposures of Islamic banks compared to conventional and hybrid banks in the GCC region.

#### **5.3.5.1. The econometrics package**

This research utilises the Stata econometric package to estimate the association between examined variables. The Stata econometrics package is chosen as it is considered as one of the very powerful software packages that allow sophisticated data management (Wooldridge, 2013: 681), especially when the when a large database is analysed (Baltagi, 2005: 28).

#### **5.3.5.2. The statistical examination of the data validation**

In order to examine the validity of the data used, before conducting the panel data with multiple regressions, some essential statistical tests are conducted, such as skewness and kurtosis and the Pearson correlation matrix test to assess the multicollinearity between assessed variables. The results for these statistical examinations are presented in the relevant empirical chapters (6 and 7).

To examine the magnitude of the data diverging from normality, skewness and kurtosis standards are applied (Brooks, 2008), as skewness gauges the degree of departure of data distribution from its mean value (Brooks, 2008: 170 and Gujarati, 2004: 148). The data is normally distributed when the skewness results are between  $\pm 1.96$  (Haniffa and Hudaib, 2006). As for kurtosis, according to Brooks (2008: 161), it “measures how fat the tails of the distribution are”. Data distribution is not skewed when the coefficient of kurtosis ranges between  $\pm 3$  (Brooks, 2008: 161; Gujarati, 2004).

Given that some of the examined variables are not normally distributed as a result of the outliers, this study normalises the data distribution by winsorising (Dhaliwal *et al.*, 2012: 732 and Artiach *et al.*, 2010: 40). According to Artiach *et al.* (2010: 41) “winsorising is the process of transforming or replacing extreme values in the data to reduce the impact of outliers”.

Multicollinearity refers to the degree of possibility that a variable can be explained by other variables in the analysis, which as a problem appears in statistical analysis when two or more variables are strongly interrelated (Hair et al., 2010: 244). If the examined variables suffer from multicollinearity, it will baffle the econometric model to assess the effect of each variable individually that will mislead the explanation of the measuring the association between the dependent and independent variables (Hair et al., 2010: 244).

To check with the multicollinearity issues, this study uses the Pearson correlation matrix, which is used for parametric data. Despite that the actual magnitude of multicollinearity is not well outlined (Wooldridge, 2013: 98), according to Brooks (2008: 172), the independent variables are highly correlated when the correlation is equivalent to or exceeding 0.8. Haniffa and Cooke (2005) state that the correlation between variables is tolerant unless it exceeds 0.8.

### **5.3.5.3. Regression analysis methods**

This section details the method of regressions analysis used in this study. The results of each of the respective methods are presented in the respective chapters, namely Chapters 6 and 7.

#### *5.3.5.3.1. Panel data regressions analysis*

In analysing data to examine the relationship between dependent and independent variables, the panel data regressions method is used, which is an econometrics approach that controls for both time series and cross-sectional elements affecting the examined objects. The panel data studies the same entities and examines them empirically over time (Brooks, 2008: 487). Moreover, panel data can be categorised into balanced or unbalanced panel data. While in a balanced panel, all individuals or firms have all the observations for all cross-sectional entities during the whole sample period; in unbalanced panel data, some individuals or firms have some observations missing for some cross-sectional entities over the sample period (Wooldridge, 2013: 491 and Baltagi, 2005: 165). Since, the data of the GCC banks are not available for some observations, this research follows unbalanced panel data approach.

One of the simple econometric methods to analyse panel data is to estimate through pooled regressions “which would involve estimating a single equation on all the data

together” (Brooks, 2008: 487). However, using pooled regressions may lead to serious limitations. One of the biggest disadvantages is that under pooled regressions assumption all “the average values of the variables and the relationships between them are constant over time and across all of the cross-sectional units in the sample” (Brooks, 2008: 488), which is not always the case, especially when unobserved variables exist. Therefore, in order to control for the correlation between unobserved variables and the explanatory variables that affect the explained variable, two econometric models are commonly used namely, fixed effects and random effects.

#### *5.3.5.3.2. Fixed effects estimator model*

Since the fixed effects estimator allows for arbitrary correlation between unobserved variables and the explanatory variables in any given time, the main purpose of using fixed effects model is to capture the correlation between unobserved variables that do not change over time, and independent variables that affect the dependent variable (Brooks, 2008: 491 and Wooldridge, 2013: 460). Hence, if there is a doubt that explanatory variables are affected by any omitted variable, fixed effects model must be applied in running the regressions (Wooldridge, 2013: 460).

#### *5.3.5.3.3. Random effects estimator model*

Under random effects assumption all unobserved variables are uncorrelated with explanatory variables whether they are constant over time or not (Wooldridge, 2013: 494). Usually, random effects model is considered to be an appropriate specification when the research examines randomly chosen individuals from a large population, such as the case for household panel studies (Brooks, 2008: 14). Accordingly, the random effects model assumes the estimator is “consistent (not unbiased) and asymptotically normally distributed” (Wooldridge, 2013: 494). However, “the properties of the random effects (RE) estimator with small  $N$  [number of observations] and large  $T$  [large period of time] are largely unknown, although it has certainly been used in such situations” (Wooldridge, 2013: 494).

#### *5.3.5.3.4. Choosing between fixed effects and random effects*

Given that the examined sample is characterised as unbalanced panel data, where data are not available for all banks for the same years (which is called attrition), the fixed

effects model appears to be the most suitable as it prevents the correlation between attrition and undetected variables (Wooldridge, 2013: 492-493). Another pattern of the fixed effects model is that the dummy variable can be used in the regressions as an explanatory variable to obtain its impact on the examined subject (Brooks, 2008: 491; Wooldridge, 2013: 487). In addition, when the sample covers a large period of time and the number of the observations is not very large, the fixed effect must be utilised (Wooldridge, 2013: 490). Moreover, the fixed effects with robust standard errors model “is potentially more sensitive to nonnormality, heteroskedasticity, and serial correlation in the idiosyncratic errors” (Wooldridge, 2013: 490), which is the case of the examined sample. Accordingly, the sample characteristics match with the fixed effects econometric specifications implying the fixed effects model is the best fitted model to run the panel data regressions with in this study.

Moreover, this study further conducts Hausman test to statistically confirm whether the fixed effects or random effects model is the most appropriate model that needs to be adopted (Baltagi, 2005: 19). The econometric specification of the Hausman test is constructed on the difference between fixed and random estimators. The rejection of the null hypothesis indicates that the random individual effects are associated with the regressors. This suggests that using random effects is inconsistent and the fixed effects model must be applied (Baltagi, 2005: 202). Hence, based on the sample characteristics and Hausman test results in both empirical models (Chapters 6 and 7) where the null hypothesis is rejected implying the difference in coefficient is systematic suggests that the fixed effects is the most suitable for the developed econometric models in Chapters 6 and 7.

#### **5.3.5.4. Sensitivity test for assessing empirical results**

In order to check the robustness of the obtained empirical results of the panel data regressions with fixed effects model, this study conducts additional sensitivity tests to detect the existence of any statistical issues that may cause inconsistency in the acquired empirical results. To do so, this study conducts additional individual regressions to estimate the effect of bank type variables and other explanatory variables on liquidity creation and liquidity risk exposures separately in order to isolate the effect of each one on the other.

In addition, it is known that one of the major problems that may occur in panel data regressions as a result of omitted variables is the difficulty in estimating their association with the explanatory variables that affect the explained variable. Such an issue can lead to serious endogeneity of the explanatory variables on the right-hand side of the model (Wooldridge, 2013: 494; Baltagi et al., 2003: 113 and Baltagi et al., 2003: 113). Endogeneity refers to the existence of correlation (reverse causality) between the right-hand side of regressors and regressands that might result from “the omission of relevant variables, measurement error, sample selectivity, self-selection or other reasons” (Baltagi et al., 2003: 113).

It should be noted that the endogeneity leads to inconsistency in the results obtained through OLS and, hence, it requires more sophisticated econometric methods such as instrumental variable methods (Wooldridge, 2013: 494) that can be conducted by using two-stage least squares (2SLS) in order to acquire coherent results (Baltagi et al., 2003: 113). 2SLS is very popularly used to deal with the endogeneity problem (Wooldridge, 2013: 494). 2SLS mechanically is conducted in two stages: in the first stage it obtains and estimates the reduced form equations using OLS. Then, it saves the fitted values for the dependent variables. In the second stage it estimates the structural equations using OLS, but replaces any right-hand side endogenous explanatory variables with their first stage fitted values (Brooks, 2008: 277). However, most econometrics software packages, such as Stata, have particular commands to run the 2SLS technique and, hence, it is advised that there is no need to conduct the two stages explicitly (Wooldridge, 2013: 494). Moreover, to statistically examine the threat of endogeneity, after running regression analysis with 2SLS technique, the standard Hausman-Durbin-Wu test of endogeneity is conducted (Essen et al., 2013: 219). Accepting the null hypothesis of the Durbin-Wu test indicates no threat of the endogeneity problem in the applied model (Gujarati, 2004).

In addition, to support the results of the fixed effects model, this research runs further regressions analysis using random effects model to control further for the correlation between the unobserved variable that changes over time and the explanatory variable that affects the explained variable (Wooldridge, 2013: 494 and Baltagi, 2005: 12).

#### **5.4. LIMITATIONS AND DIFFICULTIES**

Since this research attempts to explore issues related to liquidity in Islamic banks in

comparison with conventional and hybrid banks, that is considered one of the fresh topics in the field of banking sector, various methodological challenges and limitations occurred during defining and designing the research framework. One of the key challenges that was faced is data collection, as a very limited access is available to obtain the data from the GCC banks. More specifically, since this research deals with a very critical topic in the banking sector, a very detailed nature of the empirical data is required to obtain an adequate and reliable interpretation of the data analysis. Hence, the major limitation is the inaccessibility of the frequent and detailed data from the GCC banks to measure the examined variables, which limits the generalisation of the research findings. In addition, due to the limited research that dealt with issues related to liquidity in conventional banks in general and in Islamic banks in particular and more specifically in the case of the GCC region, the critical challenges that the researcher faced in conducting this study were the difficulties in constricting and developing the measurements to examine the liquidity creation and liquidity risk exposures of Islamic banks compared to conventional and hybrid banks in the case of the GCC region.

**CHAPTER SIX**  
**EXPLORING LIQUIDITY CREATION IN THE GCC BANKING SECTOR: A**  
**COMPARATIVE EMPIRICAL ANALYSIS BETWEEN ISLAMIC,**  
**CONVENTIONAL AND HYBRID BANKS**

**CHAPTER SIX**  
**EXPLORING LIQUIDITY CREATION IN THE GCC BANKING SECTOR:**  
**A COMPARATIVE EMPIRICAL ANALYSIS BETWEEN ISLAMIC,**  
**CONVENTIONAL AND HYBRID BANKS**

**6.1. INTRODUCTION**

While Chapters 2 and 3 established the theoretical framework for this research, Chapter 4 presented a background on the sampled GCC countries and Chapter 5 provided the research process framework. Thus, based on such an informed understanding, this empirical chapter attempts to measure the actual amount of liquidity that the banking sector creates in the case of 58 GCC commercial banks over the period of 1992-2011 to examine the extent to which Islamic banks can create liquidity to finance economic and financial activities that promote and enhance the development of the economic conditions, compared to conventional and hybrid banks in the case of the GCC region.

In doing so, this chapter also aims to assess the determinants of liquidity creation through a dynamic panel data regressions model, which helps to locate the potential factors that may affect the GCC banks' liquidity creation function. In such an attempt, this chapter places emphasis on banking regulations such as the power of official supervisory authority in terms of taking specific actions against banks' management, the impact of restrictions on banks' activities in respect to security, insurance and real estate activities, the impact of stringent banking market entry standards and the capital requirement regulations. Moreover, some bank specific variables are also taken into consideration, which include credit risk and bank's size. In addition, GDP growth is included to examine the impact of macroeconomic variables on liquidity creation of the sampled GCC banks.

In conducting the empirical analysis, this chapter uses the Stata econometric package. To assess the robustness of the data, as an econometric method, few essential statistical approaches and tests, such as winsorising method to normalise the data, the skewness and kurtosis standards for investigating the data distribution, Pearson correlation matrix test to assess the multicollinearity between examined variables. Furthermore, Hausman

test is employed to check the fittingness of using panel data regressions with either fixed or random effects. It should be noted that the empirical model opted for in this chapter measures the determinants of the liquidity creation of the examined GCC banks by utilising panel data regressions with fixed effects model with robust standard error. In addition, for sensitivity test, the research uses additional four regressions models to isolate the effects of all independent variables on each other based on their econometric specification on their relationship with liquidity creation as the dependent variable. Also, panel data regressions with random effects model with robust standard error is conducted in an attempt to confirm the fixed effects results. Moreover, Hausman - Durbin-Wu for endogeneity test is applied after conducting two stage least square (2SLS) test to examine the existence of endogeneity problem if any. Accordingly, the obtained statistical results of this chapter are consistent with the developed hypotheses.

As for the structure of the chapter, it begins with establishing the hypotheses of expected association between liquidity creation and its key determinants. This is followed by the descriptive statistics of the examined data. Before running the regression analysis, this chapter conducts some statistical tests to check the nature and validity of the assessed data and examined variables. Then, the developed hypotheses are tested through panel data regressions with fixed effects model. After that, this empirical chapter conducts further sensitivity tests to examine the robustness of the obtained results.

## **6.2. HYPOTHESES DEVELOPMENT**

In order to have a better understanding of the nature of the association between liquidity creation and its determinants, it is important to develop hypotheses based on the theoretical discussion of the relevant literature presented in Chapter 2 and Chapter 3, which will be tested empirically in this chapter. The following sections provide the developed hypotheses:

### **6.2.1. Bank Type: Islamic Banks (IB), Conventional Banks (CB) and Hybrid Banks (HB)**

Understanding the nature of financial principles, operation and products of Islamic banks is a key factor in hypothesising the expected behaviour of Islamic banks towards liquidity creation in comparison with conventional and hybrid banks.

Based on the theory, through liquidity creation, banks play a dynamic intermediation role in economic activities. Hence, it is crucial to explain briefly (as all *Shari'ah*-related issues have been detailed in Chapter 2) the main characteristics of Islamic finance in relation to liquidity creation.

The basic understanding of Islamic banking implies conducting banking operations according to the *Shari'ah* (Islamic law) (El Gamal, 2006; Ayub, 2007; Ben Arab and Elmelki, 2008: 82). As a result, Islamic banks have many unique features that are associated with the liquidity creation function, which cannot be found in the conventional banking system. In this context, the main features can be described very briefly as follows:

(i) The *riba* (interest) must not be charged or paid on any financial transactions (El Gamal, 2006; Ayub, 2007; Obaidullah, 2005). Since money is considered as an intermediary between goods, charging interest on loans is believed unjust from an Islamic law perspective. Many reasons have been illustrated as to why *riba* has been prohibited, however, possibly the most significant reason, in relation to liquidity creation, is that money should not generate profit unless it is joined with human efforts or unless a risk is involved (Ben Arab and Elmelki, 2008: 81).

(ii) Based on Islamic financial principles, any kind of sale contract or business that involves *gharar* is not permitted. Many financial instruments that have been widely used by conventional banks are not permitted for Islamic banks due to *gharar* elements, for example options and other derivatives (El-Gamal, 2006: 61-62; Khan, 2010: 807). Such a limitation for using these kinds of financial instruments forces Islamic banks to trade in asset-based/backed/related instruments that, in turn, boosts their liquidity creation, as all asset-attached transactions tend to have a longer term or involve real economic activities. Consequently, it increases Islamic banks' involvement in creating higher levels of real economic activities which implies a positive impact on economic growth.

(iii) Each financial transaction must refer to a tangible and identifiable underlying asset (Cox and Thomas, 2005: 171). Such a distinctive feature directly leads Islamic banks to transform savings into illiquid tangible assets. Accordingly, Islamic banks' financial activities by definition should be embedded in the real economy and hence, create a

higher level of liquidity than conventional banks whereby economic expansion can be facilitated;

(iv) A profit and loss sharing concept is one of the key pillars of Islamic banking, which means that all the parties in a financial transaction must share the risks and rewards that are attached to it (El Gamal, 2006; Ben Arab and Elmelki, 2008: 80). Such a concept is realised in all equity-based modes of financing that orientate the banks to deal with higher levels of illiquid assets, which consequently promotes the liquidity creation function;

(v) Money in Islamic financial law is initiated not to be desired in itself but as a tool for measuring the value of other commodities. Money increases when it is invested in tangible economic activities (El Gamal, 2006; Ben Arab and Elmelki, 2008: 82) suggesting that revenue can be generated by channelling liquid funds into illiquid assets that boosts the liquidity creation.

Such principles imply that the financing by Islamic banks is embedded in real economic activities rather than leading financialisation. This reflects that Islamic banks are expected to create higher level of liquidity compared to conventional and hybrid banks in order to sustain real economy-based growth. In addition, due to their mixed nature, hybrid banks are expected to be in a middle position between Islamic and conventional banks in creating liquidity. This can be interpreted as a consequence of conducting part of their business operations according to Islamic banking principles. Based on these foundational principles, the following hypotheses are developed:

*Hypothesis 1:* Due to their unique nature, Islamic banks create higher level of liquidity than the conventional and hybrid banks.

*Hypothesis 2:* Due to their mixed nature, hybrid banks offering Islamic windows create higher levels of liquidity than conventional banks, however, at a lower level than Islamic banks.

### **6.2.2. Official Supervisory Power (OSP)**

Barth et al. (2004) state that the official supervisory power may enhance monitoring banks and decrease their risk-taking behaviour. It has been argued that a strong

supervisory power leads to a reduction in excessive risk-taking behaviour by bank managers (Barth et al., 2004: 213; Fernandez and Gonzalez, 2005: 475; Pasiouras et al., 2006: 425; Agoraki et al., 2011; Klomp and Hann, 2012: 3201). Accordingly it can be understood that such power may reduce the bank's ability to invest in risky illiquid long-term projects by using their liquid liabilities. This in turn may decrease generating new loans (or expanding financing activities) as well as lower extending of the maturities of the existing loans (or financing). Based on these arguments, the following hypothesis is developed:

*Hypothesis 3:* The more powerful the supervisory authorities, the lower risk-taking activities that bank may undertake, hence, the less liquidity amount that banks create.

### **6.2.3. Bank Activity Restrictions (BAR)**

According to John et al. (1994) and Barth et al. (2004), the banks diversify their activities through securities underwriting, insurance underwriting, and real estate investment. Barth et al. (2004) state a wider diversity of activities allows banks to increase loan portfolio. Hence, it can be argued that less restriction on banks' activities allows banks to exploit economies of scale and scope (Barth et al., 2004; Claessens and Klingebiel, 2000; Claessens and Laeven, 2004). However, when banks are involved conspicuously in creating non-interest revenue or attracting non-deposit financing it may cause financial instability (Demirgüç-Kunt and Huizinga, 2009; Klomp and Haan, 2012: 3201). Based on this, it is expected to have a negative relationship between higher restriction on the business activities and liquidity creation of banks. Hence, the following hypothesis is constructed:

*Hypothesis 4:* The greater the restrictions on banks' activities, the lower the range of activities and, hence, the lower the level of liquidity that banks create.

### **6.2.4. Capital Requirements Regulation (CAP)**

Since banks, as intermediary institutions, mainly compete in accumulating funds from public and reinvesting them, it is crucial to emphasise on capital regulations in setting up the required standards for generating new loans or offering new deposits. It is expected that applying a high stringency on capital regulation leads to stricter standards for generating new loans or conducting new financing activities, as flexibility in such

standards may deteriorate the loan quality (Bolt and Tieman, 2004). Thakor (1996) adds that stricter capital requirements lead to stricter screening procedures for the borrowers that lower the amount of loans to be granted. Furthermore, Barth et al. (2004) document that having restricted capital regulations would reduce banks' incentives to screen and lend. It should also be noted that on the liabilities side, raising capital requirements forces banks to reduce their deposits to reduce the costs, especially if the price of raising equity capital is more expensive than deposits, which negatively impacts the liquidity creation function of banks (Gorton and Winton, 2000; Barth et al., 2004). Accordingly, a restricted market with high capital requirements may lead to riskier business activities (Barth et al., 2004; Santos, 2001; Gorton and Winton, 2003).

Given that higher stringency in capital requirements leads banks to set stricter acceptance standards for generating new loans (Bolt and Tieman, 2004), more restricted capital regulation means a higher price of equity capital than raising deposits. In turn, this reduces banks' incentives to screen borrowers and grant new loans or extend the existing ones (Thakor, 1996; Gorton and Winton, 2000; Barth et al., 2004). In line with this argument, it is expected that a high level of capital requirement regulations have a negative impact upon liquidity creation of banks. Accordingly, the following hypothesis is developed:

*Hypothesis 5:* The higher stringency on capital regulations is associated with lower amounts of liquidity that banks create.

#### **6.2.5. Banking Market Entry Standards (MES)**

It is significant to examine the impact of market entry standards on liquidity creation, as applying higher level of restrictions on banking entry standards may promote bank competition strategies (Agoraki et al., 2011: 39). This allows existing banks to accumulate power and possess greater franchise value (Agoraki et al., 2011: 39; Klomp and Haan, 2012: 3201; Barth et al., 2004: 210; Keeley, 1990). Martinez and Repullo (2006) and Wagner (2010: 73) argue that an increase in competition in the loan portfolios may weaken bank solvency by reducing banks' margins. Moreover, in a less competitive environment the loans price increases, which in turn leads to a higher level of profits that banks receive on their loan portfolios. On the deposit side, less competition in the banking sector lowers the deposit rates (returns), which reduces the

capital costs and, as a result, increases banks' profits (Boyd and Nicolo, 2005: 1329-1330; Tabak et al., 2012: 3367). Based on such arguments, less market competition boosts banks' incentives to generate more loans and finance a wider range of business activities. Accordingly, it is expected that higher restrictions on market entry standards is associated positively with bank liquidity creation as suggested in hypothesis below.

*Hypothesis 6:* The higher levels of restrictions of entry standards into the banking sector is associated with a greater amount of liquidity that banks create.

#### **6.2.6. Credit Risk (CR)**

According to Berger and Bouwman (2009a), it is important to control for bank risk “to isolate the role of capital in supporting the liquidity creation function of banks from the role of capital in supporting banks' function as risk transformers” (Berger and Bouwman, 2009a: 3812). In banking theory, in the case of credit quality deterioration, banks' loan loss provision may become insufficient to cover anticipated loan losses. Such loan losses, as a measure of credit risk, may erode bank capital that, in turn, disturb the incentive for banks to grant new loans (Seodarmono, 2012: 5). Bouvatier and Lepetit, (2008: 525) document that “sudden identification of problem loans during a downturn constrains banks to make non-discretionary provisions, which reduces their incentive to supply new credits”. Given that the higher level of loan loss provisions indicates deterioration of the credit quality (Bouvatier and Lepetit, 2008: 525; Dietrich and Wanzenried, 2011: 311), the higher credit risk negatively impacts the banks' incentives to expand their lending activities through decreasing funding of illiquid assets by liquid liabilities. Accordingly, the following hypothesis is developed:

*Hypothesis 7:* The higher degrees of credit risk, the lower liquidity amount that banks create.

#### **6.2.7. Bank Size (SIZE)**

It is important to control for the bank size as a key determinant of the amount of liquidity that banks create (Berger and Bouwman, 2009a). According to Berger and Bouwman (2009a), bank size promotes liquidity creation. Berger et al. (2007: 13) state that large banks offer loans to small investors at low prices. As a result, this leads to attract more customers that will increase loan allocations (financing activities). Such an

increase in lending behaviours will directly boom the liquidity creation function of banks (Berger et al., 2007: 13). Yet, such banks may yield a lower rate of returns and this is why large banks are said to be disadvantaged in providing funds to small businesses (Kishan and Opiela, 2000: 126; Carter et al., 2004; Berger et al., 2007). According to Kishan and Opiela (2000: 122), small banks are more restricted to the monetary policies because of their disability to offset deposit drains. Based on this, it can be stated that large banks are imposed to less restriction in respect of financing activities due their easy access to funds through offering liquid deposits. However, the large banks may experience “the ‘lender’s trap’ of being induced to lend more in order to increase the value of its outstanding loans” (Spiegel, 1992: 466).

Moreover, based on the ‘too big to fail’ argument, large banks create more liquidity. The idea of ‘too big to fail’ implicitly refers to the guarantees that government provides to refund bulky uninsured investors of large banks that promote their credibility (Mishkin, 2006: 990). The protection from government may have some advantages such as preventing bank panics and may increase banks’ incentives to invest in riskier illiquid businesses, as fully protected creditors have little inducement to invigilate the banks’ undertakings and lower the possibility of withdrawals. Having such relaxed creditors and investors increases banks’ incentives to involve in high hazardous and long-term investments (Mishkin, 2006; Morrison, 2011), which enhance their ability to create higher amounts of liquidity. It may also motivate banks to relax more in expanding and extending their loans and financing activities that may boost the banks’ ability to create more liquidity. Hence, in line with such substantiation, the following hypothesis is drawn:

*Hypothesis 8:* The larger the bank size, the greater amount of liquidity that banks create.

#### **6.2.8. Economic Growth (GDP)**

The real GDP growth is considered as one of the key macroeconomic determinants to control for business cycle variations (Bernanke and Gertler, 1989; Kiyotaki and Moore, 1997). As experience over the many years demonstrates, during economic recession times loan quality deteriorates, which discourages banks to expand their loans allocations or financing activities (Naceur and Omran, 2011: 6). This implies that during economic booms the demand of loans and financing activities increases. Agoraki

et al., (2011: 46) state that a higher level of GDP growth causes a reduction in credit risk and increases bank solvency. Hence, it boosts the lending behaviour of banks (Micco and Panizza, 2006: 250). In other words, it can be argued that banks' incentives to use their liquid liability to finance illiquid assets increase during economic growth, which leads to higher degrees of liquidity that banks create.

According to Aspachs et al. (2005: 7), during economic deterioration periods the lending activities are not worthy; hence, banks may hoard their liquidity. This implies that banks reduce their loans and financing activities. Hence, it can be stated that banks invest more when the economy is in a growth state, where banks reduce their liquidity cushions to increase their revenue.

Moreover, Pana et al. (2010: 79) show that the demand for various financial products increases rapidly during economic booms, which motivate banks to upsurge their business activities at swifter degrees. Such an upturn in business activities implies rises in banks' holding illiquid assets. Such an environment directly and positively influences the liquidity creation of banks. One of the key elements that boost banks' behaviour towards increasing illiquid assets during economic growth is the easing of the restrictions on bank lending regulations. In addition, economic booms reduce the banks' asymmetric information and agency costs, since the evaluation of new borrowers' solvency becomes easier (Pana et al., 2010: 79). Consequently, such easiness in screening borrowers helps banks to magnify their long-term illiquid assets (loans and financing activities) and this in turn translates into an increase in liquidity creation. Accordingly, the following hypothesis is developed:

*Hypothesis 9:* The higher the GDP growth, the greater amount of liquidity the banks create.

After identifying all the possible and plausible hypotheses in designing the framework of the research, the following sections present the empirical process and the findings.

### **6.3. DESCRIPTIVE DATA ANALYSIS AND INTERPRETATION**

The following section presents the initial descriptive analysis of the sampled data. As mentioned earlier, the sample in this research covers 58 commercial banks in the GCC countries including the Kingdom of Saudi Arabia, United Arab Emirates (UAE), State

of Qatar, Kingdom of Bahrain and State of Kuwait; and the sample consists of 19 Islamic banks (IB), 20 conventional banks (CB) and 19 hybrid banks (HB).

**Table 6.1: The Sample Distribution Based on Bank Type and Country**

Country	IS	IS %	CB	CB %	IW	IW %	Total	Total %
UAE	4	21.053	10	50	4	21.053	18	31.034
Bahrain	7	36.842	3	15	3	15.789	13	22.414
KSA	3	15.789	0	0	8	42.105	11	18.966
Kuwait	3	15.789	6	30	0	0	9	15.517
Qatar	2	10.526	1	5	4	21.053	7	12.069
Total	19	32.759	20	34.483	19	32.759	58	100

*Source of the Bank Type Classification: Banker, (2007-2013) and Al-Hassan et al. (2010)*

In terms of the distribution of the sampled banks to countries, 18 banks are sampled from UAE that represent the largest percentage in the total sample which is equivalent to 31.03 per cent of the total sample. The UAE sample consists of four Islamic banks, ten conventional banks and four hybrid banks. The second largest portion of the examined sample is from the Kingdom of Bahrain with 13 banks that covers 22.41 per cent of the total sample and consists of seven Islamic banks, three conventional banks and three hybrid banks. The Kingdom of Saudi Arabia comes in third place after the UAE and Bahrain with 11 banks consisting of three Islamic banks and eight hybrid banks; and the Saudi Arabian sample claims the 18.96 per cent of the total sample. While, the State of Kuwait occupies the fourth position in the sample with nine banks that is equal to 15.51 per cent of the total sample by including three Islamic bank, six conventional banks and four hybrid banks. Lastly, the selected banks of the State of Qatar covers 12.06 per cent of the total sample in question, which includes two Islamic banks, one conventional bank and four hybrid banks.

With regard to the descriptive statistics of the examined variables, Table 6.2 shows that the liquidity creation (LC) of the GCC banks ranges between -1.81 and 0.8 with a mean value of 0.031. The mean value implies that liquidity creation of the GCC banks equal 3.16 per cent of its total assets with standard deviation of 2.29 reflecting the level of dispersal from the mean. Such a figure is relatively very low compared to the amount of liquidity created by US banks, where Berger and Bouwman (2009a) and Deep and Schaefer (2004) show that liquidity creation of US banks equals 20 per cent of their total assets. Table 6.2 presents the descriptive statistics of the examined variables.

**Table 6.2. Descriptive Statistics**

STATS	LC	IB	CB	HB	OSP	MES	CAP	BAR	CR	SIZE	GDP
MEAN	0.031	0.22	0.46	0.32	0.89	0.82	0.72	0.57	0.02	22784.79	5.68
MAX	0.86	1	1	1	1	0.9	0.89	0.75	1.19	77934.9	50.69
MIN	-1.81	0	0	0	0.71	0.44	0.44	0.25	-0.02	74.9	-5.15
SD	0.29	0.41	0.5	0.47	0.11	0.14	0.15	0.16	0.09	0.62	5.6

*Data Source:* Bankscope database

With regard to the regulation indices, officially supervisory power (OSP) ranges between 0.71 and 1 with a mean value of 0.89, suggesting a strong position that supervisory agencies have over the banking sector by taking specific actions and decisions to correct and avert some problems taking place.

Similarly, the banking market entry standards (MES) score an overall value of 0.818 and range between 0.44 and 0.9, implying a fluctuation of standards of getting lenience for a bank to operate in the GCC banking market.

With respect to the capital requirement regulation (CAP), GCC banks apply 0.72 on average. In applying such a capital regulation, GCC banks scores range between 0.44 and 0.88. Such a range suggests that GCC countries vary in the magnitude of restriction in regulating capital requirement for the banking sector over the sample period (1992-2011).

The GCC banks score the lowest degree of restrictions on bank activities in comparison with officially supervisory power, banks capital regulation and market entry standards. The overall bank activity regulatory (BAR) index scores a value of 0.56 and ranges between 0.25 and 0.75. These ratios suggest that financial authorities in GCC countries sometimes provide the banking sector with more flexibility by allowing a wider range of financial activities such as in the securities market, insurance and real estate activities.

In addition, Table 5.2 shows that the magnitude of credit risk (CR) scopes between -0.02 and 1.19 with mean value of 0.017, suggesting a bearable size of bad loans.

In relation to the bank size (SIZE), the statistics show the average total asset of GCC banks is 22784.79 and ranging between 77934.9 and 74.9 (US\$ million), reflecting the variations between examined banks size throughout the sample period.

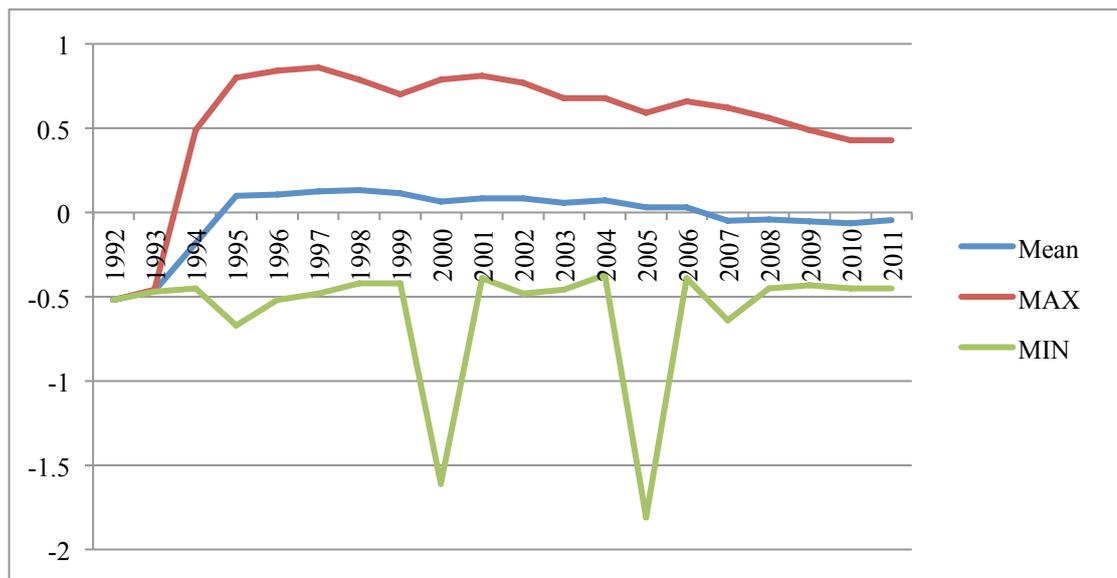
Finally, the real GDP growth rates of the GCC countries where the examined banks

operate have scored 5.68 on average with maximum and minimum values of 0.69 and -5.15 respectively, suggesting the fluctuation of the economic conditions throughout the examined period that may positively or negatively affect the liquidity creation function in each of the jurisdiction covered by this study.

### 6.3.1. The Trends of the Examined Variables over the Sample Period

In order to have a visual understanding on the assessed variables, it is important to look at the trends of the examined data throughout the sample period. Figure 6.1 depicts the trends of overall liquidity creation during the sample period. It can clearly be noticed that the overall liquidity creation of the examined GCC banks is in a steady decline in general and in particularly before and during the recent global financial crisis of 2007-2009.

**Figure 6.1: Trends of Liquidity Creation of GCC Banks**



*Data Source: Bankscope Database*

As presented in figure 6.1, in 1995 the overall liquidity amount that was created by GCC banks in the sample reaches 0.097, which represents 9.7 per cent of total assets. As can be seen, the highest level of liquidity creation was achieved in 1998. However, in 2007 a dramatic decline in liquidity creation is scored, where only 0.048 of liquidity is created, equalling 4.80 per cent of total assets, which suggests the negative impact of the financial crisis of 2007-2009 on the liquidity creation. However, as can be seen, this ratio increased slightly in 2010 to 0.064 with 6.46 per cent of total assets of GCC banks.

Such a trend indicates a very low level of liquidity creation in GCC banks in comparison with other countries such as the US. While the liquidity creation of US banks reached an overall of 20 per cent of total assets during the period between 1997 and 2001 (Deep and Schaefer, 2004), the examined GCC banks reached 10 per cent of total assets during the same period. Moreover, Berger and Bouwman (2009a) reached a similar conclusion (by excluding the off-balance-sheet items in their measure) and found that US banks' liquidity creation reached about 20 per cent of their total assets in 2003, which is higher than the liquidity amount that the examined GCC banks created in 2003, which equalled only 5 per cent of their total assets in 2003.

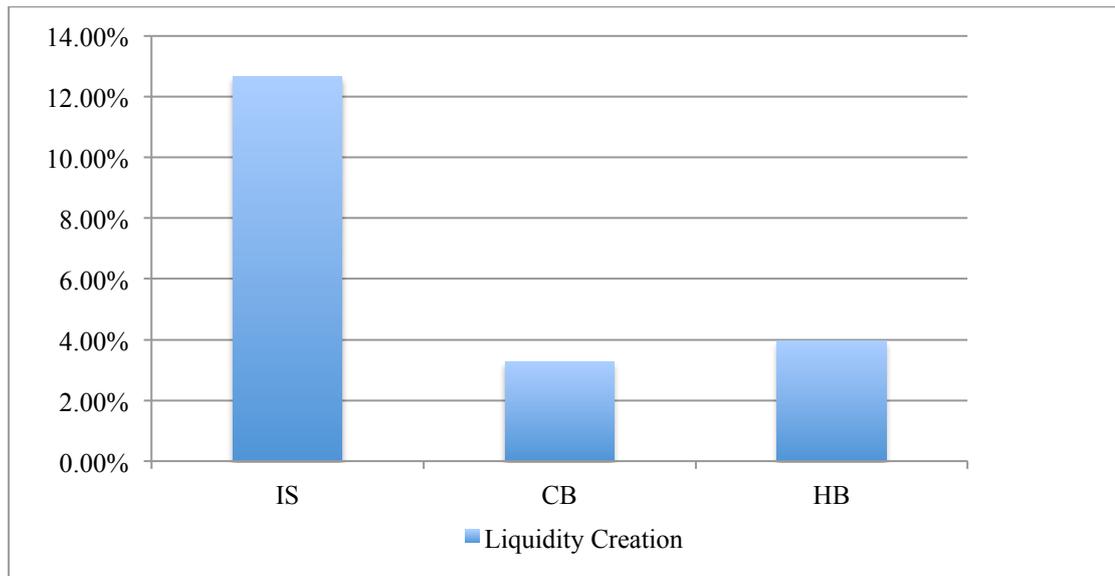
While the highest level of liquidity is created in 1997 with 8.6 per cent of total assets, the maximum liquidity creation of the GCC banks continued to gradually decline in a parallel trend with the mean value of liquidity creation. The lowest amount of liquidity creation is scored in 2000 with -16.1 per cent and in 2005 with -18.1 per cent of total assets of the GCC banks, implying that some of the GCC banks rather destroy liquidity during the stipulated periods.

### **6.3.2. Comparative Descriptive Statistics of the Factors Determining Liquidity Creation in Islamic, Conventional and Hybrid Banks in the GCC Region over the Sample Period**

Regardless of such weak overall liquidity creation performance of the GCC banks as explained above, figure 6.2 shows that Islamic banks remain in a better position than conventional and hybrid banks in their liquidity creation function, as figure 6.2 visualises the overall liquidity creation ratio to total assets of the GCC banks. However, it can be stated that such low ratios of liquidity creation support the criticism against GCC banks in general and Islamic banks in particular in terms of their limited contribution in promoting economic growth. This further testifies that Islamic banks do not optimise their position in liquidity creation function.

In respect of the amount of liquidity creation of Islamic banks compared to conventional and hybrid banks, figure 6.2 shows that Islamic banks create the highest volume of liquidity. In checking the overall Islamic banks score, as can be seen, the highest level of liquidity creation compared to conventional and hybrid banks with a ratio of 12.66 per cent, 3.26 per cent and 3.95 per cent respectively.

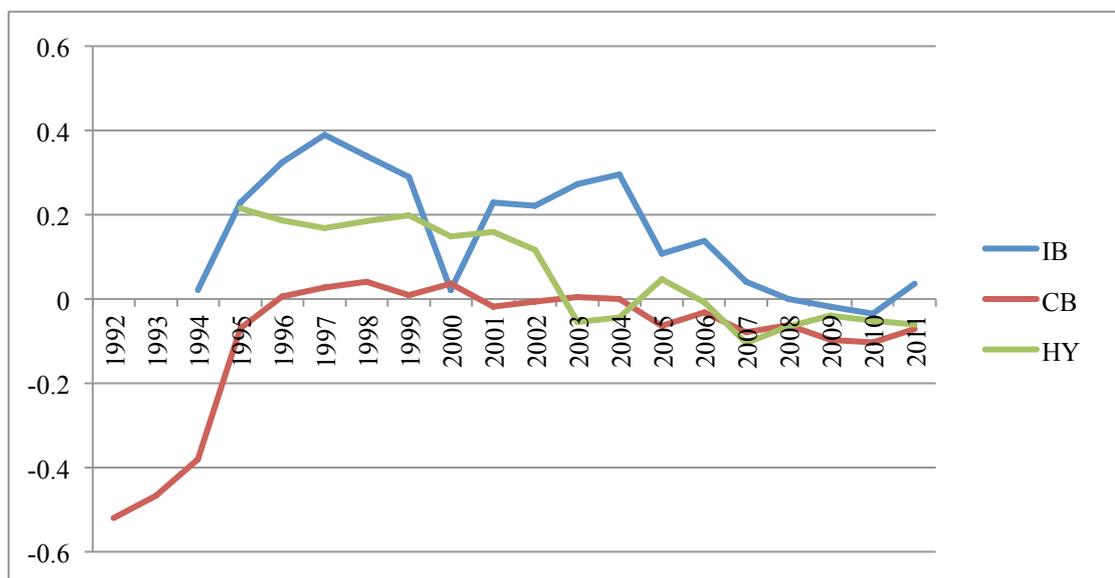
**Figure 6.2: Comparative overall Ratio of Liquidity Creation to Total Assets of Islamic, Conventional and Hybrid Banks in the GCC Region**



*Data Source: Bankscope Database*

As shown in figure 6.3, in 1997 Islamic banking liquidity creation ratio represents 39 per cent of their total assets, while for conventional and hybrid banks the liquidity creation ratio scores 2.8 per cent and 16.8 per cent of their total assets, respectively.

**Figure 6.3: The Trends of Liquidity Creation in Bank Types**



*Data Source: Bankscope Database*

However, Figure 6.3 shows that Islamic banks recorded the lowest level of liquidity creation in 2000 with a ratio of 3.7 per cent of their total assets to reach the same level as the conventional banks, while hybrid banks scored a stronger position in creating liquidity with a ratio of 14.9 per cent of their total assets. In 1997, Islamic banks led the

market by creating the largest amount of liquidity. Yet this is not the case in 2000, where hybrid banks stand as the top liquidity creators.

As the trends in Figure 6.3 show, from 2004 to 2010, the ratio of liquidity creation of Islamic banks dramatically decreased from 29.6 per cent to 3.5 per cent of their total assets, yet they remained in a better position than conventional and hybrid banks.

Even during the financial crisis of 2007-2009, as figure 6.3 shows, Islamic banks created liquidity at higher levels than conventional and hybrid banks. As can be seen, from 2001 to 2011 Islamic banks incessantly were the top creator of liquidity in the GCC banking industry.

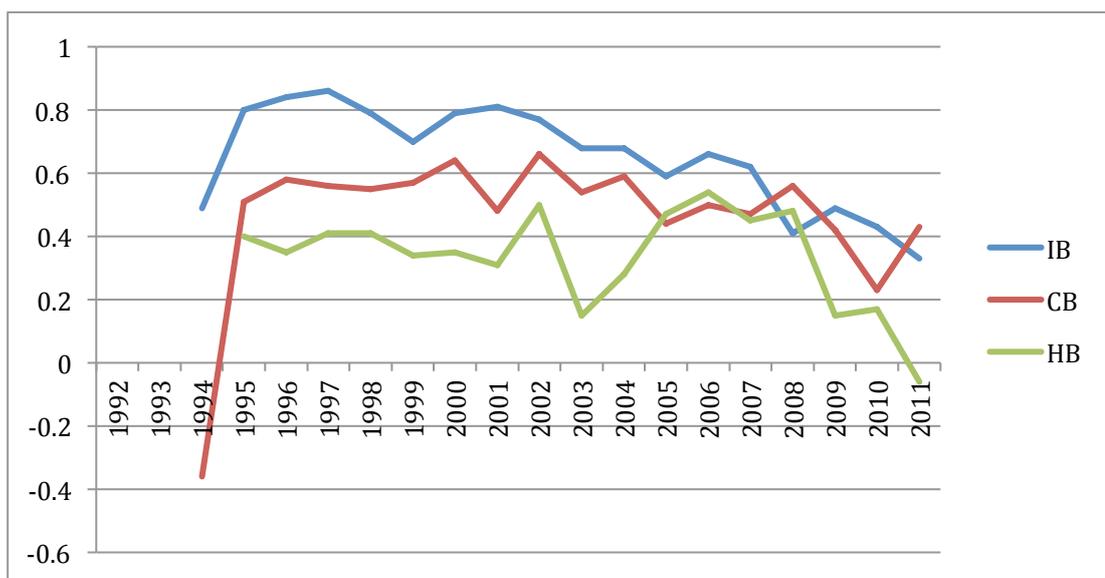
Such indicators give confidence to state that, despite the low and weak position of the GCC banks in creating liquidity, Islamic banks are the most creators of liquidity in the GCC banking market, and hence they stand to be the most contributors of promoting the GCC economic activities in the examined sample. This gives a clear evidence that Islamic banks recorded the best performance of liquidity creation in comparison with conventional and hybrid banks in the sampled GCC banks.

The above-mentioned trend and ratios also demonstrate that hybrid banks create higher amounts of liquidity than conventional banks. Such results can be due to the unique nature of Islamic financial principles, products and operations of Islamic banks (as detailed in Chapter 2). Moreover, it can be claimed that such features seem to have a positive impact on hybrid banks' liquidity creation function as illustrated in figure 6.3.

In terms of the banks that create the highest liquidity in the GCC banking market, figure 6.4 provides the trends of maximum amount of liquidity that were created by the GCC banks over the sample period.

As can be seen, Figure 6.4 depicts that Islamic banks remain at the top of the market as being the most liquidity creator in the GCC banking industry. This confirms the previous statement of Islamic banks being the most contributors of the GCC economic growth.

**Figure 6.4: The Maximum of Liquidity Creation by the GCC Banks**



*Data Source:* Bankscope Database

Moreover, in order to have a better understanding of the liquidity creation behaviour of the Islamic banks in a comparative manner with conventional and hybrid banks, following Berger and Bouwman (2009a), two further ratios of liquidity creation are calculated, namely; the ratio of liquidity creation to customer deposits and the ratio of liquidity creation to equity.

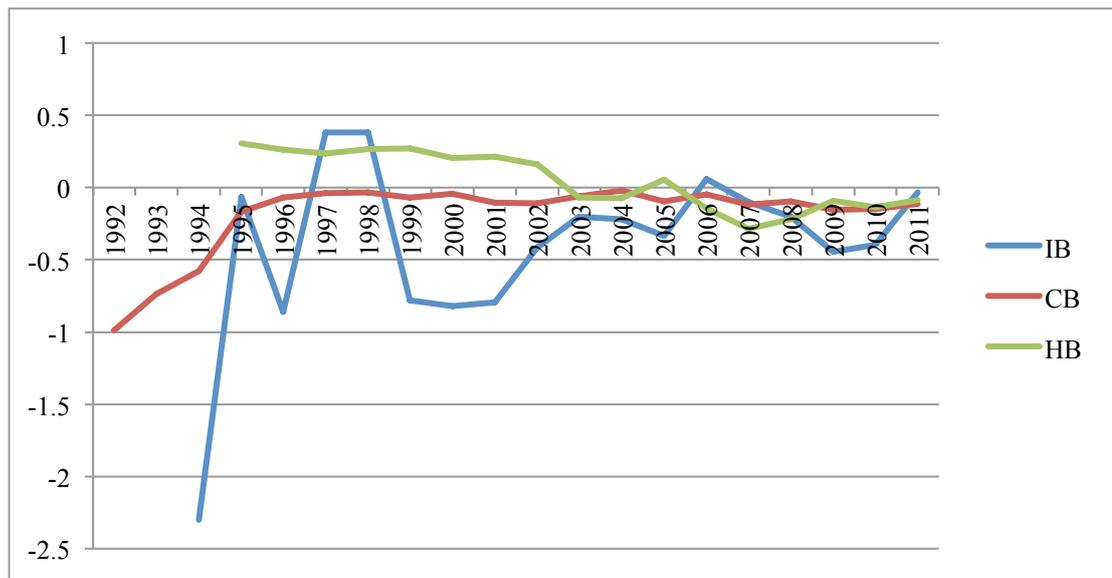
Since the customer deposits as liquid liabilities are given a positive weight in the liquidity creation measure, the ratio of liquidity creation to customer deposits indicates the extent to which the bank relies on its customer deposits to generate liquidity. The low ratio indicates the larger quantity and contribution of customer deposits and, hence, the lesser the ratio of liquidity creation to customer deposits, the better off the bank as liquidity creator.

On the other hand, since a negative weight is given to equity in the liquidity measure, it implies that when a bank uses its equities (long term liabilities) in financing short- or long-term investments (such as loans), it would not create liquidity; on the contrary, it would destroy liquidity (Berger and Bouwman, 2009a). Accordingly, a high ratio of liquidity creation to equity indicates less reliance on equity in creating liquidity and hence a better position that a bank is in as liquidity creator.

Based on the overall ratio of liquidity creation to customer deposits, Islamic banks record the lowest levels compared to conventional and hybrid banks with a mean value

of -0.29, -0.095 and 0.012 respectively. Figure 6.5, presents the trends of liquidity creation to customer deposits ratio of the GCC banks over the sample period, and depicts that during the financial crisis of 2007-2009, Islamic banks recorded the lowest ratio of liquidity creation to customer deposits that ranged between -0.1 and -0.4 from 2007 to 2009, while conventional banks recorded between -0.1 and -0.15, and hybrid banks scored between -0.28 per cent and -0.13 per cent, respectively.

**Figure 6.5: The Ratio of Liquidity Creation to Customer Deposits**



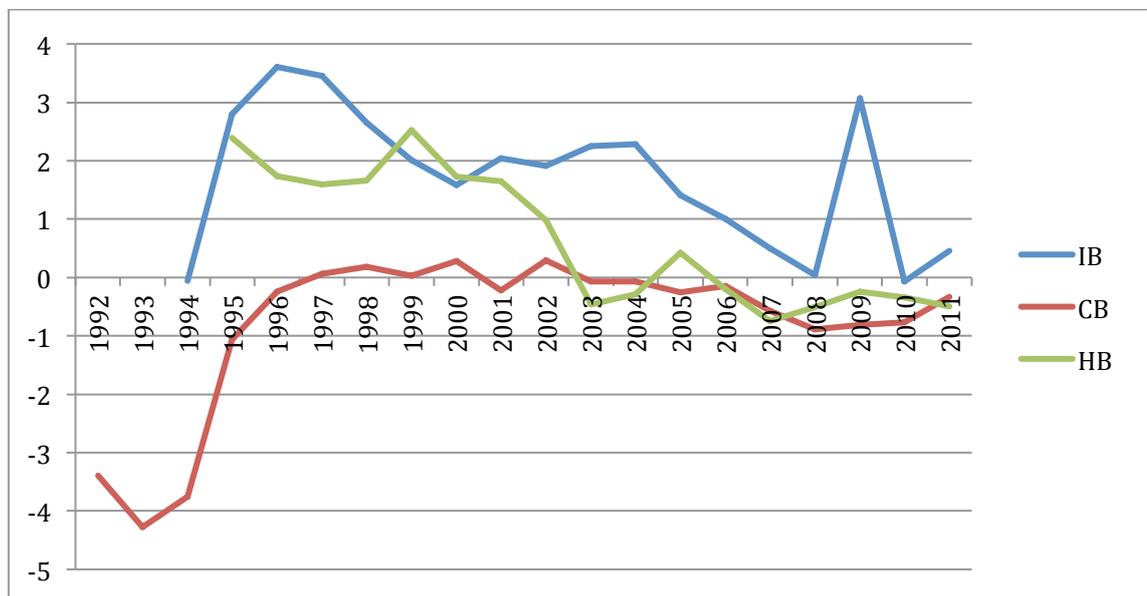
Data Source: Bankscope Database

Based on trends in Figure 6.5, it can be stated that Islamic banks managed to attract more deposits during the recent global financial crisis than conventional and hybrid banks. This can be an indicator that Islamic banks were seen as the safest places to keep deposits compared to conventional and hybrid banks, which positively influenced their liquidity creation function.

Regarding to the ratio of liquidity creation to equity of the examined GCC banks, Islamic banks recorded the highest levels compared to conventional and hybrid banks, with mean values of 1.35, -0.308 and 0.48 respectively. This suggests that Islamic banks created \$1.35 of liquidity per \$1 of equity capital and hybrid banks created \$0.43 per \$1 of equity capital. However, conventional banks destroyed -0.3 of liquidity per \$1 of equity capital, implying that conventional and hybrid banks used their long-term liabilities (equities) to finance their short/long-term assets at higher levels than Islamic banks.

As can be seen in figure 6.6, almost during the whole period covered by the sample in this study, the Islamic banks scored the highest ratio of liquidity creation to equity suggesting the low reliance of Islamic banks on its equity in creating liquidity compared to conventional and hybrid banks. It is important to mention that even during the latest economic recession, Islamic banks held the highest record of the liquidity creation to equity ratio with a mean value ranged between of 0.5 in 2007 and 3.07 in 2009, while conventional banks recorded a mean value ranged between -0.57 and -0.8 in 2007 and 2009, and hybrid banks scored a mean value ranged between - 0.75 and - 0.25 in 2007 and 2009.

**Figure 6.6: The Ratio of Liquidity Creation to Equity**



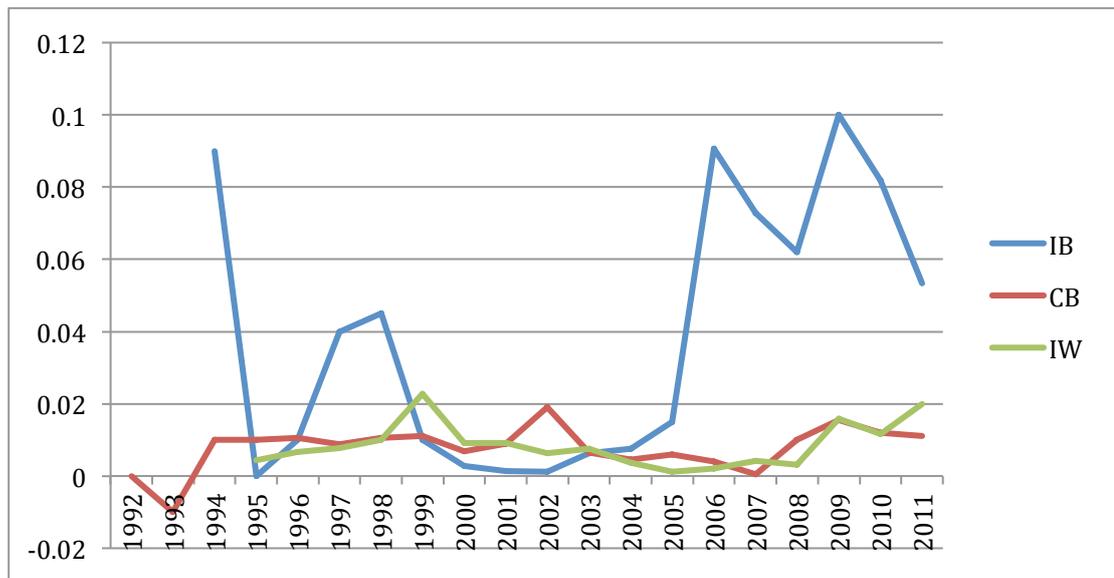
*Data Source:* Bankscope database

In further exploring the trends, figure 6.7 depicts the trends of the credit risk of the GCC banks. By looking at the historical trends of the credit risk of the GCC banking sector, it is very clear that Islamic banks are the most exposed banks to the credit risk compared to both conventional and hybrid banks as shown in figure 6.7. Particularly, before and during the recent global financial crisis, the percentage of credit risk increased between 2007 and 2009 from 0.07 to 0.1 per cent, while conventional banks record 0.0005 per cent to 0.015 per cent and hybrid banks score 0.0042 per cent to 0.015 per cent, respectively. Such statistics suggest that Islamic banks suffered from higher levels of credit risk than conventional and hybrid banks during the sample period. This implies that, although Islamic banks as liquidity creators were not affected negatively as conventional and hybrid banks during the financial crisis of 2007-2009, their credit

quality deteriorated, which can be as a result of their exposures to the volatilities in the real estate prices that negatively influenced their performance.

As the trends in figure 6.7 illustrates, conventional and hybrid banks have parallel trends in their credit quality, however, despite their low exposure to credit risk in general; during the recent financial crisis their loan quality deteriorated as well, yet did not reach the level of credit deterioration of Islamic banks.

**Figure 6.7: The Trends of the Credit Risk of the GCC Banks**



Data Source: Bankscope database

Based on the descriptive statistical analysis presented so far, it can be said that despite the high levels of difficulties and loan deterioration, Islamic banks create higher amounts of liquidity than conventional and hybrid banks in the case of the sampled GCC banks in the period in question. Hence, Islamic banks need to pay careful attention in conducting such function, which can also be given as a justification of why Islamic banks conduct their businesses mostly based on short-term debt-based financing activities rather than equity-based modes of financing.

#### 6.4. TESTING THE HYPOTHESES: ECONOMETRIC ANALYSIS

As it has been mentioned earlier, the Stata package for econometric analysis is used to test the developed hypotheses by assessing relationship between liquidity creation as dependent variable and independent variables through panel data regressions with fixed effects model.

As part of the empirical process, in order to examine the validity of the data used before conducting the panel data with multiple regression tests, some essential statistical tests are conducted. The skewness and kurtosis standards are conducted to examine the magnitude of the data departure from normality, the results of which are presented in Table 5.3. Since some of the examined variables are not normally distributed as a result of the outliers, this study normalises the data distribution by winsorising (Dhaliwal et al., 2012: 732; Artiach et al., 2010: 40). By applying the winsorising, the assessed data tend to be normally distributed where the skewness results are between  $\pm 1.96$  and the coefficient of kurtosis ranges between  $\pm 3$ , as shown in Table 6.3.

**Table 6.3: Skewness and Kurtosis Statistics**

stats	LC	CB	HB	CR	OSP	MES	CAP	BAR	Size	GDP
skewness	0.388	0.146	0.771	1.445	-0.568	-1.725	-0.325	-0.468	-0.241	0.791
kurtosis	2.400	1.021	1.594	1.943	1.837	2.760	1.820	1.800	2.427	1.538

*Data Source:* Bankscope Database

As a result of the normally distributed data, this study therefore applies Pearson correlation matrix to investigate the multicollinearity between examined variables. As shown in Table 6.4, the Pearson correlation matrix fails to detect a correlation value equivalent to or higher than 0.8 (Brooks, 2008; Haniffa and Cooke, 2005; Jing et al., 2008) and, therefore, the examined variables are perceived not to be highly correlated.

**Table 6.4: Pearson Correlation Matrix Test**

	LC	CB	HB	CR	OSP	MES	CAP	BAR	Size	GDP
LC	1.000									
CB	-0.259	1.000								
HB	0.002	-0.638	1.000							
CR	-0.142	0.015	-0.083	1.000						
OSP	0.230	-0.071	0.145	-0.038	1.000					
MES	0.204	-0.041	0.059	0.003	0.147	1.000				
CAP	-0.139	0.446	-0.441	0.035	0.442	0.370	1.000			
BAR	0.029	-0.134	0.142	0.052	-0.186	0.335	-0.324	1.000		
Size	-0.138	-0.283	0.476	0.006	-0.091	-0.144	-0.191	0.179	1.000	
GDP	-0.032	-0.018	-0.033	-0.196	-0.201	-0.389	-0.129	-0.404	-0.103	1.000

*Data Source:* Bankscope Database

Based on the *p*-value of the Hausman test (0.000; significant at 1%) as presented in Table 6.5, the null hypothesis is rejected, signifying the difference in coefficient is systematic and, hence suggesting that the fixed effect is the most suitable for the

examined data.

Table 6.5 reports the result of the panel data regressions with fixed effects model of the relationship between liquidity creation and independent variables in testing the developed hypotheses. The results of fixed effects regressions show that the overall model is significant at  $p < 0.01$  (F-test = 0.000) with  $R$ -square equal 0.6210 indicating a moderate level of goodness of fit of the model.

**Table 6.5: Panel Data Regressions with Fixed Effects Model: Measuring the Determinants of Liquidity Creation**

LC	Coef.	t-value
IB (_cons)	0.4796023	3.09***
CB	-0.296808	-6.93***
HB	-0.2767765	-5.8***
OSP	-0.6161595	-2.31**
BAR	-0.6337079	-3.26***
CAP	-0.9164603	-6.58***
MES	1.486832	3.88***
CR	-2.892295	-3.1**
Size	0.036091	1.79*
GDP	0.0001723	0.07
R-Square		0.6210
Prob>F		0.0000
Hausman		0.0000
Bank No		58
Obs No		677
Group		20

Notes: \* $p < .10$ , \*\* $p < .05$ , \*\*\* $p < .01$

As presented in Table 6.5, in consistence with the theory of Islamic banking, the fixed effects regressions results show that the association between and Islamic banks and liquidity creation is positive and statistically significant at  $t = 3.09$ ,  $p < 0.01$ . Moreover, the empirical results detect that the relationship between conventional banks and liquidity creation is negative and statically significant at  $t = -6.93$ ,  $p < 0.01$ , and likewise, the association between hybrid banks and liquidity creation is negative and statistically significant at  $t = -5.8$ ,  $p < 0.01$ .

Consistent with hypothesis 1, such results imply that Islamic banks create higher levels of liquidity than conventional and hybrid banks and, accordingly, contribute more in creating economic and financial activities. Moreover, consistent with hypothesis 2, the results show that hybrid banks create greater amounts of liquidity (with coefficient value of -0.2767765) than conventional banks (with coefficient value of -0.296808), suggesting that the mixed nature of business operations, as a part of their business is

conducted based on Islamic banking principles, promotes the amount of liquidity that hybrid banks create. The results provide statistical evidence to the theory of Islamic banking where Islamic banks are required to make a direct and effective impact on economic growth through operating in accordance with *Shari'ah* (Islamic law) (El Gamal, 2006; Ayub, 2007; Ben Arab and Elmelki, 2008: 82). The statistical results suggest that Islamic banks transfer higher levels of liquid liabilities into risky illiquid assets and hence create more liquidity than conventional and hybrid banks. Consequently, it can confidently be stated that Islamic banks form a real channel of transforming savings into genuine investment activities.

The positive and significant association between Islamic banks and liquidity creation can be explained as a direct impact of the restrictions that are applied to the Islamic banks as a result of Islamic financial law requirements and the unique nature of Islamic banking financial operations, which cannot be found in conventional and are only partially presented in hybrid banks. As explained earlier in theoretical framework in Chapter two, due to the prohibition of *riba* which comes on the top of restrictions, by definition, money should not generate revenue unless it is amalgamated with human efforts and involves risk. Based on Islamic financial principles, any kind of sale contract or business that has been involved with an extreme *gharar* (uncertainty) is not permitted and therefore, many financial instruments that have been widely utilised by conventional banks are not allowed for Islamic banks due to *gharar* elements, such as options and other derivatives (El-Gamal, 2006: 61-62; Khan, 2010: 807). Such limitations of using these kinds of financial instruments forces Islamic banks to trade and deal with asset-based/backed type instruments, where each financial transaction in Islamic banking must refer to a tangible and identifiable underlying asset (Cox and Thomas, 2005: 171). That, in turn, has a positive influence in improving the liquidity creation function. Consequently, it enhances the Islamic banks' contribution to economic and financial activities and positively influences the economic growth of the countries where they operate.

Moreover, according to El Gamal, (2006) and Ben Arab and Elmelki (2008: 80) profit/loss sharing (or equity-based) modes of financing such as *musharakah* and *mudarabah* are the most desirable by Islamic financial law. Conducting such modes of financial operations has a positive impact on liquidity creation of Islamic banks as

liquidity is created when a bank use liquid liability to finance illiquid risky assets (Berger and Bouwman, 2009a). Furthermore, since money in Islamic financial law serves as a measuring tool to define the value of goods, it can be increased only when it is invested in tangible or real economic activities (El Gamal, 2006; Ben Arab and Elmelki, 2008: 82). Accordingly, Islamic banks by definition have to be directly involved in creating real economic activities that lead to creating higher levels of liquidity in comparison to conventional banks. Similarly, based on the above principles, due to their mixed nature, hybrid banks are expected to be in a middle position between Islamic banks and conventional banks in creating liquidity. This can be interpreted as an advantage of conducting a part of their business operations based on Islamic banking principles (as has been detailed in Chapter two).

As can be seen in Table 6.5 consistent with hypothesis 3, the fixed effects regressions results show the association between official supervisory power and liquidity creation is negative and statistically significant at  $t = -2.31$ ,  $p < 0.05$ , with a coefficient value of  $-0.6161595$ . This implies that an increase of 1 per cent in the officially supervisory power leads to a decrease of the liquidity creation by  $-0.62$  per cent. This result suggests that more power of official supervisory bodies in taking particular actions to correct or prevent bank management attitudes leads to less amount of liquidity creation by the GCC banks. Such results are supported by previous empirical studies, which stated that official supervisory power improves the monitoring process of banks and, hence, prevents bank runs by increasing the public trust in the banking sector and reducing the risk-taking behaviour of banks, which may consequently promote banking financial stability (Barth et al., 2004; Fernandez and Gonzalez, 2005: 475; Pasiouras et al., 2006: 425; Agoraki et al., 2011; Klomp and Hann, 2012: 3201). Accordingly, such a reduction in risk-taking attitudes decreases banks' ability to create higher degrees of liquidity through using liquid liabilities to fund illiquid risky assets, which are the main factors of such a function as evidenced by the obtained fixed effects model results in Table 6.5.

With regard to hypothesis 4, the regressions results in Table 6.5 report that the relationship between bank activity restrictions and liquidity creation of the GCC banks is negative and statistically significant at  $t = -3.26$ ,  $p < 0.01$  with a coefficient value of  $-0.6337079$ . This implies that an increase of 1 per cent in the banks' activity restrictions leads to a decrease of the liquidity creation by  $-0.63$  per cent. The obtained result

indicates that the high stringency on banks' involvement in securities underwriting, insurance underwriting and selling as well as the ability of banks to undertake real estate investment leads to a decline in the amount of liquidity creation by the GCC banks. This result is in line with previous studies that suggest that relaxing banking regulations helps involvement in a wider variety of activities. Fewer limitations allow banks to exploit economies of scale and scope (Barth et al., 2004; Claessens and Klingebiel, 2000). According to Matutes and Vives (2000) bank activity restrictions assist the deposit insurance and capital requirements in restricting risk-taking behaviour in a highly competitive environment. Such results indicate that higher levels of restrictions on banks' activities decreases the risk-taking behaviour of banks that, in turn, reduces their capability to increase their involvement in illiquid investment, such as real estate, by raising non-deposits funds. Consequently, the negative association between liquidity creation of the GCC banks and high stringency on banking activities regulation is in line with a vast amount of related literature.

In line with hypothesis 5, the fixed effects regressions results in Table 6.5 show the relationship between stringency on capital regulations and liquidity creation of the GCC banks being negative and statistically significant at  $t = -6.58$ ,  $p < 0.01$  with coefficient value of  $-0.9164603$  indicating an increase of 1 per cent in the degree of stringency on the banks' capital requirements causes a decrease of the liquidity creation by  $-0.92$  per cent. These results are supported by Bolt and Tieman (2004), as more stringency in setting up the bank capital adequacy requirements leads to requiring stricter acceptance standards to create new loans. Accordingly, this directly reduces the banks' aptitude to create liquidity. In addition the obtained results can be interpreted by stating that stricter capital requirement regulations leads to severer screening processes for borrowers, which causes lesser loans to be contracted as argued by Thakor (1996). Furthermore, the detected negative and significant association is in line with Barth et al.'s (2004) argument that since the price of raising equity capital is more costly than offering deposits, having restricted capital regulations may discourage banks to screen and lend. In turn, this leads banks to reduce their deposits, since the lending activities are not high due to the high restrictions on acceptance standards and on capital adequacy requirement as stated by Gorton and Winton (2000) and Barth et al. (2004). Accordingly, the achieved fixed effects regressions results of this study are in line with such studies, suggesting that the strict capital regulations, in the case of GCC banks,

negatively affect the liquidity creation function.

Regarding the affiliation between the banking market entry standards and liquidity creation, the empirical results in Table 6.5 are consistent with hypothesis 6 showing that the impact is positive and statistically significant at  $t = 3.88$ ,  $p < 0.01$  with a coefficient value of 1.486832. It suggests that an increase of 1 per cent in the banking market entry standards causes an increase of the liquidity creation by 1.5 per cent. Thus, the empirical results of fixed effect regressions indicate that a greater restriction on bank entry standards tends to improve the liquidity creation. The obtained results are in line with the theory of banking, as applying higher level of boundaries on banking entry would promote bank competition attitude, as tighter entry regulations allow existing banks to accrue power and possess vaster franchise value (Agoraki et al., 2011: 39; Klomp and Haan, 2012: 3201; Barth et al., 2004: 210; Keeley, 1990) as only few banks would be able to afford the initial entry requirements (Agoraki et al., 2011: 39). Accordingly, in a less competitive market environment, the loans price increases which results in a higher level of rents that banks receive and, as a consequence, deposit rates decrease. This, as a result, leads to an increase in banks' profits (Boyd and Nicolo, 2005: 1329-1330; Tabak et al., 2012: 3367). Based on these, the high level of stringency on banking entry standards boost banks' incentives to further increase their lending activities and finance a wider range of businesses. According to the theory and based on the achieved empirical results, the higher restrictions on entry regulations promote the banking competition that in turn positively influences the liquidity creation of the GCC banks as shown in Table 6.5.

As for the relationship between liquidity creation and credit risk, as Table 6.5 depicts, a negative impact of credit risk on liquidity creation is found, which is statistically significant at  $t = -3.1$ ,  $p < 0.05$  with a coefficient value of -2.892295. In confirming the validity of hypothesis 7, this implies that an increase of 1 per cent in the credit risk leads to a decrease of the liquidity creation by -2.9 per cent. The empirical results, hence, indicate that the greater level of credit risk causes a negative influence on liquidity creation in the case of the GCC banks. These findings imply that when loan loss provisions as a measure of credit risk are inadequate to protect against the loan losses, it dramatically erodes the bank's capital hoardings, which may negatively interrupt bank incentive to provide new loans (financing in the case of Islamic banks) or extend the

current ones. Moreover, the negative association found in this study is consistent with previous studies which state that the greater level of loan loss provisions indicates the deterioration of the credit quality (Bouvatier and Lepetit, 2008: 525; Dietrich and Wanzenried, 2011: 311), as such deterioration causes an immediate decrease in expanding lending or financing activities through reducing financing illiquid risky assets by liquid liabilities, which negatively influences the banks' ability to create higher levels of liquidity.

Consistent with hypothesis 8, the empirical results in Table 6.5 depicts that the relationship between bank size and liquidity creation is positive and statistically significant at  $t = 1.79$ ,  $p < 0.10$  with a coefficient value of 0.036091, which implies that an increase of 1 per cent in the bank size leads to an increase of the liquidity creation by 0.036 per cent. The reported positive and significant relationship between bank size and liquidity creation is consistent with the theoretical argument of previous studies, which among other includes, Berger and Bouwman (2009a), Rauch et al. (2010), Kishan and Opiela (2000: 126) and Haselmann and Wachtel (2010: 977-978). It should be noted that the large banks provide loans with low rates that enhance the lending activity and, hence, boom the liquidity creation function of banks. According to Kishan and Opiela, (2000: 122) small banks are more restricted to the monetary policies because of their disability to offset deposit drains. Based on such an argument, it can be stated that large banks are imposed less restriction in respect of financing activities due their easy access to funds through offering liquid deposits. According to Kishan and Opiela (2000: 126) and Haselmann and Wachtel (2010: 977-978), large banks tend to deal mainly with large firms and also governments, where more funding activities are required. Additionally, based on the argument 'too big to fail' where government guarantees refunding large uninsured investors (Mishkin, 2006: 990) large banks are less exposed to bank panics. Hence, it increases banks' incentives to invest in riskier businesses (Mishkin, 2006 and Morrison, 2011). Consequently, it motivates banks to relax more in expanding and extending their loans and financing activities and, hence, boosts the amount of their liquidity creation. Based on these, it can be confidently stated that the obtained positive and significant association between bank size and liquidity creation is consistent with theoretical argument of the existing literature.

Contrary to the expectation from hypothesis 9, the regressions results in Table 6.5 show

an insignificant positive association between GDP and liquidity creation with  $t = 0.07$ ,  $p > 0.10$ . It should be noted that the reported positive effect of GDP on liquidity creation is in line with the vast literature available on the subject matter. This implies that the credit quality gets improved during robust economic growth in the GCC banking sector, which leads to relaxation in banking lending standards that increase the liquidity creation of GCC banks as argued by Agoraki et al. (2011: 46) and Micco and Panizza (2006: 250). The positive relationship between GDP and liquidity creation may also be explained by the reductions that banks apply to its liquidity hoardings as the rate of return gets higher during the high economic growth as stated by Aspachs et al. (2005: 7). Moreover, during the economic booms, according to Pana et al. (2010: 79), the demand of diverse financial commodities raises swiftly, which enhance the bank's business activities at swifter degrees, that improves banks liquidity creation. One of the elements that boost banks' behaviour towards increasing illiquid assets during economic growth is the easing of the restrictions on bank lending regulations (Pana et al., 2010: 79). Consequently, such easiness in screening borrowers helps banks to magnify their long-term illiquid assets (loans and financing activities) and this in turn is translated into an increase in liquidity creation. However, the insignificant impact can be due to the low levels of the GDP growth as a result of decreases in the oil prices in the GCC region as argued by Al-Khouri (2012: 73).

## **6.5. SENSITIVITY TESTS FOR EXAMINING THE ROBUSTNESS OF THE EMPIRICAL RESULTS**

This section presents the results of some other econometric models and tests to verify and confirm the robustness of the obtained results of panel data regressions with fixed effects model in the previous section.

### **6.5.1 Measuring the Determinants of Liquidity Creation through Additional Four Panel Data Regressions with Fixed Effects Model Using Robust Standard Error**

In order to investigate the robustness of the examined model in the previous section, measuring the determinants of liquidity creation is presented in four additional different models. The aim of such approach is to estimate and control for the interaction effects between bank types variables and other independent variables on liquidity creation individually.

Model I includes only bank type variables, namely Islamic, conventional and hybrid banks; Model II includes bank types and regulation variables; Model III contains bank types variables and bank specific variables. Lastly, in model IV all variables are included; however, with regard to the bank type variables, three dummies are included, in which the Islamic bank dummy is not taken as the base. This approach is conducted to leave the freedom of omitting one of the three dummy variables to the Stata econometric package system with the objective of mitigating the effects of arbitrary selection of the base dummy.

**Table 6.6: Estimating the Determinants of Liquidity Creation through Additional Four Panel Data Regressions with Fixed effects Model Using Robust Standard Error**

LC	Model I		Model II		Model III		Model IV	
	Coef.	t-value	Coef.	t-value	Coef.	t-value	Coef.	t-value
IB (_cons)	0.2318001	8.74***	0.3752307	2.12**	0.4737619	4.91***	0.4796023	3.09***
CB	-0.2692675	-7.6***	-0.2048511	-7.05***	-0.2646823	-8.57***	-0.296808	-6.93***
HB	-0.1850149	-5.27***	-0.221095	-6.79***	-0.1494453	-3.67***	-0.2767765	-5.8***
OSP			-0.107426	-0.34***			-0.6161595	-2.31***
BAR			-0.4448327	-2.23***			-0.6337079	-3.26***
CAP			-0.8379389	-6.44***			-0.9164603	-6.58***
MES			0.9843819	2.51***			1.486832	3.88***
CR					-4.003223	-3.48***	-2.892295	-3.1***
Size					0.0574106	2.19**	0.036091	1.79*
GDP					0.0028905	1.2	0.0001723	0.07
R-Square		0.2289		0.7154		0.3919		0.6210
Prob>F		0.0000		0.0000		0.0000		0.0000
Hausman		0.0000		0.0000		0.0000		0.0000
Bank No		58		58		58		58
Obs No		677		677		677		677
Group		20		20		20		20

Notes: \*p < .10; \*\*p < .05; \*\*\*p < .01

The results of all regressions models as depicted in Table 6.6 report a consistent outcome with the main fixed effects regressions model. Consistently with fixed effects model, the software omitted the Islamic banks dummy to be taken as the base and presented by the intercept value as assumed by Model IV. All the Models I, II, III and IV show that the Islamic bank dummy variable is significant and positively associated with liquidity creation and the conventional, and hybrid banks dummy variables are significant and negatively associated with liquidity creation. Such results confirm the statement that, due to their unique nature, Islamic banks create greater amounts of liquidity than conventional and hybrid banks as proposed in hypothesis 1. Moreover, the

result in all models, as depicted in Table 6.6, confirm that hybrid banks create a larger size of liquidity than conventional banks implying the impact of operating partially in a *Shari'ah*-compliant manner as suggested in hypothesis 2.

In respect to rest of the variables, consistently with the main fixed effects regressions model (as depicted in Table 6.5), the regressions models in Table 6.6 report the same relationship direction and significant impact on liquidity creation. The results of all models show that officially supervisory power, capital requirement regulations and bank activity restrictions are significant and negatively affect the liquidity creation of the GCC banks. All models report that the banking market entry standards variable is significant and positively associated with liquidity creation. In respect to the banks size and GDP as explored in Models III and IV, it is significant and positively associated with liquidity creation, while the GDP as proxy for economic growth remains positively associated and has no significant effect on liquidity creation.

### **6.5.2. Estimating the Determinants of Liquidity Creation through Panel Data Regressions with Random Effects Model and Hausman Durbin-Wu Test for Endogeneity**

In order to confirm the robustness of the fixed effects results, the panel data regressions is conducted with random effects model in this section. In addition, to check that the examined variables are exogenous, the statistical relationship among variables is examined by using Hausman Durbin-Wu test, after running the regression using 2SLS instrumental variable regressions test to confirm non-existence of endogeneity threat.

Table 6.7 illustrates the results of the panel data regressions with random effects model measuring the determinants of liquidity creation of the GCC banks. The panel data regressions with the random effects model results report consistent outcome with the initial fixed effects regressions model results (as depicted in Table 6.5), however, with slightly different coefficient values and the  $p$ -values that can be a consequence of the differences in the econometric specifications of both models. Consistent with the fixed effects regressions model, the panel data regressions with random effects model show that Islamic banks are positively associated with liquidity creation and statically significant at  $z = 2.09$ ,  $p < 0.05$  with coefficient value of 0.434592, while, conventional and hybrid banks are statistically significant and negatively associated with liquidity

creation  $z = -5.95$ ,  $p < 0.01$  with coefficient value of  $-0.1771262$ , and  $z = -4.29$ ,  $p < 0.01$  with coefficient value of  $-0.1058256$ , respectively, with the exception of a reduction in magnitude of  $p$ -value of the Islamic banks in association with liquidity creation. Hence, consistent with hypothesis 1, the panel data regressions with random effects model results indicate that Islamic banks create higher levels of liquidity creation than conventional and hybrid banks. The results also show that hybrid banks generate larger amount of liquidity than conventional banks, as suggested in hypothesis 2.

**Table 6.7: Panel Data Regressions with Random Effects Model and Hausman Durbin-Wu Test for Endogeneity**

LC	Coef.	z-value
IB (_cons)	0.434592	2.09**
CB	-0.1771262	-5.95***
HB	-0.1058256	-4.29***
OSP	-0.0136577	-0.04*
BAR	-0.2462758	-1.16*
CAP	-0.7709768	-5.48***
MES	0.8632911	2.04**
CR	-3.249938	-3.2***
Size	0.060579	3.04***
GDP	0.0018387	1.07
R-Square		0.3113
Prob>F		0.0000
Durbin-Wu		0.1116
Hausman		0.0000
Bank No		58
Obs No		677
Group		20

Notes: \* $p < .10$ ; \*\* $p < .05$ ; \*\*\* $p < .01$

The panel data regressions with random effects model, consistent with the initial fixed effects regressions (as depicted in Table 6.5) and hypothesis 3, 4 and 5, report that official supervisory power, bank activity restrictions and capital requirement regulations negatively affect liquidity creation of the examined GCC banks and statistically significant at  $z = -4.29$ ,  $p < 0.10$  with coefficient value of  $-0.0136577$ ,  $z = -1.16$ ,  $p < 0.10$  with coefficient value of  $-0.2462758$  and  $z = -5.48$ ,  $p < 0.01$  with coefficient value of  $-0.7709768$ , respectively. Moreover, the panel data regressions with random effects model reports that the bank market entry standards variable is significant and positively associated with liquidity creation with  $z = 2.04$ ,  $p < 0.05$  with coefficient value of  $0.8632911$  as obtained by fixed effects model (as depicted in Table 6.5) and proposed in hypothesis 6.

Furthermore, the panel data regressions with the random effects model is consistent with the initial model of fixed effects regressions (as depicted in Table 6.5) and detects a negative association between credit risk and liquidity creation and statistically significant at  $t = -3.2$ ,  $p < 0.01$  with a coefficient value of  $-3.249938$  as suggested by hypothesis 7.

The panel data regressions with random effects model reports consistent result with the fixed effects model (as depicted in Table 6.5), that size is positively associated with liquidity creation and statistically significant at  $z = 3.04$ ,  $p < 0.01$  with a coefficient value of  $0.060579$  as predicted in hypothesis 8. In addition, the results of using the panel data regressions with random effects model, consistent with fixed effects model (as depicted in Table 6.5) and hypothesis 9, show that while GDP is positively associated with liquidity creation, it remains with insignificant effects with  $z = 1.07$ ,  $p > 0.10$  with coefficient value of  $0.0018387$ .

Lastly, to confirm that the examined variables are exogenous, Durbin-Wu test was conducted after running the regression using 2SLS instrumental variable regression test. The Durbin-Wu  $F$ -test indicates insignificant value ( $p$ -value =  $0.1116$ ) implying that the null hypothesis of the Durbin-Wu test cannot be rejected. Hence, accepting the null hypothesis of the Durbin-Wu test confirms that the examined variables are exogenous and, hence, the endogeneity does not signify a problem.

## **6.6. CONCLUSION**

Based on the empirical results of analysing the dataset of 54 GCC commercial banks over the period of 1992- 2011, the descriptive statistical results in this empirical chapter confirm that Islamic banks create higher amounts of liquidity than conventional and hybrid banks. Moreover, the fixed effects regressions model with robust standard error indicated a positive and statistically significant association between Islamic banks and liquidity creation, indicating the positive role played by Islamic finance. Moreover, the same panel date regressions with fixed effects model show that conventional and hybrid banks are in negative and significant statistical relationship with liquidity creation. Hence, the results in this chapter empirically confirm that Islamic banks generate greater amounts of liquidity than conventional and hybrid banks, implying more contribution in creating real economic activities.

Regarding the banking regulations, this chapter confirms a negative and statistically significant association between official supervisory power and liquidity creation. This chapter also shows stringency on bank capital regulations negatively and significantly impacting the liquidity creation of the GCC banks. With regard to bank activity restrictions, the chapter statistically provides evidence of a negative and statistically significant association between liquidity creation and stringency on bank activity regulations. Accordingly, it can be stated that such results suggest that high stringency in setting up these types of banking regulations decreases the liquidity creation of banks and, hence, reduces their contribution in promoting the production in the case of the examined GCC banks. Moreover, this chapter empirically shows that stricter the banking entry standards promote the liquidity levels that the examined commercial banks in the GCC region create.

Furthermore, this chapter shows that credit risk has negative and statistically significant impact on liquidity creation. The chapter also detects a positive and statistically significant relationship between bank size and liquidity creation in the case of the sampled GCC banks. Regarding the association between GDP and liquidity creation, a positive relationship is confirmed; however, this study does not provide any empirical evidence on the significant impact of GDP on banks' liquidity creation. Moreover, the sensitivity tests confirm the robustness of the obtained results of the initial panel data regressions with fixed effects model.

**CHAPTER SEVEN**  
**ASSESSING LIQUIDITY RISK EXPOSURE OF THE GCC BANKS: A**  
**COMPARATIVE ANALYSIS BETWEEN ISLAMIC, CONVENTIONAL AND**  
**HYBRID BANKS**

**CHAPTER SEVEN**  
**ASSESSING LIQUIDITY RISK EXPOSURE OF THE GCC BANKS: A  
COMPARATIVE ANALYSIS BETWEEN ISLAMIC, CONVENTIONAL AND  
HYBRID BANKS**

**7.1. INTRODUCTION**

Liquidity risk in the banking sector is an ongoing concern to managers as well as fund providers, and is considered as one of the strategic reasons for bank failures (Zidulina, 2010: 164; Weiß, 2013: 3334). Liquidity risk anxieties increase to higher degrees, especially during stress times, when liquidity shortfall imposes an early costly liquidation (Weiß, 2013: 3334; Acharya and Naqvi, 2012: 349; Horvath et al., 2012; Sadka, 2011: 144; Jasiene et al., 2012: 190). Despite the constant attention being paid to liquidity risk exposures, as one of the main concerns of the financial market and regulatory bodies, the recent global financial crisis of 2007–2009 has intensely re-emphasised the importance of measuring, forecasting and understanding liquidity risk and its determinants (Weiß, 2013: 3334; Acharya and Naqvi, 2012: 349). It can be stated that such emphasis is a result of the liquidity shortages that hastily spread and caused exceptional escalations in interbank lending rates across the global financial market (Liang and Wei, 2012: 3274; Acharya and Naqvi, 2012: 349).

This empirical chapter, hence, attempts to measure the liquidity risk exposures of the GCC Islamic banks compared to conventional and hybrid banks covering the period between 1992 and 2011 through developing a dynamic panel data regression model, which is also utilised to examine the determinants of liquidity risk with the objective of investigating the potential elements that may affect liquidity risk exposures of banks, with particular reference to the banks' capital regulations. In addition, some associated bank specific variables are taken into consideration, such as credit risk, long-term debt, bank size as well as the impact of economic growth on such a critical risk.

In conducting the empirical process, this research utilises panel data regressions using the Stata econometric package for statistical analysis. Before running regressions, the Stata software is utilised to conduct a number of essential statistical tests to ensure the

soundness of data and assessed variables. The tests include data winsorising to eliminate the outliers, skewness and kurtosis standards for examining the data distribution and the Pearson correlation matrix test to assess the multicollinearity between assessed variables. Furthermore, Hausman test is employed to check the fitted method for running panel data regressions to decide whether to use fixed effects model or random effects model. As can be seen in the proceeding sections, this chapter measures the determinants of liquidity risk exposure through panel data regressions with fixed effects model using robust standard error. In addition, to check the robustness of the obtained results, this empirical chapter conducts panel data regressions with fixed effects model through three additional models. Moreover, random effects model is applied to the panel data regressions to confirm the results of the main fixed effects model. Furthermore, in order to investigate the existence of any endogeneity inferences, Hausman Durbin-Wu test is applied after running two stage least square (2SLS). This chapter, by using fixed effects regressions test with robust standard error and sensitivity tests, shows that the developed hypotheses are supported with the obtained statistical results.

In terms of the structure of this chapter, it starts with developing the hypotheses of the expected association between liquidity risk exposure and its main determinants in the case of the sampled GCC banks. It then presents a descriptive analysis of the assessed data. After conducting some statistical tests to verify the fitness of the data, this chapter presents the empirical analysis based on panel data regressions with fixed effects model with the objective of estimating the factors that impact liquidity risk exposure. The chapter, then, presents the results of further econometric tests, which aim to check the robustness of the obtained results and closes with a conclusion.

## **7.2. HYPOTHESES DEVELOPMENT: OPERATIONALISING THE RESEARCH**

This section provides a detailed discussion on the construction of the hypotheses of the expected association between the liquidity risk and Islamic, Conventional and Hybrid banks as well as other key determinants that may affect such exposures.

### **7.2.1. Bank Type Variables: Islamic Banks (IB), Conventional Banks (CB) and Hybrid Banks (HB)**

In order to have a clear understanding of the expected liquidity risk exposures of Islamic banks compared to conventional and hybrid banks, it is important to spell out briefly some related implications of the unique nature of Islamic financial operations and products on liquidity risk as discussed in Chapter 3. Such unique nature imposes more complications on Islamic banks in managing their asset and liability positions. Hence, it is theoretically accepted that Islamic banks are more exposed to liquidity risk than conventional and hybrid banks. For instance, due to *Shari'ah* restrictions on the sale of debt, Islamic banks face difficulties in liquidating debt-based assets when needed (Ahmed, 2011: 60). This causes more complexity in obtaining capital from the money market and, as a result, Islamic banks have limited accessibility of the *Shari'ah*-compatible money market (Ahmed, 2011: 60). Moreover, Islamic banks do not have access to many common conventional financial tools and instruments due to involvement of *gharar* (uncertainty) features, which among others include options and derivatives (El-Gamal, 2006: 61-62; Khan, 2010: 807) that leave Islamic banks with wider financing gaps and, hence, more vulnerable to liquidity risk.

In addition, Islamic banks hold large amount of current accounts that can be withdrawn at any time (Iqbal and Mirakhour, 2007), which may cause wider financing gaps. Considering the small number of Islamic banks (Greuning and Iqbal, 2008), slow growth of financial products (Khan and Ahmed, 2001), lack of an integrated and sophisticated payment and settlement schemes to ensure that all payment transactions are made according to *Shari'ah* and differences in standardisation of documentation, product, process and accounting criteria impose different degrees of liquidity risk on Islamic banks (Greuning and Iqbal, 2008; Abdullah, 2011: 14). Moreover, the equity characteristics of deposits and the risk-sharing concept of Islamic financial products can cause an increase of the uncertainty on depositors' return and increase the possibility of withdrawals that can lead to bank runs. Moreover, the multifaceted nature of Islamic financing modes also leads to higher costs that reduce efficiency of Islamic banks.

Islamic financial principles, thus, play a critical role in increasing the riskiness of Islamic banks (Beck et al., 2013: 436; El Gamal, 2006; Ben Arab and Elmelki, 2008: 80). Accordingly, such principles make the nature of Islamic banking financial

operations as well as the Islamic financial products more complex. Such complex nature implies that Islamic banks are expected to face a wider financing gap and greater difficulties in obtaining required funds to manage their liquidity risk than conventional and hybrid banks. On the other hand, since hybrid banks are a mixture of Islamic and conventional bank operations, they are expected to be in a middle position between Islamic and conventional banks in facing liquidity risk. As a result, the following hypotheses are developed:

*Hypothesis 1:* The Islamic banks face higher degrees of the liquidity risk exposures than the conventional and hybrid banks.

*Hypothesis 2:* The hybrid banks that offer Islamic windows face less liquidity risk exposures than Islamic banks, yet, higher than conventional banks.

### **7.2.2. Banking Capital Regulation (CAP)**

The capital regulation remains on the top priority of banking supervisory regulations as a key determinant of liquidity (Distinguin et al., 2013: 3304). Since capital regulations may vary across countries, it is important to control for potential country effects (Barth et al., 2004; Distinguin et al., 2013: 3302).

It should be noted that this variable is considered as a critical factor influencing the behaviours of the banks as emphasised by the Basel Committee (Laeven and Levine, 2009: 263; Distinguin et al., 2013: 3302). The capital regulation is calculated as index based on the World Bank guidance for banking regulation and supervision in conjunction with Basel Accords (Barth et al., 2004; Distinguin et al., 2013: 3303; Laeven and Levine, 2009: 260). Accordingly, the greater value of the bank capital regulation index implies a stricter regulatory oversight under which banks operate (Barth et al., 2004; Klomp and Haan, 2012: 3201; Distinguin et al., 2013: 3303; Laeven and Levine, 2009: 260). It is, hence, important to point out that such an index does not assess bank capital requirements. However, it gauges the supervisory behaviour of assessing and validating the capital level at risk (Laeven and Levine, 2009: 263).

According to Laeven and Levine (2009: 260) the purpose of setting stricter capital regulation is to lessen risk-taking behaviour of influential bank shareholders through enforcing them to provide further funds at risk to meet the capital requirement.

Distinguin et al. (2013: 3303) argue that stricter capital oversight incentivises banks to enhance their capital ratio and hence hold a higher capital level. Accordingly, holding a high level of capital implies narrower financing gaps that directly decrease the liquidity risk that banks may face.

Having said that capital adequacy determines the amount of banks' loans that must be covered by their equity, it prevents them of taking excessive leverage to avoid insolvency risk. This suggests that high restrictions on capital adequacy ratio may limit banks' lending capacity (Eichberger and Summer, 2005: 550) and, hence, it may have negative association with their financing gap that could decrease the possibilities of banks facing liquidity risk. Moreover, applying stricter capital adequacy lead to higher acceptance standards and screening processes for generating new loans (Bolt and Tieman, 2004; Thakor, 1996), which has a direct impact in minimising the banks' financing gap and, hence, lessening the possibility of liquidity risk exposures that banks may face.

Consequently, in line with this argument, it is expected that high level of stringency on capital requirement is negatively associated with liquidity risk exposures that banks may face. Accordingly, the following hypothesis is developed:

*Hypothesis 3:* The tighter capital regulations, the less financing gap and, accordingly, the less liquidity risk exposures that banks face.

### **7.2.3. Credit Risk (CR)**

The ratio of loan loss provision to gross loans has been widely used as a proxy of credit risk (Dietrich and Wanzenried, 2011: 311; Klomp and Haan, 2012: 3198; Bouvatier and Lepetit, 2008: 521; Athanoglou et al., 2008: 27-28; Dietrich and Wanzenried, 2011: 311; Iannotta et al., 2007: 2132). According to Dietrich and Wanzenried (2011: 311) high levels of loan loss provision to gross loans ratio designates deterioration in credit quality that leads to worsening bank profitability and productivity. Hence, it can be argued that in a rational banking industry, such low credit quality may negatively impact the banks' lending and financing activities that immediately narrow down banks' financing gap. This can be as result of a negative impact of credit risk on banks' ability to borrow additional funds from the money market to cover its liquidity needs, as it may alert other money market players' concern that may muddle their incentives to respond

to such banks' liquidity needs. On the other hand, even if other money market members agree to lend, the funds will be available only at a high cost.

In these cases, the rational position for such banks with a high credit risk is to narrow their financing gap through reducing their lending activities or by raising more funds through offering high rates to attract more deposits. Hence, it can be stated that a high possibility of credit risk may push the bank to minimise its financing gap to mitigate potential liquidity risk exposures. Accordingly, this research develops the following hypothesis:

*Hypothesis 4:* The higher level of credit risk, the lower levels of liquidity risk exposures the bank will face.

#### **7.2.4. Liquid Assets (LA)**

The illiquid nature of banks' assets is considered as one of the critical sources of fragility of the banking sector (Wagner, 2007: 121). Therefore, it is required by regulatory bodies that all banks to have in place liquid assets to protect against liquidity risk. Liquid assets that banks hold can be considered as a 'net defensive position' against liquidity risks (Davis, 2008: 114). Hence, a bank can enhance its capability to fund any liquidity scarcity by increasing its liquid assets (Gatev and Strahan, 2006: 867).

However, among others, Cebenoyan and Strahan (2004: 19) and Wagner (2007: 121) state that an active bank in the loan sale market would have a lesser degree of liquidity shocks through risk diversification and transformation. Nowadays banks try to evade stocking liquid assets due to lower profits that they generate (Iannotta et al., 2007: 2132) and also because of "the low frequency of crises, limited liability of shareholders, and the safety net" (Davis, 2008: 114). A good testimony to this argument is the decline in the liquid assets of banks. For instance, in the United Kingdom, banks' liquid assets were 30 per cent of the total assets in the 1950s. However, nowadays they are only 1 per cent of its total assets (Davis, 2008: 114).

Holding high levels of liquid assets, therefore, may lead banks to "offset risks they have transferred from their balance sheet by taking on new risks. They may also be encouraged to increase their risk because a higher liquidity of loans allows them to liquidate more easily in a crisis" (Wagner, 2007: 122). A high level of liquid assets,

therefore, would boost the banks' confidence in getting easy access to the loan sale market. As a result, it may decrease the possibility of bank runs, which may boost banks' incentives to invest in risky assets or increase risk-taking activities (Cebenoyan and Strahan, 2004: 19). Based on this argument, the following hypothesis is developed:

*Hypothesis 5:* The higher levels of liquid assets that banks hold, the greater risk taking incentives of banks and, hence, the higher liquidity risk exposures the banks face.

#### **7.2.5. Long-Term Debt (LTD)**

Long-term debt is considered as one of the critical components of the capital structure of banks (Gill et al., 2011: 4; Bhagat et al., 2011: 1582). Since debts are exempted from corporate taxes, it may incentivise the bank managers to increase their lending and financing activities depending on such external funds (Bhagat et al., 2011: 1583). High debt levels imply lower equity ratio that may cause greater credit risk, which may lead to "lower profitability due to a greater likelihood of uncollectible amounts owed by bank clients" (Berríos, 2013: 107). Moreover, a large amount of debt ratio leads to an increase in long-term interest rates (Drudi and Giordano, 2000: 961). Hence, banks' exposures to insolvency may occur. Such a high degree of riskiness causes a negative impression on the bank management as managers seek external funds to cover their liquidity needs when they are unable to raise them internally (Bhagat et al., 2011: 1583). This in turn can lead to a customer panic, which may result in large amount of withdrawals that may lead to a bank run.

It can be also argued that "because long-term debt lowers the manager's continuation value through the likelihood of bankruptcy, the manager chooses lower long-term debt to lower the probability of bankruptcy" (Bhagat et al., 2011: 1583). However, an increase in the risk aversion attitude of bank managers decreases the productivity that managers can generate in each period and, hence, the anticipated compensation declines. Therefore, the managers focus on their own initial pay-off through raising external funds to boost the business activities rather than their continuation value. Managers choose greater long-term debt to exploit the positive effects of *ex post* debt tax shields on the surplus they generate from external financing to increase their initial pay-off (Bhagat et al., 2011: 1584).

Furthermore, Kapopoulos and Lazaretou (2007: 150) state that a large amount of debt-

to-assets ratio indicates lower fractions of shares possessed by bulky shareholders that implies a fragile structure of the firm's ownership. Hence, it is argued that debt influences the managers' behaviour, which may incentivise managers to act in favour of the firm and not shareholders. High levels of debt may also hinder investigating innovative businesses and, thus, negatively impact bank profitability (Barnett and Salomon, 2012: 1310; Kapopoulos and Lazaretou, 2007: 150) as high debt levels are associated with larger expenses (Perrini, 2008: 319; Chhibber and Majumdar, 1999: 229; Gill et al., 2011: 5). Accordingly, lower bank profitability and higher expenses levels may easily discourage new investors and depositors, thereby causing a dramatic decline in deposits. This in turn, leaves banks with wider financing gaps and, hence larger liquidity risk exposures are expected to face banks. Accordingly the following hypothesis is developed:

*Hypothesis 6:* The higher ratio of long-term debt is positively associated with higher degrees of liquidity risk exposures that banks face.

#### **7.2.6. Bank Size (SIZE)**

It is important to control for the size of the total assets to assess the riskiness of the banks (Iannotta et al., 2007: 2131; Klomp and Haan, 2012: 3202; Berger et al., 2007: 13; Athanasoglou et al., 2008: 28; Berger and Bouwman, 2009a). It is argued that large size allows banks to conduct a higher degree of product and loan diversification than smaller banks that in turn leads to reduction in risk (Dietrich and Wanzenried, 2011: 312). This can be explained by having large banks being less restricted than small banks in conducting their business operations as a result of their ability to offset the withdrawals by having an easy access to raise funds through offering high rate to attract larger amounts of deposits (Kishan and Opiela, 2000: 122). However, such behaviour may lower banks' profitability (Kishan and Opiela, 2000: 126; Carter et al., 2004; Berger et al., 2007).

Moreover, the implicit guarantee of compensation to investors of banks with large size by the governments may positively boost the confidence of investors and depositors to deposit or invest their funds with such banks (Mishkin, 2006: 990). The high confidence may protect banks from sudden withdrawals, which leads usually to insolvency risk (Mishkin, 2006: 990).

Furthermore, banks with bulky assets size tend to dedicate a huge amount of their financing activities to large firms and also governments (Kishan and Opiela, 2000: 126; Haselmann and Wachtel, 2010: 977-978). Since the government and other large firms are seen to be well trusted bodies by the public, large banks may attract higher level of deposits and other funds. Moreover, given that the deposits are the main players in banks' capital structure in general, and in the GCC banks in particular, it is expected that large banks would face less financing gap. According to Al-Hassan et al. (2010: 7-8) and Al-Khouri (2011: 74), the majority of the GCC banks are possessed by local investors and wealthy families due to the high restriction on market entry regulation as mentioned in the liquidity creation chapter. Hence, it can be stated that the GCC banking industry is not well segmented and depends heavily on a very traditional method that relies on local deposits and loans as its main resources and usages of funds. Consequently, such an environment lowers the contribution of the foreign liabilities and, hence shrinks the interbank market and weakens the performance of the bond markets (Al-Hassan et al., 2010: 7-8). As a result, the banking industry in the GCC region depends heavily on local deposits as the main sources of funds. This theoretical argument is consistent with actual statistics of this research sample where the ratio of deposits to total assets signifies 77 per cent to 80 per cent that represents the majority of the banks' capital structure. Accordingly, it can be argued that the higher size of total assets implies a higher amount of deposits that the GCC banks hold. Accordingly, based on the measurement of the financing gap, the higher level of deposits that banks hold, the narrower the financing gap that banks will face. As a result, the following hypothesis is established:

*Hypothesis 7:* The larger the banks' size, the less liquidity risk exposure the banks face.

### **7.2.7. Economic Growth (GDP)**

Since variations in economic conditions play a critical role in the pricing fluctuations of loans and deposits (Demirguc-Kunt, 2004: 596; Iannotta, 2007: 2131; Agoraki et al., 2011: 46), it is important to include real GDP growth to control for the impact of macroeconomic factors in assessing liquidity risk exposures. It can be stated that the higher levels of GDP growth promote the investment conditions (Agoraki et al., 2011: 46; Micco and Panizza, 2006: 250), which may in turn incentivise banks to offer high rates of return to attract more deposits to meet the high demand for various financial

products. Accordingly, it is expected that during economic booms, the banks may have higher levels of deposits that have a significant impact on minimising the financing gap of banks, which positively improves the liquidity position and reduces the risk exposure of banks. Hence, the following hypothesis is developed:

*Hypothesis 8:* The higher level of economic growth, the less liquidity risk the banks are exposed to.

### 7.3. DESCRIPTIVE DATA ANALYSIS

This section provides the descriptive statistics of the examined variables from the sampled banks, which helps to develop a better understanding of liquidity position of the sampled banks and establishes a good platform for testing the developed hypotheses. Table 6.1 presents the descriptive statistics.

As shown in Table 7.1, the magnitude of liquidity risk variable (LRE) of GCC banks ranges between a minimum value of -34.28 and maximum value of 0.54 with a standard deviation of 2.95, reflecting the level of dispersal from the mean, which indicates the variation of the degrees of liquidity risk exposures between the examined banks during period in question. The overall liquidity risk of the examined GCC banks recorded a mean value of -0.572. Such a mean value (-0.572) implies that overall GCC banks keep a good distance from being exposed to liquidity risk. Such statistics suggest that the examined GCC banks demonstrate to be risk averse to avoid the risk of incapability of meeting their financial obligations in a timely manner.

**Table 7.1: Descriptive Data of Liquidity Risk and its Determinants**

STATS	LRE	IB	CB	HB	CAP	CR	LA	LTD	Size(TA)	GDP
MEAN	-0.572	0.216	0.463	0.32	0.724	0.017	0.125	0.041	9405.1	5.684
MAX	0.54	1	1	1	0.89	1.19	0.79	0.78	77934.9	50.69
MIN	-34.28	0	0	0	0.44	-0.02	0	0	74.9	-5.15
SD	2.949	0.412	0.499	0.467	0.15	0.089	0.148	0.09	12711.2	5.597

*Data Source:* Bankscope Database

On the other side of the equation, the magnitude of the capital regulation stringency (CAP) ranges between 0.44 and 0.88 with a mean value of 0.72. Such fluctuation suggests that GCC countries do not stay on the same level of restriction in regulating capital requirements for the banking sector during the sample period.

With regard to the credit risk (CR) level, its magnitude ranges between -0.02 and 1.19 with a mean value of 0.017. The data indicates relatively low levels of external long-term debt funds that GCC banks hold, where the mean of long-term debt funds (LTD) that GCC banks hold is 0.041, representing 4.1 of it is total assets. Such a reasonably low ratio of debt level indicates the well-capitalised nature of the GCC banks in general. On other the hand, the ratio of liquid asset to total assets (LA) of the GCC banks on average scores 0.125, representing 12.5 per cent of total assets, which supports the statement that the GCC banks are of a ‘well capitalised nature’.

In relation to the size of total assets, the statistics show the average total asset of GCC banks ranges between US\$ 9,405.1 billion and US\$ 77,934.9 billion dollars, implying the examined GCC banks are having a different volume of total assets over the sample period. Finally, the real GDP growth rates of the GCC countries where the examined banks operate have scored 5.68 on average and with maximum and minimum of 50.69 and -5.15 respectively, suggesting the examined banks operate in different economic conditions that may positively or negatively affect their exposures to liquidity risk.

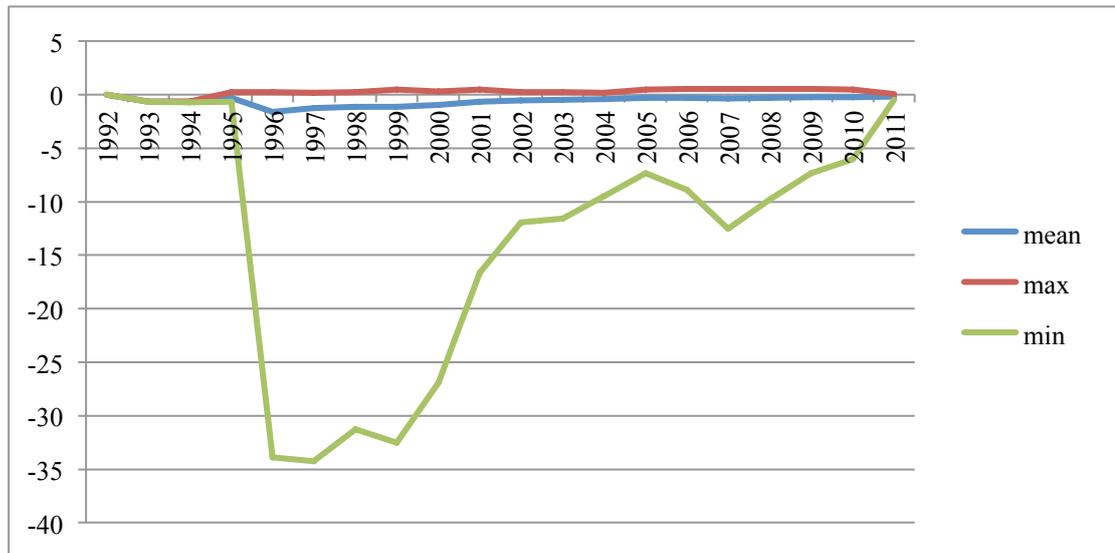
### **7.3.1. Trends of the Examined Variables**

To establish a deeper understanding of descriptive data analysis, it is important to explore the trends of the examined variables.

As Figure 7.1 illustrates, it can be clearly noticed that liquidity risk exposures of the GCC banks is in a state of constant increase in general and in particularly before and during the recent global financial crisis of 2007-2009. This implies that GCC banks are not immune to liquidity risk, especially during financial stress times. In 1996, the overall liquidity risk exposures scored the lowest levels, where the mean value reached -1.6 and ranged between minimum of -33.9 and maximum of 0.22. However, the good liquidity position of GCC banks did not last long, as the GCC banks’ financing gap increased especially from 2005 to the end of the sample period, where the financing gap reached a point not very far from zero as the mean score a value of -0.3 in 2005.

As can be seen in figure 7.1, the highest level of liquidity risk exposure was scored in 2009 and 2010 where the obtained mean scores are -0.25 and -0.22, respectively. Such statistics give a clear understanding that the GCC banks were dramatically affected by the global financial crisis of 2007-2009 in an adverse manner.

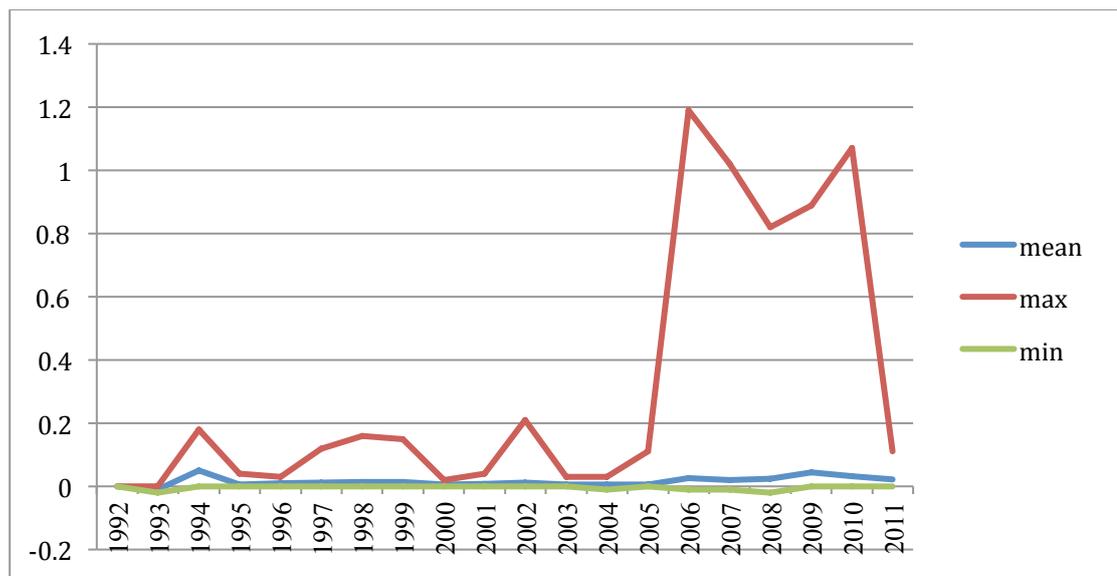
**Figure 7.1: Trends of Liquidity Risk Exposures of the GCC Banks over the Sample Period**



Data Source: Bankscope Database

The deterioration of loan quality and increasing the riskiness of banking sector can be the key sources of such liquidity position of the GCC banks as can be seen in figure 7.2 and 7.3. Figure 7.2 shows that credit risk of the GCC banks continued to be stable on average until 2005. From 1995 to 2005 the average credit risk ranged between 0.006 and 0.015, which indicates almost stable and low levels of credit risk that the GCC banks experienced during this period.

**Figure 7.2: Trends of Credit Risk of the GCC Banks over the Sample Period**

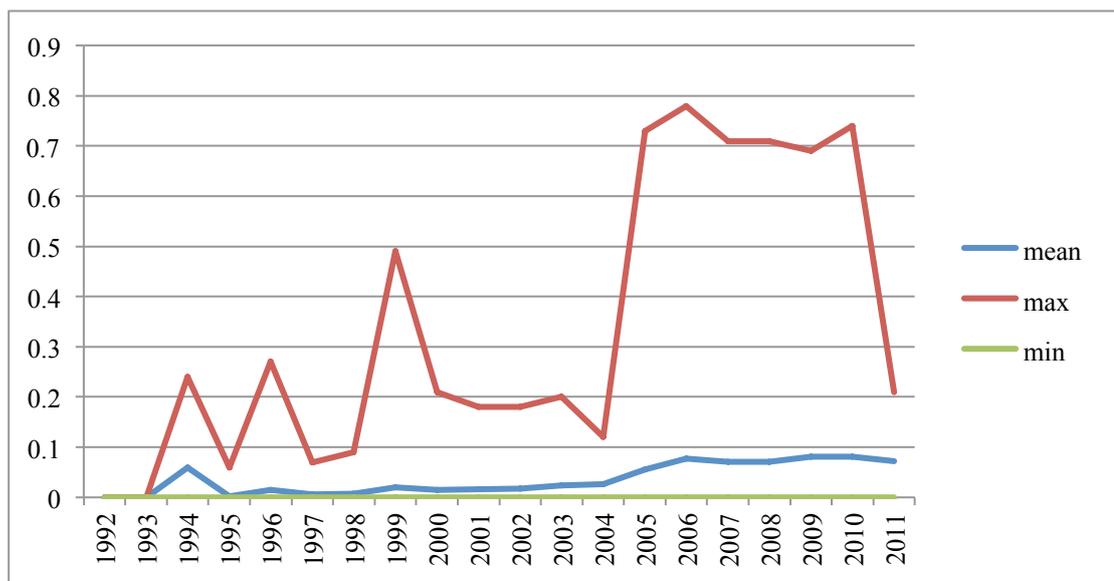


Data Source: Bankscope Database

However, as Figure 7.2 shows, the GCC banks could not continue to enjoy similar quality in their loans, where the deterioration of loan quality began to occur from 2006 onwards, as the credit risk on average reached 0.09, which implies bad loans representing 9 per cent of total loans. As can be seen, the highest level of GCC banks credit risk is scored in 2010, where the mean value reached 0.10, which implies bad loans representing 10 per cent of total loans. This indicates that the global financial crisis of 2007-2009 affected the deterioration of the bank loan quality in the GCC region. Moreover, in extreme cases the credit risk scores were at very high levels where the maximum of loan loss provisions value ranged between 1.19 and 1.07 in 2005 and 2010 respectively.

As can be seen in figure 7.3, the ratio of long-term debts as an indicator of riskiness level of the GCC banks provides evidence for the ‘negative impact’ of the recent global financial crisis on the GCC banks. The ratio of long-term debt continues at low levels on average from 1995 to 2004, as its ratio to total assets ranged between 0.002 and 0.02 respectively. However, from 2005 onwards, the GCC banks started to increase their borrowings of long-term debts as the mean curve began to rise and reached 0.08 in 2006 and continued increasing until 2010 with a mean value of 0.81, which implies that long-term debt represented 8.1 per cent of the GCC banks' total assets in 2010.

**Figure 7.3: Trends of Long-Term Debts of the GCC Banks over the Sample Period**

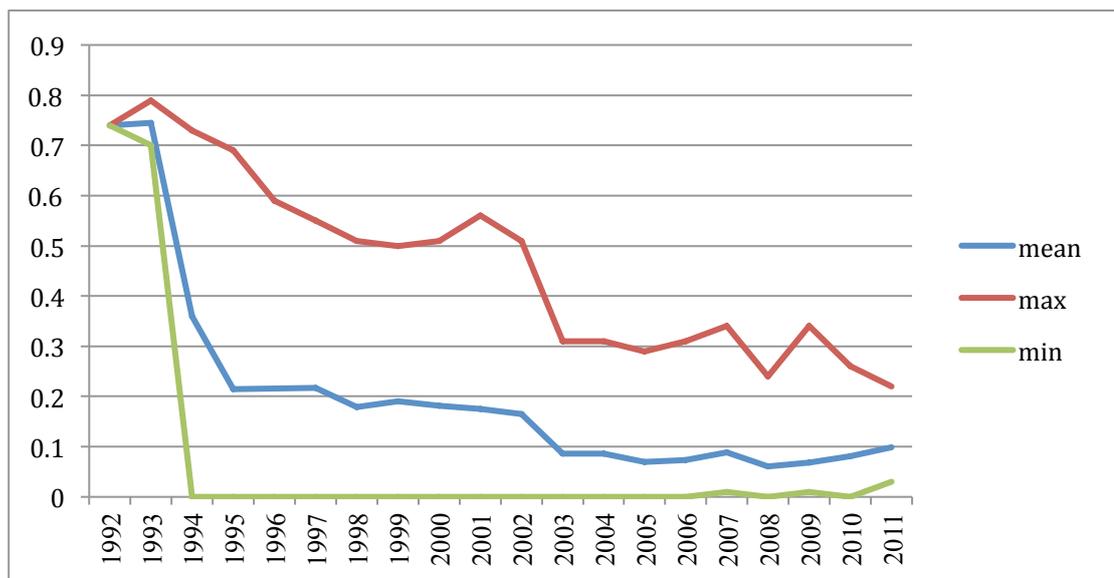


Data Source: Bankscope Database

As the trend implies, the GCC banks had to cover their liquidity needs during the recent global financial crisis by seeking external funds from money market as a result of inability of raising funds internally, such as through offering deposits. The maximum ratio of long-term funds to total assets recorded 0.78 and 0.74 in 2006 and 2010, respectively. Such statistics confirm that depending heavily on external funds and not on core deposits leads to a liquidity crisis (Saunders and Cornett, 2006).

Figure 7.4 shows the trends of liquid asset positions of the GCC banks over the sample period, which clearly shows that the GCC banks were in a steady illiquidity transformation from 1995 onwards, as the ratio of liquid assets to total assets on average scored a mean value of 0.21. In 2003 the illiquidity went further deeply downwards as the mean value reached 0.08.

**Figure 7.4: Trends of Liquid Assets of the GCC Banks over the Sample Period**

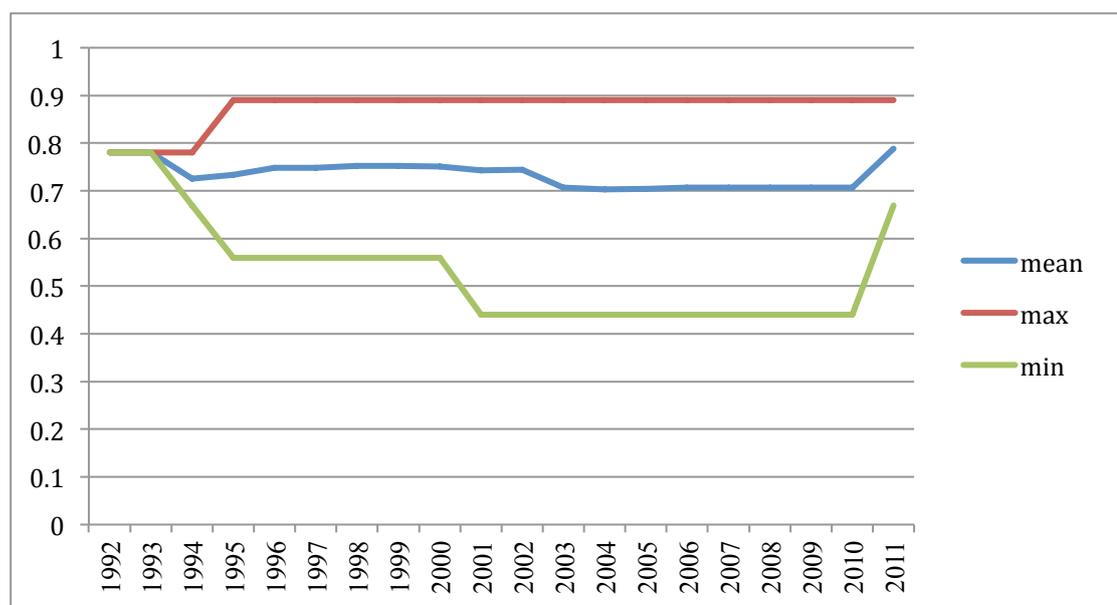


*Data Source:* Bankscope Database

As figure 7.4 show, it can be noted that 2008 witnessed the lowest degrees of liquid assets in the GCC banks, where the mean value score was 0.06, implying that the liquid assets represented 6 per cent of total assets in 2008 when the global financial crisis was at its peak. This statistic clearly indicates that the GCC banks' liquidity continued a steady decline in general and during the financial crisis in particular. Such statistics can be interrelated to deterioration of loan quality and the increases in borrowing levels from the money market.

Figure 7.5 depicts the trends in the stringency of capital regulation during the sample period with the objective of locating any changes in relation to the economic fluctuations. As the trends indicate in figure 7.5, the capital regulation remained with the same stringency level relatively from 1995 to 2002 with a mean value of 0.75. However, as can be seen from figure 7.5, the GCC countries reduced their banking capital regulation to 0.70 for the period between 2003 and 2010. It can be stated that the GCC countries considered the macroeconomic conditions and accordingly amended the capital regulation; accordingly a relaxation in capital regulation stringency was applied at the value of 0.05. Such a relaxation may help banks to cover their liquidity needs internally from their liquidity buffers rather than seeking external funds from the money market.

**Figure 7.5: Trends of Capital Regulatory Stringency of the GCC Banks over the Sample Period**



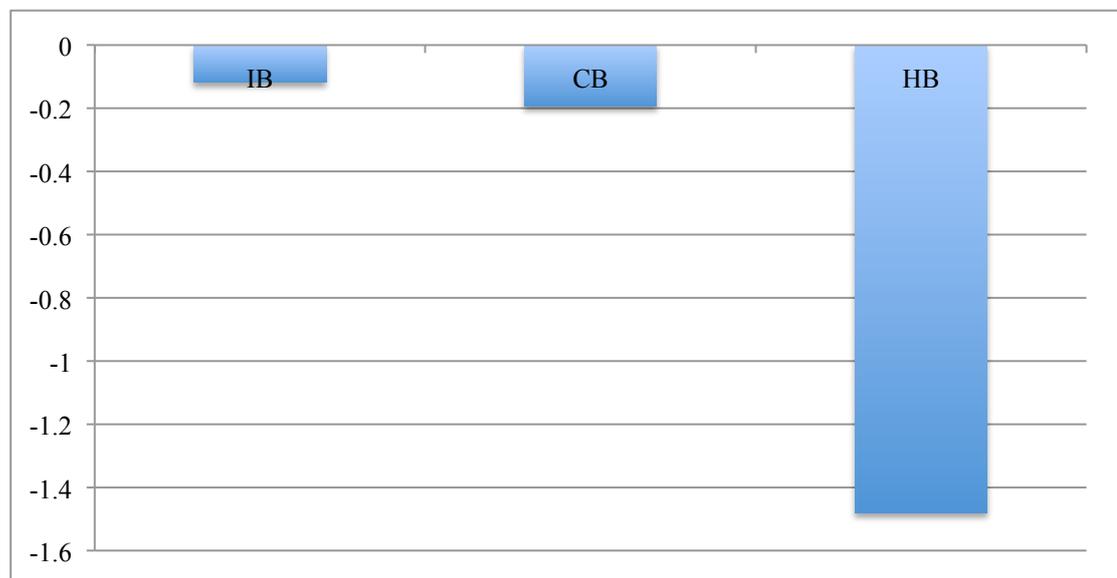
Data Source: Bankscope Database

### 7.3.2. Comparative Trends of the Variables between Islamic, Conventional and Hybrid Banks

For the sake of fulfilling the research objectives, it is important to explore the trends of liquidity risk exposures and some assessed bank specific variables that determine such exposures in the GCC banking sector in a comparative manner between Islamic, conventional and hybrid banks over the sample period to develop a better understanding.

Figure 7.6 illustrates the total overall liquidity risk exposures of Islamic banks compared to conventional and hybrid banks in the GCC region during the period in question. Figure 7.6 shows that Islamic banks are more exposed to liquidity risk than conventional banks with a mean value of -0.11 and -0.20, respectively as expected in hypothesis 1. However, inconsistent with the hypothesis 2, the descriptive data analysis shows that hybrid banks illustrated to be the safest in terms of facing liquidity risk with a mean value of -1.50. As the trends depicts in Figure 7.6, the obtained exposures to liquidity risk are in parallel with the actual assets size of Islamic, conventional and hybrid banks, where the overall mean value of their total assets records US\$ 5468.5, US\$ 6268.042 and US\$ 17061.5 million dollars.

**Figure 7.6: Overall Total Liquidity Risk of the GCC IB, CB and HB**

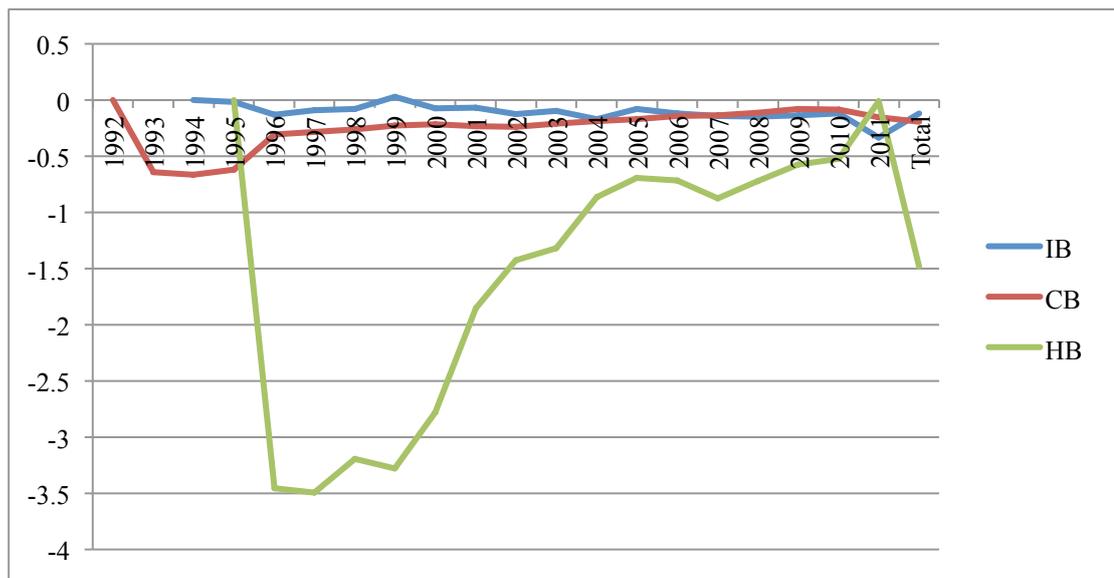


*Data Source:* Bankscope Database

It can be argued that such differences in facing liquidity risk exposures come as a direct result of the unique nature of Islamic banks' financial operations and products that are different from the conventional. This unique style leaves Islamic banks with more complications in managing their assets and liabilities positions. These results are consistent with theoretically developed hypothesis 1. However, inconsistent with hypothesis 2, the lowest exposure to liquidity risk is obtained in the case of hybrid banks, that can be as a result being a mixture of Islamic and conventional banking and attracting higher levels of funds from clients of both systems.

The overall trends of liquidity risk exposures, as depicted in figure 7.7, support the theoretical expectation of hypothesis 1. However, at the time of financial crisis of 2007-2009, Islamic banks show a better liquidity position than conventional banks. The mean value of Islamic banks' liquidity risk scored -0.14 in 2007, which began to increase in 2009 and 2010 with a mean value of -0.13 and -0.11 respectively, while conventional banks were exposed to liquidity risk with a mean value of -0.13 in 2007 and -0.11, -0.08 and -0.085 in 2008, 2009 and 2010 respectively. This implies that Islamic banks during the financial crisis attract higher levels of deposits, which should be considered as evidence for them to be considered safer than conventional banks. As the trends show, the hybrid banks continued to be in the best position even during the financial crisis with a mean value of -0.87, -0.72, -0.57 and -0.52 in 2007, 2008, 2009 and 2010, respectively compared to Islamic and conventional banks.

**Figure 7.7: Trends of Liquidity Risk of the GCC IB, CB and HB over the Sample Period**



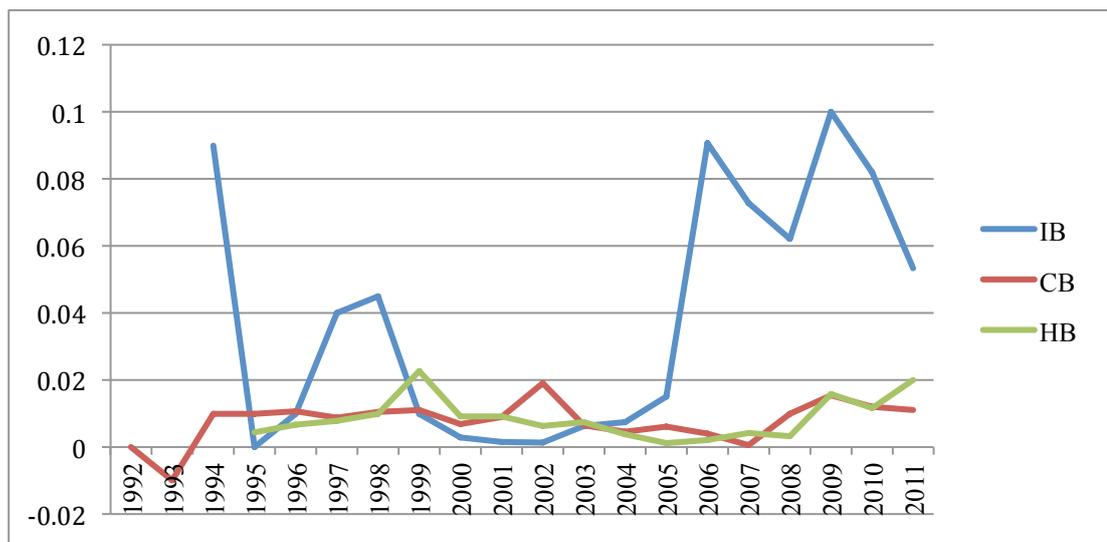
Data Source: Bankscope Database

It is important to have a critical understanding on the ratio of loan loss provision to total loan as a proxy of credit risk of Islamic banks compared to conventional and hybrid banks. Such analysis descriptively helps in understanding the quality of their loan profiles in a comparative manner. Figure 7.8 illustrates a remarkable fluctuation in credit risk trends in the GCC Islamic banks, as the trend shows that Islamic banks were the most vulnerable to credit risk in the GCC market with an overall mean value of 0.048, while conventional and hybrid banks scored an overall mean value of 0.009 and

0.0075, respectively.

As can be seen in Figure 7.8, the highest levels of loan loss provision to gross loans as a measure of credit risk occurred in the case of Islamic banks in 2006 and 2009 with a mean value of 0.09 and 0.10 respectively. This implies the Islamic banks' expectations of their bad loans much higher as their loan loss provisions to gross loans ranged between 9 per cent and 10 per cent of total assets in 2006 and 2009, which is very high compared to conventional banks with ratios and hybrid banks. As can be clearly seen from Figure 7.8, conventional and hybrid banks experienced very similar levels of credit risk. The degree of credit risk for conventional banks reached a mean value of 0.0005, 0.01, 0.15 and 0.012 in the year of 2007, 2008, 2009 and 2010, respectively, while for hybrid banks the credit risk reached a mean value of 0.004, 0.003, 0.015 and 0.011 in 2007, 2008, 2009 and 2010, respectively.

**Figure 7.8: Trends of Credit Risk of the GCC IB, CB and HB over the Sample Period**



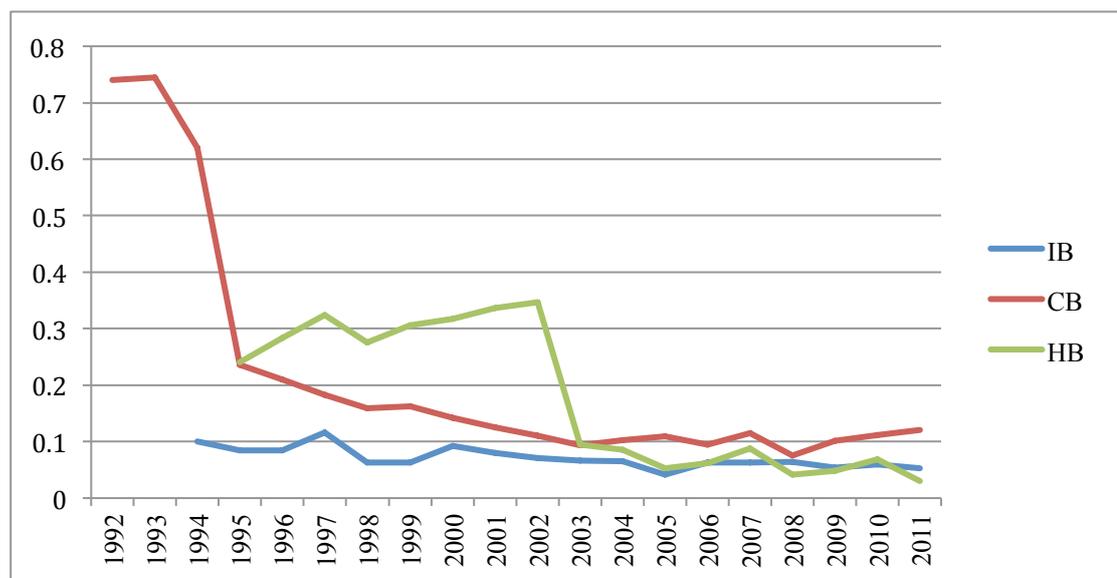
*Data Source:* Bankscope Database

It should be noted that even after the recent financial crisis, the ratio of loan loss provisions to gross loans as a proxy of credit risk of Islamic banks was higher than conventional and hybrid banks'. Such trends can be explained by the fact that Islamic financing being significantly concentrated on real estate and construction sectors, which have been exposed to hard hit throughout the GCC region (Al-Hassan, 2010), resulted in high levels of non-performing loans (Dar et al., 2014). It also can be as a response to the complexity of raising needed funds from Islamic money market, as Islamic banks

were recommended by regulatory bodies such as AAOIFI to adopt dynamic loan loss provisions that allow them to cover their credit risk. Such high levels of loan loss provisions can be also due to the declines of their deposit to total asset ratio that recorded a value of 0.65 in 2005, and stayed in a low levels in post-crisis period in 2010 and 2011 with value of 0.68 and 0.64 compared to conventional banks with value of 0.74 in 2005, 0.77 and 0.77 in 2010 and 2011, respectively, and as for hybrid banks with value of 0.80 in 2005 and 0.78 and 0.77 in 2010 and 2011, respectively as shown in Figure 7.8. Moreover, such high levels of loan loss provisions as a measure of credit risk can also be as a response to the higher level of long-term debt that Islamic banks held in the post-crisis period than conventional and hybrid banks as shown in Figure 7.10.

With regard to liquid assets, trends in Figure 7.9 also support the theoretical argument that Islamic banks are less liquid than conventional and hybrid banks as mention earlier. The statistics illustrate that Islamic banks are less liquid compared to conventional and hybrid banks in the GCC region with an overall mean value of 0.065 for Islamic banks and 0.14 and 0.15 for conventional and hybrid banks respectively. These figures support the previous results in relation to hybrid banks being the safest compared to Islamic and conventional banks in the examined sample.

**Figure 7.9: Trends of Liquid Assets of the GCC IB, CB and HB over the Sample Period**



Data Source: Bankscope Database

As the trends in Figure 7.9 show, the highest level of liquidity of Islamic banks is recorded in 1997, where the mean value reached to 0.12, which implies that the liquid assets represented 12 per cent of the total assets. However, as can be seen, the Islamic banks could not sustain the same level of liquid assets, especially in 2005 and onward until 2010, where the mean value ranged between 0.04 and 0.05. This confirms the critical situation that Islamic banks could experience if sudden withdrawals occur. As for the conventional banks, the mean value ranged between 0.1 and 0.12 between 2005 and 2010, which illustrate them to be highly liquid compared to Islamic banks. However, hybrid banks are shown to be less liquid between 2005 and 2010 than conventional banks, where the mean value ranged between 0.05 and 0.07, yet indicating a better position than Islamic banks.

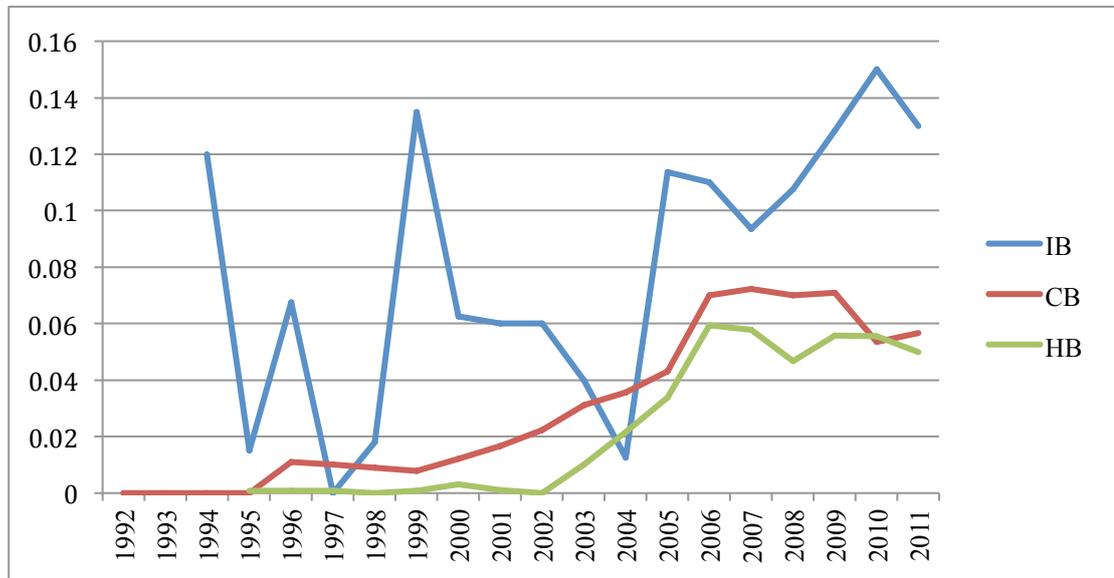
The descriptive analysis in the form of trend analysis in Figure 7.10 confirms the argument stating that due to the complex nature of the financial operations and products, Islamic banks are characterised with a high level of risk. The overall total mean value of long-term debt to total assets as a proxy for riskiness recorded 0.092 for Islamic banks and for conventional and hybrid banks 0.03 and 0.027, respectively.

Figure 7.10 illustrates the observed high fluctuations of Islamic banks' long-term debts, as an indicator of the riskiness level (Waddock and Graves, 1997; Kapopoulos and Sophia, 2007; Barnett and Salomon, 2012) that refers to the inability of banks to raise the required funds internally, throughout the sample period as the debt ratio records the highest levels at three points of time in year of 1999, 2005 and 2010 with mean value of 0.13, 0.11 and 0.15 respectively. The data shows that during the recent financial crisis Islamic banks assimilated large amounts of long-term debt, which explains the critical situation that Islamic banks suffer from as a consequence of the complex nature of its financial operations and products.

Along similar lines, as can be seen in Figure 7.10, conventional and hybrid banks increased their long-term debts borrowings from 2003 onwards, but at lower rates than Islamic banks, while from 1995 to 2002, the hybrid banks hold almost zero ratios of long-term debt to total assets. As shown in Figure 7.10, the highest levels of long-term debts for conventional and hybrid banks were recorded at the beginning of the financial crisis in 2007 with a mean value of 0.072 and 0.06 respectively. However, such ratios are still lower than the degree of Islamic banks' long-term debts with a value of 0.093 in

the same year. The given statistics clearly show that Islamic banks hold much higher levels of long-term debts, that clearly indicates a higher fragility of Islamic banks' capital structure and hence higher exposures to liquidity risk.

**Figure 7.10: Annual Trends of Long-Term Debt of the GCC IB, CB and HB over the Sample Period**



*Data Source:* Bankscope Database

Based on the trend analysis in this section, it can be stated that the descriptive statistics indicate that Islamic banks are more exposed to liquidity risk in comparison to conventional and hybrid banks. It also illustrates that hybrid banks are in a better position compared to conventional banks. The analysis further indicates that the Islamic banks are more exposed to credit risk, and their liquid assets are lower than conventional and hybrid banks. In addition, the data also shows that Islamic banks hold higher levels of long-term debts compared to their conventional and hybrid counterparts in the GCC region during the period in question.

#### **7.4. TESTING HYPOTHESES: AN EMPIRICAL COMPARATIVE ANALYSIS**

After presenting the results of the descriptive analysis in the preceding section, this section presents the empirical results of the panel data regressions with fixed effects model to test the developed hypotheses through estimating the key determinants of liquidity risk of the examined GCC banks. However, before providing the results, this section initially presents some econometric tests to confirm the reliability of the

examined variables. To examine the normality of the data, *skewness* and *kurtosis* standards are applied.

**Table 7.2: Magnitude of the Data Departure from Normality**

stats	LRE	CB	HB	CR	LA	LTD	CAP	Size	GDP
skewness	0.033	0.146	0.771	1.445	1.464	1.811	-0.325	-0.241	0.791
kurtosis	2.728	1.021	1.594	2.943	1.993	1.764	1.820	2.427	1.538

*Data Source:* Bankscope Database

As known as a rule, the data is normally distributed when the skewness results are between  $\pm 1.96$ ; and data distribution is not skewed when the coefficient of kurtosis ranges between  $\pm 3$  (Brooks, 2008 and Gujurati, 2006). Hence, in order to have normally distributed data, following Dhaliwal et al. (2012: 732) and Artiach et al. (2010: 40) this research uses winsorising method as explained in the research methodology (Chapter 4). The winsorised data appeared to be normally distributed where the skewness results are between  $\pm 1.96$  and the coefficient of kurtosis ranges between  $\pm 3$  as shown in Table 7.2.

Accordingly, as a result of the normally distributed data, this study therefore applies Pearson correlation matrix to investigate the multicollinearity between examined variables. The results of Pearson correlation matrix do not show a correlation value equivalent to or higher than 0.8 (Brooks, 2008; Haniffa and Cooke, 2005; Jing et al., 2008) and, hence, the assessed variables are seen not to be highly correlated as presented in Table 7.3.

**Table 7.3: Pearson Correlation Matrix Test**

	LRE	CB	HB	CR	LA	LTD	CAP	Size	GDP
LRE	1.000								
CB	0.053	1.000							
HB	-0.337	-0.638	1.000						
CR	0.021	0.015	-0.083	1.000					
LA	-0.501	0.066	0.153	0.044	1.000				
LTD	0.407	-0.054	-0.088	0.061	-0.202	1.000			
CAP	0.221	0.446	-0.441	0.035	-0.144	0.121	1.000		
Size	-0.319	-0.283	0.476	0.006	0.225	0.116	-0.191	1.000	
GDP	0.132	-0.018	-0.033	-0.196	-0.233	0.069	-0.129	-0.103	1.000

*Data Source:* Bankscope Database

Furthermore, Hausman test is employed to check the fittingness of using panel data regressions with either fixed effects model or random effects model. As presented in Table 7.4, the Hausman test results (0.0119;  $p < 0.05$ ) show that the null hypothesis is

rejected, implying the difference in coefficient is significant and systematic and hence suggests that the fixed effects is the most suitable method for the examined model as seen in Table 7.4.

The results of the panel data regressions with fixed effects model to estimate the determinants of liquidity risk are presented in Table 7.4, which show that the overall model is significant at  $F$ -test = 0.000,  $p < 0.01$  with  $R$ -square equal to 0.8942 indicating that goodness of fit statistics of the examined model is high as presented in Table 7.4.

**Table 7.4: Panel Data Regressions with Fixed Effects Model: Measuring the Determinants of Liquidity Risk Exposures**

LRE	Coef.	t-value
IB (_cons)	0.2845981	4.37***
CB	0.1143227	4.23***
HB	-0.1214292	-9.77***
CAP	-0.0674127	-1.32***
CR	-2.095438	-2.4**
LA	0.3838451	5.75***
LTD	1.064193	0.78
Size	-0.1254544	-7.38***
GDP	-0.0020016	-1.43*
R-Square		0.8942
Prob>F		0.0000
Hausman		0.0000
Bank No		20
Obs No		499
Group		20

Notes: \* $p < .10$ ; \*\* $p < .05$ ; \*\*\* $p < .01$

As the results in Table 7.4 depict, the panel data regressions model with fixed effects model reports consistent results with hypotheses 1 and supports the theory of Islamic banking, where a positive association between Islamic banks and liquidity risk exposures is obtained, which is statistically significant at  $t = 4.37$ ,  $p < 0.01$  with a coefficient value of 0.2845981. This statistics confirm the severity of liquidity risk exposure of examined Islamic banks.

In addition, the empirical results report a positive relationship between conventional banks and liquidity risk exposures, which is statistically significant at  $t = 4.23$ ,  $p < 0.01$  with a coefficient value of 0.1143227. The coefficient values indicate that Islamic banks are exposed to higher level of liquidity risk than conventional banks as suggested in hypothesis 1. However, in contradiction with hypothesis 2, the empirical results detect a negative association between hybrid banks and liquidity risk exposures and statistically

significant at  $t = -9.77$ ,  $p < 0.01$  with coefficient value of  $-0.1214292$  suggesting a better liquidity position of the hybrid banks than Islamic and conventional banks. Such empirical results are supported by descriptive data where the overall liquidity risk of Islamic, conventional and hybrid banks scored mean values of  $-0.11$ ,  $-0.19$  and  $-1.48$  respectively, as presented in Table 7.4.

Hence, the obtained empirical results are theoretically acceptable where the unique style of Islamic financial operations and products lead to different implications on liquidity risk of Islamic banks than conventional and hybrid banks. It imposes greater degrees of complication to Islamic banks in managing their positions on both sides of the balance sheet. Due to Islamic finance principles, such as prohibition of *riba* and *gharar*, and profit and loss sharing concept, Islamic banks need to operate under certain standards and restrictions on both sides of balance sheet. According to such restrictions, all financial contracts need to refer to a tangible, particular underlying asset (Cox and Thomas, 2005: 171). Such principles also imply that Islamic banks face more difficulties in selling debt-based assets due to the constraints on sale of debt (Ahmed, 2011: 60). Accordingly, Islamic banks have less access to raise external funds in a *Shari'ah*-compatible manner from money markets (Ahmed, 2011: 60). Moreover, Islamic banks are restricted to using options and derivatives and other common conventional financial products due to involvement of *gharar* (uncertainty) features (El-Gamal, 2006: 61-62; Khan, 2010: 807), which reflects wider ranges of difficulties in raising funds to cover their liquidity risk.

The obtained empirical results can also be supported by arguing that the small size of the Islamic banking sector (Greuning and Iqbal, 2008), the underdeveloped Islamic financial products (Khan and Ahmed, 2001), the absence of an multifaceted payment, settlement scheme in accordance with *Shari'ah*, variances in standardisation of documentation, product, process and accounting standards, impose different degrees of liquidity risk on Islamic banks (Greuning and Iqbal, 2008; Abdullah, 2011: 14). Moreover, due to the equity nature of deposits, the uncertainty on depositors' return expectation may increase the level of withdrawals (Beck et al., 2013: 436; El Gamal, 2006; Ben Arab and Elmelki, 2008: 80) and hence may cause higher degrees of liquidity risk that Islamic banks may face compared to conventional and hybrid banks as evidenced by the obtained fixed effects results in Table 7.4.

With regard to hybrid banks, their mixed nature enhances their liquidity position through the advantage of accumulating larger funds from customers of both systems. This statement is supported by the obtained descriptive data where the size of hybrid banks scores largest figures compared to Islamic and conventional banks with an overall mean value of US\$1,7061.5, while Islamic banks' score size with a mean value of US\$5,468.5 and conventional banks score size with a mean value of US\$6,268.042 million dollars. To confirm such a statement, the hybrid banks hold the largest amount of deposits with a mean value of US\$13,952.29 million, while Islamic banks hold the lowest amount of deposits with a mean value of US\$4,133.939 million. It should be noted that the conventional banks hold lower levels of deposits than hybrid banks, yet higher than Islamic banks with a mean value of US\$4,941.577 million. Such statistics support the statement that hybrid banks take advantage of their mixed nature of doing banking, which contradicts the expectation of hypothesis 2.

Moreover, the empirical results of this chapter are in-line with obtained empirical results of the liquidity creation model in Chapter 6, where it is proved empirically that Islamic banks create higher levels of liquidity and contribute more in transforming liquid liabilities into risky illiquid assets, which causes wider financing gaps and hence a greater degree of liquidity risk. However, the large size of hybrid banks allows for creating higher amount of liquidity than conventional banks, and, simultaneously provides them with a better liquidity position.

Consistent with hypothesis 3, as can be seen in Table 7.4, a negative relationship between stringency on bank capital regulatory requirement and liquidity risk exposures of the GCC banks is reported, which is statistically significant at  $t = -1.32$ ,  $p < 0.01$  with a coefficient value of  $-0.0674127$ . This implies that that an increase of 1 per cent in the level of stringency on capital regulations of GCC banks leads to a decrease of liquidity risk exposures by  $-0.067$  per cent, which suggests the important role that capital regulations play in financial stability of the GCC banks as a crucial element influencing the bank activities as highlighted by the Basel Committee (Laeven and Levine, 2009: 263; Distinguin et al., 2013: 3302).

The fixed effects regression results as depicted in Table 7.4 are also consistent with the expectation that the greater value of the bank capital regulation implies greater oversight standards under which the banks work as stated by Barth et al. (2004), Klomp and Haan

(2012: 3201), Distinguin et al. (2013: 3303) and Laeven and Levine (2009: 260). Such negative association can be explained by stating that stricter capital regulations enhances banks' capital ratio as suggested by Distinguin et al. (2013: 3303) and enhances banks' risk absorption capacity. Furthermore, the obtained results are supported by the 'financial fragility structure' and 'crowding-out of deposits' theory expecting a negative association between capital regulatory stringency and banks' lending activities (Distinguin et al., 2013: 3304) and accordingly, narrowing down the bank financing gap. Since capital fragility decreases with a high ratio of equity capital, banks' incentives to monitor borrower decreases accordingly as argued by Diamond and Rajan (2000) and Diamond and Rajan (2001) which may reduce banks' financing gaps. Moreover, the empirical results are consistent with Thakor's (1996) position that high capital requirements stringency leads to a stricter screening process of generating new loans or expanding the financing activities. Accordingly, applying such high standards on capital requirements minimises the financing gaps and hence lowers the level of liquidity risk exposures that banks face as shown in Table 7.4.

Consistently with hypothesis 4, the results in Table 7.4 depict that credit risk is negatively associated with liquidity risk exposures of the GCC banks and is statistically significant at  $t = -2.4$ ,  $p < 0.05$  with a coefficient value of -2.095438. This indicates that an increase of 1 per cent in the degree of the GCC banks' loan quality deterioration leads to a decrease in liquidity risk exposures by 2.09 per cent.

The results generated from panel data regressions with fixed effects can theoretically be supported by arguing that high levels of loan-loss provision to gross loans ratio implies an increase in depreciation level in the credit quality that leads to deterioration in bank profitability and productivity (Dietrich and Wanzenried, 2011: 311). In the case of high deterioration of loan quality, a conscientious and good bank management would focus on minimising the financing gap by reducing its lending activities by applying higher standards for generating new loans. Moreover, when a bank faces a high level of credit risk, it negatively impacts incentives for extending the existing loan and financing activities. Such behaviour may occur during the deterioration of loan or financing quality as a result of a negative impact of credit risk on banks' ability to raise additional funds from the money market to meet their liquidity needs, as other money market participants are concerned about their high degrees of credit risk. It is commonly

accepted that in a rational money market, funds are more costly for a bank with high levels of credit risk. Considering such an environment, the rational position for banks with a high credit risk is to tighten their financing gap through reducing their lending and financing activities. In addition, the negative association between credit risk and liquidity risk exposures can be explained by arguing that an increase in bad loans may erode bank capital as they have to use their capital to cover their liquidity gaps that in turn would negatively interrupt the banks' aptitude to expand their lending and investment activities (Bouvatier and Lepetit, 2008: 525) which will narrow their financing gap and hence their exposure to liquidity risk as evidenced in Table 7.4.

With regard to the association between liquid assets and liquidity risk exposures, the empirical results in Table 7.4 are consistent with hypothesis 5, which suggests that the liquid assets are positively correlated with liquidity risk exposures of the GCC banks and statistically significant at  $t = 5.75$ ,  $p < 0.01$  with a coefficient value of 0.3838451, indicating that a 1 per cent increase in the level of the GCC banks liquid asset leads to an increase of liquidity risk exposures by 0.38 per cent.

Having said that liquid assets are considered as a 'net defensive' that protects banks against liquidity shocks (Davis, 2008: 114), holding high levels of liquid assets impels banks to increase their risk-taking behaviour as suggested by Wagner (2007: 122). The obtained fixed effects regression results support the argument that a bank with high liquid assets has confidence in getting easy access to the loan sale market, which makes the bank less exposed to bank runs and hence it boosts its incentives to invest in risky assets or increase risk-taking activities as stated by Cebenoyan and Strahan (2004: 19) that positively impacts the financing gap and hence exposes itself to higher degrees of liquidity risk.

With regard to hypothesis 6, expecting a positive association between long-term debts and liquidity risk exposures is supported by the empirical result, where a positive coefficient is detected, yet, the results fail to detect any significant impact with  $t = 0.78$ ,  $p > 0.10$  with a coefficient value of 0.1, which is in contradiction with proposed hypothesis 6.

The detected positive association between long-term debts and liquidity risk exposures is in line with the hypothesis arguing that managers may increase debt ratio to increase

their initial pay-offs through expanding the business operations based on external debt financing (Bhagat et al., 2011: 1583). Moreover, high levels of long-term debts indicate the inability of banks' management to internally raise the needed funds, which leaves banks with a negative impression as suggested by Bhagat et al. (2011: 1583). This in turn can lead to a customer panic, which may in turn lead to large amounts of withdrawals that may cause a wider financing gap and, hence impose greater liquidity risk to banks.

Furthermore, holding a high amount of debt may also discourage innovative business approaches that negatively impact bank productivity, as stated by Barnett and Salomon (2012: 1310) and Kapopoulos and Lazaretou (2007: 150), as high debt levels imply higher costs (Perrini, 2008: 319; Chhibber and Majumdar, 1999: 229; Gill et al., 2011: 5). Hence, high levels of debt can lead to a decline in deposits and other funds, especially for Islamic banks, as deposits have some equity features. This, in turn, leaves banks with broader financing gaps, as is evidenced by the fixed effects regressions results in the GCC banking sector as presented in Table 7.4.

With regard to insignificant association between liquidity risk exposures and debt-to-total-assets ratio, it can be argued that levels of debt-to-assets-ratio remains limited and low, as the GCC banks are owned by rich families and governments. In addition, the liquidity effectiveness of the GCC financial sector severely depends on oil revenues. Moreover, the banking sectors in the GCC have been heavily protected from foreign competition. Under such circumstances, the sector is considered to be financially solid and well capitalised (Al-Khouri, 2011: 74). Therefore, it can be stated that in the case of liquidity shocks, the GCC banks can easily use their reserves or get support from governments rather than raising external funds from the money market in the form of long-term debts. This implies low levels of long-term debts that the GCC banks hold as GCC governments remains a safety cushion to overcome any potential liquidity difficulties.

As the findings depicted in Table 7.4 show, bank size has been detected as a negative determinant of liquidity risk exposures in the case of the GCC banking sector that is consistent with hypothesis 7, which implies that expecting a larger bank size attracts a higher amount of deposits that tightens the financing gap, and accordingly, it decreases liquidity risk exposure that banks may face. The empirical results show a negative

association between banks' size and liquidity risk exposures and is statistically significant at  $t = -7.38$ ,  $p < 0.01$  with a coefficient value of  $-0.1254544$  indicating that an increase of 1 per cent in the level of total assets of the GCC banks leads to a decrease of liquidity risk exposures by 0.125 per cent.

It should be mentioned that the existing body of knowledge supports the findings related to bank size established in this study, as higher size of total assets enhances banks' lending activities and boosts profitability. For example, bulky size allows banks to conduct larger levels of activities that promote the diversification of banks' business portfolio, which in turn lowers risk (Dietrich and Wanzenried, 2011: 312). This can be interpreted as large banks being less vulnerable to the monetary policy restrictions than small banks in conducting their business operations, which enables them to offset the sudden withdrawals by easy access to raise funds through offering a high rate of return to attract new deposits (Kishan and Opiela, 2000:122) that negatively impacts the financing gap.

Moreover, it is important to note that the implicit assurance of governments in the region in guaranteeing a compensation scheme to investors of large banks in the case of bankruptcy enhances the banks' position in the market and positively heightens the investors and depositors' confidence to deposit or invest their funds with such banks (Mishkin, 2006: 990). Having confident customers may also shield banks from very critical actions such as depositors' panic as stated by Mishkin (2006: 990). In addition, it is known that large banks usually deal with governments and large firms (Kishan and Opiela, 2000: 126; Haselmann and Wachtel, 2010: 977-978). Accordingly, such business behaviour attracts high levels of deposits and funds to invest, as the government and other large firms are perceived to be well trusted in the public's view. In addition, the empirical results are in line with the GCC banks' characteristics, where deposits are the main components of banks' capital structure as stated by Al-Hassan et al. (2010: 7-8) and Al-Khoury (2011: 74) that positively impact their liquidity position.

It is also important to stress that the banking industry in the GCC region is not well segmented, consequently, such an environment lowers the contribution of the foreign liabilities and, accordingly limits the interbank market and bond markets' activities (Al-Hassan et al., 2010: 7-8). As a result, the GCC banks depend heavily on a very traditional method that relies on local deposits as main resources of funds (Al-Khoury,

2011: 73). The theoretical construct on this issue is consistent with actual statistics of the sampled banks, where the ratio of deposits to total assets signifies 77 per cent to 80 per cent that represents the majority of the banks capital structure. Therefore, the larger banks size suggests greater amount of deposits that GCC banks hold, which directly narrows their financing gaps and hence decreases their liquidity risk as evidenced by the obtained fixed effects model results depicted in Table 7.4.

Consistent with hypothesis 8, the fixed effects regressions results in Table 7.4 report a negative relationship between real GDP growth and liquidity risk exposures. The detected relationship is statistically significant at  $t = -1.43$ ,  $p < 0.10$  with a value coefficient of  $-0.0020016$  indicating that an increase of 1 per cent in the level of the GDP in the GCC region leads to a decrease of liquidity risk exposures by 0.002 per cent. It can be stated that despite the significant impact of the real GDP growth in decreasing the liquidity risk exposures of GCC banks, its magnitude remains small. Such low impact can be as a result of low economic growth in the GCC region due to the decline in oil prices that remains the main financial source of the banking sector as stated by Al-Khouri (2011: 73). In evidencing this, it has been theoretically argued that business-cycle variations influence significantly the pricing instabilities of loans and deposits as argued by Demirguc-Kunt (2004: 596), Iannotta (2007: 2131) and Agoraki et al. (2011: 46). Accordingly, a better GDP growth improves the loan quality that decreases the credit risk and increase bank soundness (Agoraki et al., 2011: 46) that boosts lending behaviour (Micco and Panizza 2006: 250). Therefore, banks offer a higher rate of return to attract more funds to cover the market needs. The reported negative relationship, hence, can be a natural consequence of a high rate of return that attracts higher amount of funds, which positively minimises the financing gap and, hence, lowers the liquidity risk of the examined banks.

In concluding, the main finding in this empirical research confirms that Islamic banks face higher degrees of liquidity risk exposures than conventional and hybrid banks, which is consistent with the theoretical framework developed in this study. Such a conclusion highlights the importance of enhancing the product quality of Islamic banks and provides further attention of the need to accelerate and enhance the product development process to enable Islamic banks to enhance their liquidity position and optimise their role to contribute more in creating real economic activities. However, in

such an effort, authentic principles of Islamic norms should not be compromised; as it is such principles which provides robustness to the development and strength of the Islamic financial industry.

## **7.5. SENSITIVITY TESTS: ASSESSING THE ROBUSTNESS OF THE EMPIRICAL FINDINGS**

In order to examine the robustness of the results generated by the this study based on panel data regressions with fixed effects model, the association between liquidity risk exposures and its determinants is presented in three additional models that are regressed independently with fixed effects test. In addition, this section provides further checks through running panel data regressions with random effects to examine whether different econometric specifications of such a model has any impact on estimating the association between the examined variables. Furthermore, this section deals with potential endogeneity problems by applying Durbin-Wu test after conducting 2SLS instrumental variable regressions test.

### **7.5.1. Estimating the Determinants of Liquidity Risk Exposures through Additional Three Panel Data Regressions with Fixed Effects Model Applying Robust Standard Error**

With the objective of controlling for potential interaction effects between bank types (Islamic, conventional and hybrid banks) variables and other independent variables on liquidity risk exposure, further three panel data regressions models with fixed effects are applied.

Model I includes only bank type dummy variables with size and GDP variables, while model II includes bank type variables, capital regulation, size and GDP variables. In model III, all variables are included, however, with regard to the bank type variables, three dummy variables are included. It should be noted that the Islamic bank dummy variable is not taken as the base and it is left to the Stata econometric software to omit one of the three dummies. The omitted variable, then, becomes the reference point against other dummies and is represented by an intercept value (Brooks, 2008: 538). This approach is conducted to leave the freedom of omitting one of the three dummy variables to the Stata software system to control for any bias impact of selecting a dummy variable as a base for the other two dummies.

The results of all three panel data regressions models are reported in Table 7.5, which have produced consistent outcomes with the main fixed effects regressions model presented in the preceding section; however, different coefficient values are obtained due to controlling for the interaction effects of examined variables.

**Table 7.5: Estimating the Determinants of Liquidity Risk Exposures through Additional Three Panel Data Regressions with Fixed Effects Model Applying Robust Standard Error**

LRE	Coef.	t-value	Coef.	t-value	Coef.	t-value
IB (_cons)	0.3910734	4.7***	0.1681232	2.04**	0.2845981	4.37***
CB	0.0480594	2.17**	0.0696107	3.12***	0.1143227	4.23***
HB	-0.0769399	-5.46***	-0.0516735	-4.64***	-0.1214292	-9.77***
CAP			0.2831809	5.46***	-0.0674127	-1.32***
CR					-2.095438	-2.4**
LA					0.3838451	5.75***
LTD					1.064193	0.78
Size	-0.1581943	-7.59***	-0.1562523	-8.24***	-0.1254544	-7.38***
GDP	-0.0045095	-2.21*	-0.0066182	-5.51*	-0.0020016	-1.43*
R-Square		0.4428		0.4563		0.8942
Prob>F		0.0000		0.0000		0.0000
Hausman		0.0000		0.0000		0.0000
Bank No		58		58		20
Obs No		660		660		499
Group		20		20		20

Notes: \*p < .10; \*\*p < .05; \*\*\*p < .01

Model III reports that Islamic banks dummy is omitted suggesting the robustness of the main model as presented in Table 7.4. With regard to the direction of the dummies coefficients, models I, II and III report consistent results with the main model in the preceding section (Table 7.4), where a positive and significant relationship between Islamic banks and liquidity risk exposures is detected. In a similar direction, models I, II and III detect that conventional banks are positively and significantly associated with liquidity risk exposures. However, the fixed effects regression estimates in Table 7.5 suggest that the magnitude of Islamic banks' coefficient is greater than conventional banks', implying that Islamic banks are exposed to higher degrees of liquidity risk than conventional banks, which are consistent with the initial results of fixed effects as depicted in Table 7.4. The empirical results of models I, II and III also show that hybrid banks dummy has a negative coefficient and is statistically significant with liquidity risk exposures. Such results are highly consistent with the main model as presented in Table 7.4, implying the advantage of the mixed nature of hybrid banks in minimising their

financing gaps by accumulating higher funds.

The results verify the argument that Islamic banks face higher levels of liquidity risk exposures than conventional and hybrid banks. Such results confirm that the unique nature of Islamic banking operations and financial products have different implications on liquidity position. With regards to other determinants of liquidity risk exposures, model III consistently with the main fixed effects regressions model (as in Table 7.4) reports the same directions or signs of coefficients and significance impact between liquidity risk exposures and its determinants. Models II and III report consistent results with the main fixed effects model (Table 7.4) that indicate a negative and significant association between bank capital regulation stringency and liquidity risk exposures. In addition, model III detects negative and significant relationships between liquidity risk exposures and credit risk and positive and insignificant association with long-term debts. In respect to the size and GDP, while bank size stays significant and is negatively associated with liquidity risk exposures through all models, models II and III indicate that GDP is negatively and significantly associated with liquidity risk, yet not significant in model I, suggesting the interaction impact of other variables on the estimated relationship between liquidity risk exposures and the real GDP growth.

### **7.5.2. Estimating the Determinants of Liquidity Risk Exposures through Panel Data Regressions with Random Effects Model and Endogeneity Test**

In order to render further confirmation of the robustness of the main model of panel data regression with fixed effects as depicted in Table 7.4, this section presents the estimates of the panel data regressions model with random effects. As the results in Table 7.6 displays, the empirical results of panel data regression with random effects are consistent with fixed effects regressions model as depicted in Table 7.4.

As can be seen from the results in Table 7.6, the panel data regression with random effects model report a positive association between Islamic banks and liquidity risk exposures, which is statistically significant at  $z = 4.802$ ,  $p > 0.01$  with a coefficient value of 0.198025. Furthermore, the random effects regressions detect a positive association between conventional banks and liquidity risk exposures and is statistically significant at  $z = 4.57$ ,  $p > 0.01$  with a coefficient value of 0.1313544. Consistent with fixed effects regressions as reported in Table 7.4, the random effects regressions

confirm that the magnitude of Islamic banks' coefficient is greater than the coefficient produced for conventional banks, suggesting the degree of liquidity risk exposures of Islamic banks being higher than conventional banks. Thus the results obtained from the regressions model with random effects test as depicted in Table 7.6 support fixed effects estimates (as depicted in Table 7.4). Regarding the association between hybrid banks and liquidity risk exposures, where a negative relationship is detected, which is statistically significant at  $z = -10.69$ ,  $p > 0.01$  with a coefficient value of  $-0.1556443$  suggesting the advantage of mixed nature in reducing the financing gap as shown in Table 7.6.

**Table 7.6: Panel Data Regressions with Random Effects and Endogeneity Test**

LRE	Coef.	z-value
IB(_cons)	0.198025	4.802***
CB	0.1313544	4.57***
HB	-0.1556443	-10.69***
CAP	-0.0003133	-0.01***
CR	-2.768182	-3.67***
LA	0.5563309	9.18***
LTD	1.373448	21.44***
Size	-0.0780588	-5.73***
GDP	-0.0005208	-0.52*
R-Square		0.5230
Prob>F		0.0000
Durbin-Wu		0.7706
Hausman		0.0000
Bank No		58
Obs No		499
Group		20

Notes: \* $p < .10$ ; \*\* $p < .05$ ; \*\*\* $p < .01$

With regard to the stringency on capital regulations, as the results in Table 7.6 show, it remains negatively associated with liquidity risk exposures and it is statistically significant at  $z = -0.01$ ,  $p > 0.01$  with a coefficient value of  $-0.0003133$ , which is consistent with the fixed effects regressions results. The random effects regressions model as in Table 7.6 also reports consistent results with the main model based on fixed effects regressions results (as in Table 7.4), which evidences a negative association between credit risk and liquidity risk exposures with statistical significance at  $z = -3.67$ ,  $p > 0.05$  with a coefficient value of  $-2.768182$ . As the results show, the ratio of liquid assets to total assets is positively associated with liquidity risk exposures and is statistically significant at  $z = 9.18$ ,  $p > 0.01$  with a coefficient value of  $0.5563309$ . Furthermore, the empirical results of random regressions effects report that long-term debt to total assets ratio is positively associated with liquidity risk exposure and, unlike

in the main model, based on the fixed effects model (in Table 7.4), is statistically significant at  $z = 21.44$ ,  $p > 0.01$  with a coefficient value of 1.373448, which can be interpreted as a result of the econometric specification of the random effects model as explained in Chapter 4. Moreover, the random effects regressions model in Table 7.6 reports that bank size is negatively associated with liquidity risk exposures, which is statistically significant at  $z = -5.73$ ,  $p < 0.01$  with a coefficient value of -0.0780588. GDP also remains negatively associated with liquidity risk exposures and is statistically significant at  $z = -0.52$ ,  $p > 0.10$  with a coefficient value of -0.0005208, which is consistent with fixed effects regressions results in Table 7.4.

Lastly, in order to check that the examined variables are exogenous, after running the regressions using 2SLS instrumental variable test, the Durbin-Wu test is conducted to confirm non-existence of endogeneity threat. As can be seen in Table 7.6, the  $p$ -value of Durbin-Wu is 0.7706, which suggests that the null hypothesis cannot be rejected; and hence confirms that all examined variables are exogenous.

## **7.6. CONCLUSION**

Based on the empirical results of analysing the dataset of 58 commercial banks over the period 1992-2011 in the case of the GCC region, this empirical chapter provides statistical evidence of the liquidity risk exposures of Islamic banks in a comparative manner with conventional and hybrid banks. The results show that the Islamic banks are more exposed to liquidity risk than conventional and hybrid banks in the GCC region. In addition, the results empirically report that hybrid banks are less vulnerable to liquidity risk exposures than Islamic and conventional banks in the GCC banking sector. It should be noted that these empirical results are consistent with the theory of Islamic banking principles. Such a unique nature imposes higher degrees of complexity to Islamic banks in managing their assets and liabilities positions and, hence, causes greater levels of financing gap that increases their liquidity risk exposures. With regard to the key determinants of liquidity risk exposures, this chapter suggests that stricter capital regulations incentivise banks to apply sterner standards and a stricter screening process of new borrowers that lessen their lending and financing activities, which tightens the financing gap and accordingly lowers the level of liquidity risk exposures that the examined GCC banks face.

The empirical results obtained from the econometrics model tested in this chapter, moreover, suggest that credit risk is negatively and significantly correlated with liquidity risk exposures of GCC banks. Consistent with the proposed hypothesis, the empirical results detect that the liquid assets ratio is positively associated with liquidity risk exposures of GCC banks and is statistically significant. In addition, the results show that long-term debt ratio positively affects liquidity risk exposures but without any significant impact. The results also show that bank size has a negative and significant impact on liquidity risk exposures of the GCC banks. Finally, the empirical results indicate that real GDP growth has a negative and significant impact on liquidity risk exposures of the examined banks.

**CHAPTER EIGHT**  
**CONCLUSION**

## **CHAPTER EIGHT**

### **CONCLUSION**

#### **8.1. INTRODUCTION**

This research examines the hypotheses that Islamic banks contribute more in promoting economic growth through creating a higher amount of liquidity, and that their exposure to liquidity risk is higher than conventional and hybrid banks. In addition, this study investigates the key determinants of liquidity creation function and liquidity risk exposures in the case of the GCC banking sector. The previous two chapters, as the empirical chapters, provided empirical evidences for the identified hypotheses.

This chapter provides a summary of the research results followed by a critical reflection on the main findings, which also highlights the theoretical considerations and the policy implications which helped to identify certain recommendations. This chapter also underlines the research limitations and motivations for a wider scope of future research. Finally, this chapter brings the research journey to its conclusion.

#### **8.2. SUMMARY OF THE RESEARCH FINDINGS**

Consistent with the theory of Islamic financial principles, the empirical results in this study provides evidence that Islamic banks create more liquidity through transforming liquid liabilities into illiquid assets/investments and hence contribute more in enhancing the economic growth than conventional and hybrid banks as evidenced in Chapter 6. Moreover, the empirical results show that, due to unique nature of Islamic financial principles, products and operations, Islamic banks are more exposed to liquidity risk than their conventional and hybrid counterparts in the case of the GCC region as presented in Chapter 7.

The first empirical model in Chapter 6 estimates the association between liquidity creation and its key determinants. The statistical analysis of descriptive data in Chapter 6 shows that Islamic banks create a higher amount of liquidity than conventional and hybrid banks with an average ratio of liquidity creation to total assets of 0.126 for

Islamic banks, -0.032 for conventional banks and 0.039 for hybrid banks. Moreover, the fixed effects regressions model with robust standard error shows that the association between Islamic banks and liquidity creation is positive and statistically significant. The empirical results of the fixed effects model, further, detect that the relationship between conventional and hybrid banks and liquidity creation is negative and statistically significant. Such results imply that Islamic banks create higher levels of liquidity than conventional and hybrid banks, and, accordingly, contribute more in creating real economic activities in the case of examined GCC banks during the period in question. Such results provide statistical evidence that supports the theory of Islamic banking where Islamic banks are required to make a direct and effective impact on the real economy through operating in accordance with *Shari'ah* (Islamic law).

Moreover, the fixed effects regressions results of the first empirical model in Chapter 6 detect a negative and statistically significant association between official supervisory power and liquidity creation, implying the more the power that official supervisory bodies enjoy in intervening in the banks' management practices, the less amount of liquidity creation of GCC commercial banks is observed. Such a negative and significant relationship comes as a result of the limits that supervisory authorities can apply to the risk-taking activities of banks. Hence, such power of the official bodies decreases banks' long-term investment activities as well as providing new lending undertakings or extending the maturities of the existing loans/financing activities by using their liquid liabilities to foster the bank's financial strength. The empirical results of the first empirical model in Chapter 6 also show that a tighter and stringent policy on banking entry standards promotes banking competition behaviour. This implies that higher entry standards allow existing banks to accumulate power and possess greater franchise value. Accordingly, banks create higher amounts of liquidity as a result of the high price of loan/financing activities and low rates on deposits. The results of the first empirical model in Chapter 6, further show that more stringency on capital regulations has a negative and statistically significant impact on liquidity creation of the GCC banks, which suggests that more strictness in setting up the bank capital adequacy requirements usually leads to stricter acceptance standards to create new loans that funded by short-term liquid liabilities. In turn, more stringency on capital regulations causes a sharp deterioration in banks' aptitude to increase its liquidity creation. In addition, the results of the first empirical model in Chapter 6 report that a high level of stringency on bank

activity regulation triggers a reduction in liquidity creation of the examined GCC banks. This result is in-line with the argument that relaxing banking regulations helps involvement in a wider variety of activities. It suggests that such restrictions cause reductions in banks' incentives to screen borrowers and grant new loans or extend existing ones. Consistent with the theory, the results of the first empirical model in Chapter 6 indicate that credit risk has a negative and statistically significant impact on liquidity creation, which implies that a larger amount of loan loss provisions reflect in the deterioration of the credit quality that causes an immediate reduction in expanding financing and lending activities. While the empirical results of Chapter 6 detect that bank size statistically has a significant impact on liquidity creation, the results show that GDP has no significant effect on liquidity creation in the case of the examined GCC banks during the sample period. Suggesting the lower restrictions on large banks due their easy access to funds through offering liquid deposits and also based on a 'too big to fail' argument, banks with large size create higher amounts of liquidity. On the other hand, the empirical analysis in Chapter 6 suggests that due to the low levels of GDP growth of the sampled GCC countries as result of decreases in oil prices, an insignificant impact of GDP on liquidity creation of the examined GCC banks during the sample period is located. Moreover, the conducted sensitivity tests in Chapter 6 confirmed the results obtained from the main panel data regressions with fixed effects model of the first empirical model.

With regard to the liquidity risk, which is examined in the second empirical model in Chapter 7, the results show that the Islamic banks are more exposed to liquidity risk than conventional and hybrid banks in the GCC region. For this model, the descriptive analysis of examined data indicate that Islamic banks are most exposed to liquidity risk with a mean value of -0.11 of their financing gap as a measure for liquidity risk. While conventional banks show to be less exposed to liquidity risk with a mean value of -0.20, the hybrid banks illustrate the lowest degrees of liquidity risk exposures to stand as the safest type with a mean value of -1.50.

Furthermore, the panel data regressions with fixed effects model results in Chapter 7 provide empirical evidence that Islamic banks are more exposed to liquidity risk than conventional and hybrid banks. In addition, the results report that hybrid banks are less exposed to liquidity risk than Islamic and conventional banks in the GCC region. Hence,

it can be stated that the fixed effects regressions model reports consistent empirical results with the theoretical argument and descriptive data analysis suggesting that due to their distinctive nature, Islamic banks are more exposed to liquidity risk than conventional and hybrid banks.

Moreover, the results obtained for the second model in Chapter 7 show that capital regulation stringency has a negative and statistically significant impact on liquidity risk. Such findings suggest that higher level of restrictions of capital requirements implies a higher capital ratio narrows the financing gap that, in turn, decreases the liquidity risk exposures of the examined GCC banks. In addition, the empirical results of the second model in Chapter 7 show that credit risk has a negative and statistically significant impact on liquidity risk exposures, suggesting the deterioration of credit quality pushes banks to lower their financing gaps to mitigate the possibility of liquidity risk in the case of the examined sample.

With regard to liquid assets, the panel data regressions with fixed effects model in the case of the second model in Chapter 7 confirm that liquid assets are associated with liquidity risk exposures positively with statistically significant impact. Such a result confirms that holding high levels of liquid assets encourages banks into risk-taking attitudes. Since liquid assets stand as solid protection against liquidity shocks, they allow banks easy access to an assets sale market and hence boost incentives for riskier activities. This, accordingly, implies that a high degree of liquid assets positively impacts the financing gap and, consequently, lead to a higher degrees of liquidity risk exposures of the examined GCC banks.

It should be noted that second empirical model in Chapter 7 also shows a positive relationship between liquidity risk exposures and long-term debts. A high level of long-term debts implies the banks' inability to accumulate the needed funds internally that can put the banks' reputation at question by the fund suppliers. It also leads to high costs that negatively affect bank productivity, which consequently can lead to higher withdrawals. Accordingly, a high level of long-term debts leads to a wider financing gap that suggests higher exposures to liquidity risk. However, it has statistically insignificant impact, suggesting the low levels of borrowing long-term debts by the examined GCC banks that featured to be well capitalised.

With regard to the impact of bank size, the empirical results of the second model in Chapter 7 show a negative association between liquidity risk and bank size, implying that a large size allows banks to provide more products and activities diversification, which decreases risk. This, in turn, enhances banks' capacity to offset the unexpected withdrawals through offering a high rate of profits to accumulate the needed funds that directly narrow their financing gaps and, accordingly, lower their exposures to liquidity risk in the case of the examined sample. Furthermore, the empirical estimations of the second model in Chapter 7 detect a negative and statistically significant association between the GDP growth and liquidity risk exposures of the GCC banks. Such results suggest that a high level of GDP growth enhances the credit quality that improves banks' business. Accordingly it encourages banks to offer high rate to attract a higher amount of funds to cover the market's demand that, consequently, narrows down the financing gaps and, hence, lowers their liquidity risk exposures.

As the summarised findings of this study in this section suggests, it can be confidently stated that the empirical results obtained in this research are consistent with theory of Islamic banking and the existing literature on conventional banking.

### **8.3. CRITICAL REFLECTIONS ON THE RESEARCH FINDINGS AND THEORETICAL CONSIDERATIONS**

This research provides empirical findings consistent with the theory of the Islamic financial principles that Islamic banks create more liquidity through channelling higher amount of liquid funds into illiquid real economic activities, which in turn promotes more economic growth than conventional and hybrid banks in the case of the GCC region. However, the obtained results statistically provide that such levels of liquidity creation remain low compared with previous studies (Berger and Bouwman, 2009a; Deep and Schaefer, 2004). For instance, while the liquidity creation to total assets ratio of the examined GCC Islamic, conventional and hybrid banks scores 12 per cent, 3.26 per cent and 3.95 per cent respectively, based on similar measurement, the ratio of liquidity creation to total asset of the US banks was 20 per cent as found by Berger and Bouwman (2009a) and Deep and Schaefer (2004). Despite keeping in mind different banking regulations and market environment between the GCC region and US market, such differences remain high.

It should be noted that despite the large size of the GCC Islamic banking industry that represents about 34.11 per cent of global Islamic banking assets (IFSB, 2013: 9) which has mainly been possible through the oil-generated liquidity in the region, the GCC Islamic banks seem that they have not utilised their advantage of operating in a such wealthy region to contribute more in transforming the available funds into a state of productive investments. In addition, the proposed resilience of Islamic banking is very much related to such easy liquidity, which has been boosting the business cycles of the countries in the region against the adverse impact of financial crisis. Therefore, the success of Islamic banks in the region should be considered within such an abundant liquidity in the region; however, this success has not been translated proactively into creating as much as liquidity for economic activity, as this study proved so.

This relates the criticism that Islamic banks rely heavily on short-term or debt-based modes of financing by 75-80 per cent in their business operations, which contradicts the substance of Islamic law objectives, implying that Islamic banks do not optimise their position in channelling savings into real investment and hence contributing more in promoting the economic growth.

Notwithstanding such criticism, on the other hand the result of the second empirical model shows that Islamic banks, due to the unique nature of the Islamic financial system, are exposed to higher degrees of liquidity risk than conventional and hybrid banks in the case of the GCC examined sample. Accordingly, it can be stated that such higher levels of liquidity risk exposures reduce the propensity of Islamic banks to create more liquidity. Such empirical results prove that regardless of the Islamic banks' liquidity attitudes, the nature of Islamic financial products and operation force Islamic banks to create higher levels of liquidity than their conventional and hybrid counterparts.

In this respect, it is important to state that this does not imply that Islamic banks are not allowed, from a *Shari'ah* point of view, to conduct their financial activities using short-term debt-based/sale-based modes of financing activities in their operations. Therefore, it is essential to establish a clear distinction that needs to be taken into consideration between 'what is the most desirable for the ideal models for Islamic banks' and 'what is illegitimate behaviour that Islamic banks are prohibited to practice', and hence, such criticism can be accepted to some extent. However, Islamic banks in particular and the

GCC banks in general need to optimise their liquidity creation behaviour to manage their own growth as well as the growth of the countries in which they operate.

To conclude, it can be stated that the importance of liquidity creation function stems from the vital role played by banks as liquidity creators through channelling the savings into investment. In other words, in their role in combining the money with human efforts and transferring them into a state of production, banks contribute to real economic growth. It is worth mentioning that all types of banks create liquidity and hence contribute in generating real economic activities to some extent. However, the unique nature of Islamic banks provides a justification as to why Islamic banks generate higher levels of liquidity than conventional and hybrid banks in the case of the examined banks during the assessed period in the GCC region. As a consequence of such a unique nature, Islamic banks face more complexity than conventional and hybrid banks in managing their assets and liabilities in a timely fashion. In turn, this causes a wider financing gap that leads to liquidity risk exposures. Accordingly, liquidity risk causes disruptions to the economy as a result of early liquidation of the productive investments. Hence, liquidity is a very critical issue in the banking sector that needs to be very carefully dealt with.

#### **8.4. POLICY IMPLICATIONS AND RECOMMENDATIONS**

Based on the empirical results, this study provides some policy implications which can be relevant to banks, regulatory bodies and academics:

##### *Policy Implications and Recommendations for Banks:*

The empirical results show that Islamic banks create a higher level of liquidity through transforming short-term liquid liabilities into long-term illiquid assets and, as a result, are more exposed to liquidity risk than conventional and hybrid banks in the case of the examined sample from the GCC region. Accordingly, this research alerts the GCC banks in general and Islamic banks in particular to the importance of this function in contributing to enhance the economic growth, and the importance of enhancing the product development to overcome the consequences that occur due to early liquidation. Hence, this research suggests that more efforts need to be taken to establish a more sophisticated banking system by constructing internationally recognised *Shari'ah*-compliant products to enhance the Islamic money market. Accordingly, this implies that

Islamic banks in particular and conventional banks in general need to allocate more funds for further research in the field of product development and financial engineering.

Having said that one of the key sources of liquidity risk in the Islamic banking sector is the different interpretations of Islamic law by scholars, such as in the case of *bay al-dayn* (sale of debt), that lead to the lack of globally accepted instruments for managing liquidity risk. In responding to this problem, this research highlights the importance of establishing an international *Shari'ah* supervisory board that would gather the majority of the worldwide-recognised *Shari'ah* scholars to standardise the approval of dynamic instruments, which can be accepted globally for managing liquidity risk.

Moreover, this research highlights the wisdom of prioritising the equity-based model for Islamic banks in conducting their financial activities, as equity-based activities are usually with long-term tenure that positively affect the liquidity creation. Hence, this research suggests that Islamic banks, by satisfying the substance of Islamic law, will boost their liquidity creation. This in turn will increase their profitability, as illiquid assets are usually more profitable and will attract a wider range of investors, contributing further in enhancing economic growth by creating further real investments through such an ethically considered approach. However, while using illiquid equity-based financing modes will enhance the Islamic banks' ability to create higher levels of liquidity, it will increase their exposures to liquidity risk.

#### *Policy Implications and Recommendations for Regulators and Policy Makers*

Given that the empirical results show the critical role played by stringent regulatory and supervisory standards in decreasing the amount of liquidity that GCC banks create, the regulators should, therefore, be proactive in developing the necessary strategies for facilitating in a compliant manner liquidity creation in conventional banks in general and Islamic banks in particular. Although the high standards of such regulations boost the financial stability of the banks, it limits banks' capacity in creating more economic activities and promoting the growth of the economy. Hence, for regulators and policy makers, this research raises the importance of being more dynamic and proactive in taking into consideration such important functions in setting up the banking regulations. In other words, the regulators and policy makers should consider different economic conditions while setting up the regulations, in particular they need to pay special

attention during the financial stress times to promote the liquidity creation function and the financial stability of banks simultaneously.

More precisely, such implication is applied to the Basel III capital requirements, as higher capital requirements may play a significant role in reducing the lending/financing activities, which would negatively affect the amount of liquidity that banks may create. Hence, it can be stated that applying higher restrictions on capital adequacy would negatively affect banks' role of promoting the economic growth by contributing to real economic activities through channeling the funds into productive investments. Therefore, the importance of the banks' liquidity creation function should be taken into consideration while implementing Basel III liquidity ratios in order to enhance the role of banks in promoting the economic growth through financing their illiquid assets by liquid liabilities, which boosts the real economic activities.

Furthermore, despite the positive impact of applying high standards to enter the banking market on liquidity creation through promoting the competition environment, the regulators and policy makers should consider the disadvantages of uncompetitive markets that lead to monopoly and corruption, which in the long-term and on a large scale will negatively affect the social welfare and economic growth as a whole. Hence, such critical impacts need to be taken into account while setting up such standards.

In addition, since the unique nature of the Islamic financial products and operations have different implications on liquidity creation and liquidity risk exposures, the empirical results of this study highlight the need for promoting the liquidity infrastructure for the GCC banks in general and for Islamic banks in particular, such as International Islamic Liquidity Management Corporation, which plays a dynamic role in offering short-term *sukuk* to manage surpluses and demands of liquidity. This research also highlights the importance of the deposit insurance based on *takaful* that may increase the customers' trust in the Islamic banking industry, which may lead to the accumulation of more funds that will positively affect the banks' liquidity position. Moreover, using authentic, namely non-organised, *tawarruq* in the case of necessity, may also be an option for managing liquidity needs, however, it crucial to emphasise that it must be free of prearranged transactions to avoid any controversial aspects. Practicing such authentic instrument can be enhanced by promoting the role of independent agencies in facilitating the *tawarruq* transactions for all parties, the bank,

commodity vendor and commodity buyer. However, it is important to mention that using *tawarruq* may discourage the innovation in the field of product development in the Islamic financial market.

Furthermore, this research emphasises the significance of establishing internationally-accepted financial criteria related to products, operations and accounting standards that would positively affect the promotion of the liquidity position of the GCC Islamic banks in particular and Islamic banks in general, which should be positively considered.

#### *Policy Implications and Recommendations for Researchers and Academics*

With regard to critiques against Islamic banks of being heavily dependent on short-term debt-based/sale-based modes in their financial operations, this research empirically shows that regardless of such behaviour, Islamic banks create more liquidity and hence contribute more in economic growth than conventional and hybrid banks in the case of the examined GCC banks. Although criticism is always needed for further development, it needs to be constructive and weight should be given for further research and investigation for initiating new products and boosting the Islamic financial system through establishing comprehensive cooperation between researchers on individual and institutional levels, as well as bridging between academia and the financial industry.

### **8.5. LIMITATIONS AND FUTURE RESEARCH**

Despite the importance of the obtained consistent findings in relation to the role of banks in channelling savings into investment through the liquidity creation function and the critical impact of liquidity risk in causing a disruption to the productive investment as a result of early liquidation, this research remains with some limitations. The limited access to required and frequent data stays as one of the most critical limitations that faced by the researcher. For instance, having access to detailed and frequent data of on-and-off-balance sheet items might give more insights and enable generalisation of the research outcomes.

Given that liquidity-related issues are to some extent considered a new field in academia, evaluating liquidity creation and liquidity risk with other measurements with the availability of data would assist in elaborating a wider scope of liquidity behaviour and position of banks in general and Islamic banks in particular.

It would be also useful to assess the impact of explicit insurance schemes on liquidity creation and liquidity risk to test the theoretical argument of having such schemes leading to an increase in the liquidity creation of banks.

Examining the impact of quality information on liquidity behaviour to test the hypothesis that banks with higher transparency in providing information would attract more funds that would positively affect the liquidity creation and negatively impact their liquidity risk can also be a useful exercise. In addition, conducting a research on assessing the impact of liquidity creation and liquidity risk on bank reputational risk should be considered an important contribution to the literature. Furthermore, considering the impact of liquidity creation and liquidity risk on banks' value as measured based on the market-to-book ratio and the price-earnings ratio of the Islamic banks compared to conventional and hybrid banks can provide very useful insights.

Moreover, considering the quality of assets (financing activities) rather than the quantity is a very important aspect that needs to be assessed while examining the liquidity creation of banks, especially when conducting a comparative study between Islamic and conventional banks.

## **8.6. EPILOGUE**

This research set off with two main aims: to examine liquidity creation and also liquidity risk exposures of Islamic, conventional and hybrid banks in the GCC region from 1992 to 2011. In doing so, this study aimed at filling an essential gap; as modelling and empirical studies in liquidity creation and liquidity risk exposure are rather limited in the comparative investigation of Islamic, conventional and hybrid banks.

In responding to the aims and objectives of this study, mainly two empirical models developed in Chapters 6 and 7 to capture the liquidity creation function and liquidity risk exposure of Islamic banks compared with conventional and hybrid banks. For this, Chapter 2 and Chapter 3 provide the theoretical foundation, while Chapter 4 provides a background of the economic, financial system and banking sector of the sampled GCC countries and Chapter 5 presents the research process and econometrics specification.

As the foundational and empirical chapters demonstrate, this study confirms that the research aims and objectives have been fulfilled in a systematic and scientific fashion, which brings this study to an end at this stage.

## BIBLIOGRAPHY

Abdullah, D. V. (2011). Liquidity Management in Institutions Offering Islamic Financial Services. Kingdom of Saudi Arabia, Jeddah: Second Islamic Financial Stability Forum – 14 December 2010. Kuala Lumpur: Islamic Financial Service Board (IFSB).

Abul-Rahman, Y. (1999). “Islamic Instruments for Managing Liquidity”, *International Journal of Islamic Financial Services*, 1(1), 34-46.

Acharya, V. and Naqvi, H. (2012). “The Seeds of a Crisis: A Theory of Bank Liquidity and Risk Taking over the Business Cycle”, *Journal of Financial Economics*, 106, 349–366.

Acharya, V. V. (2009). “A Theory of Systemic Risk and Design of Prudential Bank Regulation”, *Journal of Financial Stability*, 5, 224–255.

Acharya, V. V. and Pedersen, L. H. (2005). “Asset Pricing with Liquidity Risk”, *Journal of Financial Economics*, 77, 375–410.

Acharya, V. V.; Amihud, Y. and Bharath, S. T. (2013). “Liquidity Risk of Corporate Bond Returns: Conditional Approach”, *Journal of Financial Economics*, 110, 358–386.

Aggarwal, R. and Yousef, T. (2000). “Islamic Banks and Investment Financing”, *Journal of Money, Credit and Banking*, 32 (1), 93-120.

Agoraki, M-E. K.; Delis, M. D. and Pasiouras, F. (2011). “Regulations, Competition and Bank Risk-Taking in Transition Countries”, *Journal of Financial Stability*, 7, 38–48.

Ahmed, H. (2011). *Product Development in Islamic Banks*. Edinburgh: Edinburgh University Press Ltd.

Akinboade, O. A. and Makina, D. (2009). “Bank Lending and Business Cycles: South African Evidence”, *African Development Review*, 21 (3), 476–498.

Al-Hassan, A.; Khamis, M. and Oulidi, N. (2010). The GCC Banking Sector: Topography and Analysis. *IMF Working Paper*, WP/10/87.

Al-Khouri, R. (2011). “Assessing the Risk and Performance of the GCC Banking Sector”, *International Research Journal of Finance and Economics*, 65, 72-81.

Al-Khouri, R. (2012), “Bank Characteristics and Liquidity Transformation: The Case of GCC Banks”, *International Journal of Economics and Finance*, 4 (12), 114-120.

Ali, S. S. (2012). State of Liquidity Management In Islamic Financial Institutions. *IRTI Working Paper Series*, No: 1433-06.

Allen, F. and Gale, D. (2004). “Competition and Financial Stability”, *Journal of Money, Credit, and Banking*, 36 (3), 453-480.

Allen, F. and Gale, D. (2004). “Financial Intermediaries and Markets”, *Econometrica*, 72 (4), 1023-161.

- Allen, F. and Santomero, A. M. (1998). “The Theory of Financial Intermediation”, *Journal of Banking and Finance*, 21, 1461-1485.
- Allen, F.; Carletti, E. and Gale, D. (2009). “Interbank Market Liquidity and Central Bank Intervention”, *Journal of Monetary Economics*, 56, 639–652.
- Allen, W. R. (1993). “Irving Fisher and the 100 Percent Reserve Proposal”. *Journal of Law and Economics*, 36 (2), 703-717.
- Altunbas, Y.; Fazylov, O. and Molyneux, P. (2002). “Evidence on the Bank Lending Channel in Europe”, *Journal of Banking and Finance*, 26, 2093–2110.
- Aragon, G. O. and Strahan, P. E. (2012). “Hedge Funds as Liquidity Providers: Evidence from the Lehman Bankruptcy”, *Journal of Financial Economics*, 103, 570–587.
- Ascioglu, A.; Hegde, S. H. and McDermott, J. B. (2005). “Auditor Compensation, Disclosure Quality, and Market Liquidity: Evidence from the Stock Market”, *Journal of Accounting and Public Policy*, 24, 325–354.
- Asea, P. K. and Blomberg, B. (1998). “Lending Cycles”, *Journal of Econometrics*, 83, 89-128.
- Aspachs, O.; Nier, E. and Tiesset, M. (2005). *Liquidity, Banking Regulation and the Macroeconomy: Evidence on Bank Liquidity Holdings from a Panel of UK-Resident Banks*. Switzerland: Bank for International Settlements.
- Asutay, M. (2007). “Two Track Development: The Future of Islamic Finance in Turkey”, *Islamic Business and Finance*, 22, 12-13.
- Asutay, M. (2012). “Islamic Economics: Between Aspirations and Reality”. *Papers of Dialogue* 3 July - September: 20-23.
- Asutay, M., Aysan, A. F. and Karahan, C. C. (2013), “Reflecting on the Trajectory of Islamic Finance: From Mit Ghamr to the Globalisation of Islamic Finance”, *Afro Eurasian Studies*, 2 (1&2), 5-14.
- Athanasoglou, P. P.; Brissimis, S. N. and Delis, M. D. (2008). “Bank-Specific, Industry-Specific and Macroeconomic Determinants of Bank Profitability”, *Journal of International Financial Markets, Institutions & Money*, 18, 121–136.
- Ayub, M. (2007). *Understanding Islamic Finance*. London: John Wiley & Sons Ltd.
- Baglioni, A. (2012). “Liquidity Crunch in the Interbank Market: Is It Credit or Liquidity Risk, or Both?”, *Journal of Financial Service Research*, 41, 1-18.
- Baglioni, A. and Monticini, A. (2010). “The Intraday Interest Rate under a Liquidity Crisis: The Case of August 2007”, *Economics Letters*, 107, 198–200.
- Baldan, C.; Zen, F. and Rebonato, T. (2012). “Liquidity Risk and Interest Rate Risk on Banks: Are They Related?”, *The IUP Journal of Financial Risk Management*, IX, 4, 27-51.

- Baltagi, B. H. (2005). *Econometric Analysis of Panel Data*. England: John Wiley and Sons.
- Banti, C.; Phylaktis, K. and Sarno, L. (2012). “Global Liquidity Risk in the Foreign Exchange Market”, *Journal of International Money and Finance*, 31, 267–291.
- Bardos, K. S. (2011). “Quality of Financial Information and Liquidity”, *Review of Financial Economics*, 20, 49–62.
- Barnett, M. L. and Salomon, R. M. (2012). “Does It Pay to be Really Good? Addressing the Shape of the Relationship between Social and Financial Performance”, *Strategic Management Journal*, 33, 1304–1320.
- Barth, J. R.; Caprio T. G. and Levine, R. (2004). “Bank Regulation and Supervision: What Works Best?”, *Journal of Financial Intermediation*, 13, 205-248.
- Barth, J. R.; Lin, C.; Ma, Y.; Seade, J. and Song, F. M. (2013). “Do Bank Regulation, Supervision and Monitoring Enhance or Impede Bank Efficiency?”, *Journal of Banking and Finance*, 37, 2879–2892.
- Barth, J. R.; Nolle, D. E.; Phumiwasana, T. and Yago, G. (2003). “A Cross-Country Analysis of the Bank Supervisory Framework and Bank Performance”, *Journal of Financial Markets, Institutions and Instruments*, 12, 67-120
- Basel Committee on Banking Supervision (BCBS) (1992). *A Framework for Measuring and Managing Liquidity*. Switzerland: Bank for International Settlement.
- Basel Committee on Banking Supervision (BCBS) (2000). *Sound Practices for Managing Liquidity in Banking Organizations*. Switzerland: Bank for International Settlement.
- Basel Committee on Banking Supervision (BCBS) (2006). *The Management of Liquidity Risk in Financial Groups*. Switzerland: Bank for International Settlement.
- Basel Committee on Banking Supervision (BCBS) (2008). *Principles for Sound Liquidity Management and Supervision*. Switzerland: Bank for International Settlement.
- Basel Committee on Banking Supervision (BCBS) (2010). *Basel III: International Framework for Liquidity Risk Measurement, Standards and Monitoring*. Switzerland: Bank for International Settlement.
- Beck, T.; Demirgüç-Kunt, A. and Merrouche, O. (2013). “Islamic VS. Conventional Banking: Business Model, Efficiency and Stability”, *Journal of Banking and Finance*, 37, 433–447.
- Ben Arab, M. and Elmelki, A (2008). “Managing Risks and Liquidity in an Interest Free Banking Framework: The Case of the Islamic Banks”, *International Journal of Business and Management*, 3 (9), 80-95.
- Ben Naceur, S. and Omran, M. (2011). “The Effects of Bank Regulations, Competition, and Financial Reforms on Banks' Performance”, *Emerging Markets Review*, 12, 1–20.

- Berger, A. N. and Bouwman, C. H. S. (2007). *Bank Liquidity Creation. Working paper*. Available at: < [http://www.fdic.gov/bank/analytical/cfr/Berger\\_Bouwman.pdf](http://www.fdic.gov/bank/analytical/cfr/Berger_Bouwman.pdf)>. Access Date: 21<sup>st</sup> January, 2012.
- Berger, A. N. and Bouwman, C. H. S. (2009a). “Liquidity Creation”, *The Review of Financial Studies*, 22 (9), 3779- 3837.
- Berger, A. N. and Bouwman, C. H. S. (2009b). *Financial Crises and Bank Liquidity Creation*. Paper Presented at Conference on the Financial Crisis, on 7<sup>th</sup>-8<sup>th</sup> May, hosted by CREI, Universitat Pompeu Fabra Barcelona.
- Berger, A. N.; Bouwman, C. H. S.; Kick, T. and Klaus, S. (2011). *Bank Risk Taking and Liquidity Creation Following Regulatory Interventions and Capital Support*. Available at SSRN: <<http://ssrn.com/abstract=1908102> or <http://dx.doi.org/10.2139/ssrn.1908102>> Access Date 3<sup>rd</sup> October 2011.
- Berger, A. N.; Bouwman, C. H. S.; Kick, T. and Schaeck, K. (2010). Bank Liquidity Creation and Risk Taking during Distress. *Discussion Paper Series 2: Banking and Financial Studies* No 05/2010. The Deutsche Bundesbank.
- Berger, A. N.; Rosen, R. J. and Udell, G. F. (2007). “Does Market Size Structure Affect Competition? The Case of Small Business Lending”, *Journal of Banking and Finance*, 31, 11–33.
- Bernanke, B. and Gertler, M. (1989), “Agency Costs, Net Worth, and Business Fluctuations”, *The American Economic Review*, 79 (1), 14-31.
- Berrios, M. R. (2013). “The Relationship between Bank Credit Risk and Profitability and Liquidity”, *The International Journal of Business and Finance Research*, 7 (3), 105-118.
- Bhagat, S.; Bolton, B. and Subramanian, A. A. (2011). “Manager Characteristics and Capital Structure: Theory and Evidence”, *Journal of Financial and Quantitative Analysis*, 46 (6), 1581–1627.
- Bhattacharya, S. and Thakor, A. V. (1993). “Contemporary Banking Theory”, *Journal of Financial Intermediation*, 3, 2-50.
- Bhattacharya, S.; Boot, A. W. A. and Thakor, A. V. (1998). “The Economics of Bank Regulation”, *Journal of Money, Credit and Banking*, 30 (4), 745-770.
- Biesing, P. (1966). “Objectivism vs. Subjectivism in the Social Sciences”, *Philosophy of Science*, 33 (1/2), 124-133.
- Bilinski, P.; Liu, W. and Strong, N. (2012). “Does Liquidity Risk Explain Low Firm Performance Following Seasoned Equity Offerings?”, *Journal of Banking and Finance*, 36, 2770–2785.
- Billett, M. T.; Flannery, M. J. and Garfinkel, J. A. (1995). “The Effect of Lender Identity on a Borrowing Firm's Equity Return”, *The Journal of Finance*, 50 (2), 699-718.
- Bolt, W. and Tieman, A. F. (2004). “Banking Competition, Risk and Regulation”,

*Journal of Economics*, 106 (4), 783–804.

Bordeleau, E. and Graham, C. (2010). The Impact of Liquidity on Bank Profitability. *Bank of Canada Working Paper*, 2010-xx.

Borio, C. and Zhu, H. (2012). “Capital Regulation, Risk-Taking and Monetary Policy: A Missing Link in the Transmission Mechanism?”, *Journal of Financial Stability*, 8, 236-251.

Bourke, P. (1989). “Concentration and Other Determinants of Bank Profitability in Europe, North America and Australia”, *Journal of Banking and Finance*, 13, 65-79.

Bouvatier, V. and Lepetit, L. (2008). “Banks’ Procyclical Behavior: Does Provisioning Matter?”, *Journal of International Financial Markets, Institutions and Money*, 18, 745-770.

Bouvatier, V. and Lepetit, L. (2012). “Effects of Loan Loss Provisions on Growth in Bank Lending: Some International Comparisons”, *International Economics*, 132, 91-116.

Boyd, J. H. and Nicolo, G. D. (2005). “The Theory of Bank Risk Taking and Competition Revisited”, *The Journal of Finance*, LX (3), 1329-1343.

Brandon, R. G and Wang, S. (2013). “Liquidity Risk, Return Predictability, and Hedge Funds’ Performance: An Empirical Study”, *Journal of Financial and Quantitative Analysis*, 48 (1), 219–244.

Broll, U. and Wahl, J. E. (2011). “Liquidity Constrained Exporters and Trade”, *Economics Letters*, 111, 26–29.

Brooks, C. (2008). *Introductory Econometrics for Finance*. Cambridge: Cambridge University Press.

Bryant, J. (1980). “A Model of Reserves, Bank Runs, and Deposit Insurance”, *Journal of Banking and Finance*, 4, 335-344.

Bryman, A. (2001). *Social Research Methods*. Oxford: Oxford University Press.

Bryman, A. (2006), “Integrating Quantitative and Qualitative Research: How is it Done?”, *Qualitative Research*, 6 (1), 97–113.

Burrell, G. and Morgan, G. (1979). *Sociological Paradigms and Organisational Analysis: Elements of the Sociology of Corporate Life*. England: Ashgate Publishing Limited.

Cao, J. and Illing, G. (2010). “Regulation of Systemic Liquidity Risk”, *Financial Markets and Portfolio Management*, 24, 31–48.

Carletti, E.; Haetmann, P. and Spagnolo, G. (2007). “Bank Mergers, Competition, and Liquidity”, *Journal of Money, Credit and Banking*, 39 (5), 1067-1105.

Carter, D. A.; McNulty, J. E. and Verbrugge, J. A. (2004). “Do Small Banks Have an

Advantage in Lending? An Examination of Risk-Adjusted Yields on Business Loans at Large and Small Banks”, *Journal of Financial Services Research*, 25:2/3, 233-252.

Cebenoyan, A. S. and Strahan, P. E. (2004). “Risk Management, Capital Structure and Lending at Banks”, *Journal of Banking and Finance*, 28, 19–43.

Cetorelli, N. and Goldberg, L. G. (2012). “Liquidity Management of U.S. Global Banks: Internal Capital Markets in the Great Recession”, *Journal of International Economics*, 88, 299–311

Chang, C-P. and Lin, T-H. (2006). “Bank as a Liquidity Provider and Interest Rate Discovery: An Option-Based Optimization”, *Expert Systems with Applications*, 31, 360–369.

Chapra, M. U. (1992). *Islamic and Economic Development*. Leicester, UK: The Islamic Foundation.

Chhibber, P. K. and Majumdar, S. K. (1999). “Foreign Ownership and Profitability: Property Rights, Control, and the Performance of Firm in India Industry”, *Journal of Law and Economics*, 42 (1), 209-238.

Chiu, J.; Chung, H.; Ho, K-Y. and Wang, G. H. K. (2012), “Funding Liquidity and Equity Liquidity in the Subprime Crisis Period: Evidence from the ETF Market”, *Journal of Banking and Finance*, 36, 2660–2671.

Choudhury, M. A. (2011). *Islamic Economics and Finance an Epistemological Inquiry*. United Kingdom: Emerald Group Publishing Limited.

Claessens, S. and Klingebiel, D. (2001). “Competition and Scope of Activities in Financial Services”, *Mimeo. World Bank Research Observer*, 16 (1), 19 – 40.

Claessens, S. and Laeven, L. (2004). “What Drives Bank Competition? Some International Evidence”, *Journal of Money, Credit and Banking*, 36, 563-584.

Claessens, S.; Djankov, S.; Fan, J. and Lang, L. (2002). “Disentangling the Incentive and Entrenchment Effects of Large Shareholdings”, *Journal of Finance*, 57, 2741–2771.

Claus, I. (2007). “The Effects of Bank Lending in an Open Economy”, *Journal of Money, Credit and Banking*, 39 (5), 1213-1243.

Clement, R. W. (2005). “The Lessons from Stakeholder Theory for U.S. Business Leaders”, *Business Horizons*, 48, 255-264.

Cocco, J. F.; Gomes, F. J and Martins, N. C. (2009). “Lending Relationships in the Interbank Market”, *Journal of Financial Intermediation*, 18, 24–48.

Cochrane, J. H. (2001). “Long-Term Debt and Optimal Policy in the Fiscal Theory of the Price Level”, *Econometrica*, 69 (1), 69-116.

Cooper, R. and Ross, T. W. (1998). “Bank Runs: Liquidity Costs and Investment Distortions”, *Journal of Monetary Economics*, 41, 27-38.

Cooper, R. and Ross, T. W. (2002). "Bank Runs: Deposit Insurance and Capital Requirements", *International Economic Review*, 43 (1), 55-72.

Cornett, M. M.; McNutt, J. J.; Strahan, P. E. and Tehranian, H. (2011). "Liquidity Risk Management and Credit Supply in the Financial Crisis", *Journal of Financial Economics*, 101, 297-312.

Coval, J. D. and Thakor, A. V. (2005). "Financial Intermediation as a Beliefs-Bridge Between Optimists and Pessimists", *Journal of Financial Economics*, 75, 535-569.

Cox, S. and Thomas, A. (2005). "Liquidity Management: Developing the Islamic Capital Market and Creating Liquidity", in Thomas, A.; Cox, S. and Kraty, B. (Eds.). *Structuring Islamic Finance Transactions*. (pp. 171-183). London: Euromoney Institution Investor PLC.

Cox, S. and Thomas, A. (2005). "Salam", in: Thomas, A.; Cox, S. and Kraty, B. (Eds.). *Structuring Islamic Finance Transactions*. (pp. 93-101). London: Euromoney Institution Investor PLC.

Cucinelli, D. (2013). "The Determinants of Bank Liquidity Risk within the Context of Euro Area", *Interdisciplinary Journal of Research in Business*, 2 (10), 51- 64.

Dar, H.; Rahman, R. and Malik, R. (2014). *Global Islamic Finance Report GIFR*. London, United Kingdom: Edbiz Consulting Limited.

Davis, E. P. (2008). "Liquidity, Financial Crises and the Lender of Last Resort – How Much of a Departure in the Sub-Prime Crises?", in: Bloxham, P. and Kent, C. (Eds.) *Lessons from the Financial Turmoil of 2007 and 2008*. (pp. 111-135). Australia: Reserve Bank of Australia.

Deep, A. and Schaefer, G. (2004). Are Banks Liquidity Transformers? *Faculty Research Working Papers Series*. John F. Kennedy School of Government, Harvard University, May 2004 RWP04-022. Available at: <<http://ssrn.com/abstract=556289>> Access Date 21<sup>st</sup> March 2011.

Demirgüç-Kunt, A. and Huizinga, H. (1999). "Determinants of Commercial Bank Interest Margins and Profitability: Some International Evidence", *The World Bank Economic Review*, 13 (2), 379-408.

Demirgüç-Kunt, A. and Huizinga, H.P. (2009). "Bank Activity and Funding Strategies: The Impact on Risk and Return", *Discussion Paper 2009-09*, Tilburg University, Center for Economic Research.

Demirguc-Kunt, A. and Levine, R. (1999). Bank Based and Market Based Financial Systems: Cross-Country Comparison. *World Bank Policy Research Working Paper*, No. 2143

Demirguc-Kunt, A. and Maksimovic, V. (2002). "Funding Growth in Bank-Based and Market Based Financial Systems: Evidence from Firm-Level Data", *Journal of Financial Economics*, 65, 337-363

Demirguc-Kunt, A.; Laeven, L. and Levine, R. (2004). "Regulations, Market Structure,

Institutions, and the Cost of Financial Intermediation”, *Journal of Money, Credit, and Banking*, 36 (3), 593-622.

Demirguc-Kunt, A.; Laeven, L.; and Levine, R. (2003). The Impact of Bank Regulations, Concentration, and Institutions and Bank Margins. *World Policy Research Working Paper*, No. 3030.

Denis, D. J. (2011). “Financial Flexibility and Corporate Liquidity”, *Journal of Corporate Finance*, 17, 667–674.

Denzin, N. K. and Lincoln, Y. S. (2005). *The SAGE Handbook of Qualitative Research*. Thousand Oaks: SAGE.

Deuskar, P.; Gupta, A. and Subrahmanyam, M. G. (2011). “Liquidity Effect in OTC Options Markets: Premium or Discount?”, *Journal of Financial Markets*, 14, 127–160.

Diamond D.W. (1991). “Debt Maturity Structure and Liquidity Risk”, *Quarterly Journal of Economics*, 106: 709-738.

Diamond, D. W and Rajan, R. G (2001). “Liquidity Risk, Liquidity Creation, and Financial Fragility: A Theory of Banking”, *Journal of Political Economy*, 109 (2), 287-327.

Diamond, D. W. (1984). “Financial Intermediation and Delegated Monitoring”, *The Review of Economic Studies*, 51 (3), 393-414.

Diamond, D. W. (2007). “Banks and Liquidity Creation: A Simple Exposition of the Diamond-Dybvig Model”, *Economic Quarterly*, 93 (2), 189–200.

Diamond, D. W. and Dybvig, P. H. (1983). “Bank Runs, Deposit Insurance, and Liquidity”, *Journal of Political Economy*, 91 (3), 401-419.

Diamond, D. W. and Rajan, R. G. (2000). “A Theory of Bank Capital”, *The Journal of Finance*, LV (6), 2431-2465.

Diamond, D. W. and Rajan, R. G. (2001). “Banks and Liquidity”, *The American Economic Review*, 91 (2), 422-425.

Diamond, D. W. and Rajan, R. G. (2005). “Liquidity Shortages and Banking Crises”, *The Journal of Finance*, 60 (2), 615-647.

Diaz, A.; Merrick, J. J. and Navarro, E. (2006). “Spanish Treasury Bond Market Liquidity and Volatility Pre- and Post-European Monetary Union”, *Journal of Banking and Finance*, 30, 1309–1332.

Dietrich, A. and Wanzenried, G. (2011). “Determinants of Bank Profitability before and during the Crisis: Evidence from Switzerland”, *Journal of International Financial Markets, Institutions & Money*, 21, 307–327.

Dietrich, D. and Vollmer, U. (2010). “International Banking and Liquidity Allocation Cross-Border Financial Services versus Multinational Banking”, *Journal of Finance Services Research*, 37, 45-69.

- Dinger, V. (2009). "Do Foreign-Owned Banks Affect Banking System Liquidity Risk?", *Journal of Comparative Economics*, 37, 647-657.
- Dinger, V. and Hagen, J. (2009). "Does Interbank Borrowing Reduce Bank Risk?", *Journal of Money, Credit and Banking*, 41 (2-3), 491- 506.
- Distinguin, I.; Roulet, C. and Tarazi, A. (2013). "Bank Regulatory Capital And Liquidity: Evidence from US and European Publicly Traded Banks", *Journal of Banking and Finance*, 37, 3295–3317.
- Dothan, U. and Williams, J. (1980). "Banks, Bankruptcy, and Public Regulation", *Journal of Banking and Finance*, 4, 65-87.
- Drehmann, M. and Nikolaou, K. (2013). "Funding Liquidity Risk: Definition and Measurement", *Journal of Banking and Finance*, 37, 2173–2182.
- Drudi, F. and Giordano, R. (2000). "Default Risk and Optimal Debt Management", *Journal of Banking and Finance*, 24, 861-891.
- Dusuki, A. W. (2007). *Commodity Murabahah Programme (CMP): An Innovative Approach to Liquidity Management*. The 5<sup>th</sup> International Islamic Finance Conference. Kuala Lumpur, Malaysia, 3<sup>rd</sup> – 4<sup>th</sup> September 2007. Malaysia: Monash University.
- Dusuki, A. W. (2012). *Islamic Financial System: Principles and Operations*. Malaysia: International Shari'ah Research Academy for Islamic Finance (ISRA).
- Easterby-Smith, M.; Thorpe, R. and Lowe, A. (2002). *Management Research: An Introduction*, (Second Ed). SAGE Publications Ltd.: London.
- Eichberger, J. and Summer, M. (2005). "Bank Capital, Liquidity, and Systemic Risk", *Journal of the European Economic Association*, 3 (2–3), 547–555.
- El-Gamal, M. A. (2006). *Islamic Finance Law, Economics, and Practice*. Cambridge: Cambridge University Press.
- Elian, M. (2013), "Determinants of Off-Balance Sheet Business in the Case of GCC Banking Sectors", *International Journal of Banking and Finance*, 9 (3), 46-68.
- Ericsson, J. and Renault, O. (2006). "Liquidity and Credit Risk", *The Journal of Finance*, 61 (5), 2219-2250.
- Essen, M. V.; Engelen, P-J. and Carney, M. (2013). "Does "Good" Corporate Governance Help in a Crisis? The Impact of Country- and Firm-Level Governance Mechanisms in the European Financial Crisis", *Corporate Governance: An International Review*, 21 (3), 201–224.
- Fecht, F.; Gruner, F. P. and Hartmann P. (2012), "Financial Integration, Specialization, and Systemic Risk", *Journal of International Economics*, 88, 150–161.
- Fecht, F.; Nyborg, K. G. and Rocholl, J. (2008). "Liquidity Management and Overnight Rate Calendar Effects: Evidence from German Banks", *North American Journal of*

*Economics and Finance*, 19, 7-21.

Fecht, F.; Nyborg, K. G. and Rocholl, J. (2011). “The Price of Liquidity: The Effects of Market Conditions and Bank Characteristics”, *Journal of Financial Economics*, 102, 344–362.

Fernandez, A. I. and Gonzalez, F. (2005). “How Accounting and Auditing Systems Can Counteract Risk-Shifting of Safety-Nets in Banking: Some International Evidence”, *Journal of Financial Stability*, 1, 466–500.

Freixas, X.; Parigi, B. M. and Rochet, T-C. (2000). “Systemic Risk, Interbank Relations, and Liquidity Provision by the Central Bank”, *Journal Of Money, Credit, and Banking*, 32 (3), 611-638.

Frestad, D. (2012), “Liquidity and Dirty Hedging in the Nordic Electricity Market”, *Energy Economics*, 34, 1341–1355.

Fungacova, Z.; Ariss, R. T. and Laurent Weill, L. (2013). “Does Excessive Liquidity Creation Trigger Bank Failures?”, *BOFIT Discussion Paper No. 2/2013*. Available at SSRN: <<http://ssrn.com/abstract=2211486>> Access Date 13<sup>th</sup> September 2013.

Fungacova, Z.; Weill, L. and Zhou, M. (2010). “Bank Capital, Liquidity Creation and Deposit Insurance”, *BOFIT Discussion Paper*, No. 17/2010. Available at: <<http://ssrn.com/abstract=1703370>> or <<http://dx.doi.org/10.2139/ssrn.1703370>> Access Date 2<sup>nd</sup> April 2012.

Gambacorta, L. and Mistrulli, P. E. (2004). “Does Bank Capital Affect Lending Behavior?”, *Journal of Financial Intermediation*, 13, 436–457.

Gatev, E. and Strahan, P. E. (2006). “Bank Advantage in Hedging Liquidity Risk: Theory and Evidence from the Commercial Paper Market”, *The Journal of Finance*, 61, 867-892.

Gatev, E. and Strahan, P. E. (2009). “Liquidity Risk and Syndicate Structure”, *Journal of Financial Economics*, 93, 490–504.

Gatev, E.; Schuermann, T. and Strahan, P. E. (2009). “Managing Bank Liquidity Risk: How Deposit-Loan Synergies Vary with Market Conditions”, *The Review of Financial Studies*, 22 (3), 995-1020.

Ghauri, P. and Gronhaug, K. (2010). *Research Methods in Business Studies*. Prentice Hall.

Ghossoub, E. A. (2012). “Liquidity Risk And Financial Competition: Implications for Asset Prices and Monetary Policy”, *European Economic Review*, 56, 155–173.

Giannotti, C.; Gibilaro, L. and Mattarocci, G. (2010). “Liquidity Risk Exposure for Specialised and Unspecialised Real Estate Banks”, *Journal of Property Investment and Finance*, 29 (2), 98-114.

Gill, A.; Biger, N. and Mathur, N. (2011). “The Effect of Capital Structure on Profitability: Evidence from the United States”, *International Journal of Management*,

28 (4), 3-15.

Gonzalez, F. (2005). "Bank Regulation and Risk-Taking Incentives: An International Comparison of Bank Risk", *Journal of Banking and Finance*, 29, 1153–1184.

Goodhart, C. A. E. (2008). "The Regulatory Response to the Financial Crisis", *Journal of Financial Stability*, 4, 351–358.

Gorton, G. (1988). "Banking Panics and Business Cycles". *Oxford Economic Papers*, 40 (4), 751-781.

Gorton, G. and Pennacchi, G. (1990). "Financial Intermediaries and Liquidity Creation", *The Journal of Finance*, XLV (1), 40-71.

Gorton, G. and Schmid, F. A. (2000). "Universal Banking and the Performance of German Firms", *Journal of Financial Economics*, 58, 29-80.

Gorton, G. and Winton, A. (2003). "Financial Intermediation", in: Constantinides, G.; Harris, M. and Stulz, R. (Eds.), *Handbook of the Economics of Finance*, (pp, 431-552). Amsterdam: Elsevier

Gorton, G. B. and Winton, A. (2000). Liquidity Provision, Bank Capital, and the Macroeconomy. *Working Paper*. Available at: <<http://ssrn.com/abstract=253849>> Access Date 11<sup>th</sup> August 2011.

Greuning, H. and Iqbal, Z. (2008). *Risk Analysis for Islamic Banks*. Washington, D. C.: The World Bank.

Greuning, H. V. and Iqbal, Z. (2008). *Risk Analysis For Islamic Banking*. Washington: The International Bank for Reconstruction and Development/The World Bank.

Gryglewicz, S. (2011). "A Theory of Corporate Financial Decisions with Liquidity and Solvency Concerns", *Journal of Financial Economics*, 99, 365–384.

Gujarati, D. (2004). *Basic Econometrics*. The McGraw–Hill Companies.

Gujarati, D. N. (2003). *Basic Econometrics*. New York: McGraw-Hill Publication.

Gupta, A.; Singh, A. K. and Zebedee, A. A. (2008). "Liquidity in the Pricing of Syndicated Loans", *Journal of Financial Markets*, 11, 339–376.

Haan, L. D. and End, W. V. D. (2013). "Bank Liquidity, the Maturity Ladder, and Regulation", *Journal of Banking and Finance*, 37, 3930–3950.

Hackethal, A.; Rauch, C.; Steffen, S. and Tyrell, M. (2010). Determinants of Bank Liquidity Creation. Available at: <<http://ssrn.com/abstract=1343595>> Access Date 11<sup>th</sup> July 2011.

Hair, J. F.; Black, W. C.; Babin, B. J. and Anderson, R. E. (2010). *Multivariate Data Analysis: A Global Perspective*, (Seventh Ed.). Pearson Prentice Hall: USA.

Hakim, S. R. (2007). "Islamic Money Market Instruments", in: M. K. Hassan and M. K.

Lewis (Eds.), *Handbook of Islamic Banking*, (pp. 161–171). Cheltenham, UK and Northampton, MA, USA: Edward Elgar.

Hammoudeh, S. M.; Yuan, Y. and McAleer, M. (2009). “Shock and Volatility Spillovers Among Equity Sectors of the Gulf Arab Stock Markets”, *The Quarterly Review of Economics and Finance*, 49, 829–842.

Haniffa, R. and Hudaib, M. (2006). “Corporate Governance Structure and Performance of Malaysian Listed Companies”, *Journal of Business Finance and Accounting*, 33 (7-8), 1034–1062.

Haniffa, R. M., and Cooke, T. E. (2005). "The Impact of Culture and Governance on Corporate Social Reporting", *Journal of Accounting and Public Policy*, 24(5), 391- 430.

Haselmann, R. and Wachtel, P. (2010). “Institutions and Bank Behavior: Legal Environment, Legal Perception, and the Composition of Bank Lending”, *Journal of Money, Credit and Banking*, 42 (5), 956-984.

Holmstrom, B. and Tirole, J. (2000). “Liquidity and Risk Management”, *Journal of Money, Credit and Banking*, 32 (3) 295-319.

Holmström, B. and Tirole, J. (1998). “Private and Public Supply of Liquidity”, *The Journal of Political Economy*, 106 (1), 1-40.

Horvath, R.; Seidler, J. and Weill, L. (2012). Bank Capital and Liquidity Creation: Granger – Causality Evidence. *European Central Bank Working Paper Series*, No. 1497. Available at: < <http://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp1497.pdf>>. Access Date: 6<sup>th</sup> June 2013.

Horvath, R.; Seidler, J. and Weill, L. (2013). How Bank Competition Influence Liquidity Creation (2013). *BOFIT Discussion Paper* No. 16/2013. Available at SSRN: <<http://ssrn.com/abstract=2289816>> or <<http://dx.doi.org/10.2139/ssrn.2289816>> Access Date 2<sup>nd</sup> July 2013.

Horvath, R.; Seidler, J. and Weill, L. (2014). “Bank Capital and Liquidity Creation: Granger-Causality Evidence”, *Journal of Financial Services Research*, 45 (3), 341-361.

Hussey, J. and Hussey, R. (1997). *Business Research: A Practical Guide for Undergraduate and Postgraduate Students*. Basingstoke: Palgrave.

Iannotta, G.; Nocera, G. and Sironi, A. (2007). “Ownership Structure, Risk and Performance in the European Banking Industry”, *Journal of Banking and Finance*, 31, 2127-2149.

IMF (2012a). Economic Prospects and Policy Challenges for the GCC Countries. Saudi Arabia: Annual Meeting of Ministers of Finance and Central Bank Governors October 5-6, 2012. Washington, D.C.: International Monetary Fund.

IMF (2012b). Strong Saudi Economy Gives Fillip to Region, Advances Social Agenda. Annual Policy Consultation. IMF Survey, September 18, 2012. Washington, D.C.: International Monetary Fund.

- IMF (2012c). Kuwait—2012 Article IV Consultation Concluding Statement of the IMF Mission April 30, 2012. Washington, D.C.: International Monetary Fund.
- IMF (2013a). Labor Market Reforms to Boost Employment and Productivity in the GCC. Annual Meeting of Ministers of Finance and Central Bank Governors October 5, 2013. Riyadh. Washington, D.C.: International Monetary Fund.
- IMF (2013b). Saudi Arabia: Financial Sector Assessment Program Update—Detailed Assessment of Observance of the Basel Core Principles for Effective Banking Supervision. July 2013 IMF Country Report No. 13/213. Washington, D.C.: International Monetary Fund.
- IMF (2013c). IMF Executive Board Concludes 2013 Article IV Consultation with United Arab Emirates. Press Release No. 13/283 FOR IMMEDIATE RELEASE July 30, 2013. IMF Country Report No. 13/239. Washington, D.C.: International Monetary Fund.
- IMF (2013d). Qatar. 2012 Article IV Consultation. IMF Country Report No.13/14. January, 2013. Washington, D.C.: International Monetary Fund.
- IMF (2013e). Kuwait. 2013 Article IV Consultation. IMF Country Report No. 13/336. Washington, D.C.: International Monetary Fund.
- IMF (2014a). United Arab Emirates, 2014 Article IV Consultation—Staff Report; Press Release; And Statement By The Executive Director For The United Arab Emirates. IMF Country Report No. 14/187. Washington, D.C.: International Monetary Fund.
- IMF (2014b) IMF Executive Board Concludes 2014 Article IV Consultation with Bahrain. Press Release No. 14/289. Washington, D.C.: International Monetary Fund.
- IMF (2014c). Qatar, Selected Issues. IMF Country Report No. 14/109. Washington, D.C.: International Monetary Fund.
- Iqbal, M. and Molyneux, P. (2005). *Thirty Years of Islamic Banking: History, Performance and Prospects*. Singapore: John Wiley & Sons (Asia) Pte Ltd.
- Iqbal, Z. and Mirakhor, A. (2007). *An Introduction to Islamic Finance: Theory and Practice*. Singapore: John Wiley & Sons (Asia) Pte Ltd.
- Iqbal, Z.; Mirakhor, A.; Krichenne, N. and Askari, H. (2010). *The Stability of Islamic Finance: Creating a Resilient Financial Environment for a secure Future*. Singapore: John Wiley and Sons.
- Islamic Financial Service Board (IFSB) (2012). Guiding Principles on Liquidity Risk Management For Institutions Offering Islamic Financial Services [Excluding Islamic Insurance (*Takaful*) Institutions And Islamic Collective Investment Schemes]. Kuala Lumpur, Malaysia.
- Islamic Financial Service Board (IFSB) (2013). Islamic Financial Services Industry: Stability Report. Kuala Lumpur, Malaysia.

- Ismail, A. G. (2010). *Money, Islamic Banks and the Real Economy*. Singapore: Cengage Learning Asia Pte Ltd.
- Ismal, R. (2008). “Shariah Issues in Liquidity Risk Management: A Survey”, *Review of Islamic Economics*, 12 (2), 45-67.
- Ismal, R. (2010). “How Do Islamic Banks Manage Liquidity Risk? An Empirical Survey on the Indonesian Islamic Banking Industry”, *Kyoto Bulletin of Islamic Area Studies*, 3-2, 54–81.
- Jasiene, M.; Martinavicius, J.; Jaseviciene, F. and Krivkiene, G. (2012). “Bank Liquidity Risk: Analysis and Estimates”, *Business, Management and Education*, 10 (2), 186-204.
- Jiang, Y. and Marcozzi, M. D. (2012). “Asset Liquidity and the Valuation of Derivative Securities”, *Journal of Computational and Applied Mathematics*, 236, 4525–4536.
- John, B. J. (1980). “A Model of Reserves, Bank Runs, and Deposit Insurance”, *Journal of Banking and Finance*, 4, 335-344.
- John, K.; John, T. A. and Saunders, A. (1994). “Universal Banking and Firm Risk-Taking”, *Journal of Banking and Finance*, 18, 307-323.
- Kahf, M. (2006). Innovation And Risk Management In Islamic Finance: Shari’ah Considerations. Paper prepared for the Seventh Harvard International Forum on Islamic Finance, April 22- 23, 2006. Available at: <<http://monzer.kahf.com/papers/english/>> Access Date 3<sup>rd</sup> March 2011.
- Kamara, A.; Lou, X. and Sadka, R. (2008). “The Divergence of Liquidity Commonality in the Cross-Section of Stocks”, *Journal of Financial Economics*, 89, 444–466.
- Kapopoulos, P. and Lazaretou, S. (2007). “Corporate Ownership Structure and Firm Performance: Evidence from Greek Firms”, *Corporate Governance*, 15 (2), 144-158.
- Kashyap, A. K.; Rajan, R. and Stein, T. C. (2002). “Banks as Liquidity Providers: An Explanation for the Coexistence of Lending and Deposit-Taking”, *The Journal of Finance*, 57 (1), 33-73.
- Keeley, M. (1990). “Deposit Insurance, Risk, and Market Power in Banking”, *American Economic Review*, 80, 1183-200.
- Kelly , A. P. (2011). *Social Research Methods*. London: University of London.
- Kessler, S. and Scherer, B. (2011). “Hedge Fund Return Sensitivity to Global Liquidity”, *Journal of Financial Markets*, 14, 301–322.
- Khan, A. A. and Mould, H. (2008). *Islam and Debt*. Birmingham: Islamic Relief Worldwide. Available at: <<http://www.islamicrelief.com/indepth/downloads/islamanddebt>. Access Date: 12 December 2012.
- Khan, F. (2010), “How ‘Islamic’ is Islamic Banking?”, *Journal of Economic Behavior*

*and Organization*, 76, 805–820.

Khan, T. and Ahmad, H. (2001). *Risk Management; An Analysis of Issues in Islamic Financial Industry*. Occasional Paper No. 5. Jeddah: Islamic Development bank.

King, T. B. (2008). “Discipline and Liquidity in the Interbank Market”, *Journal of Money, Credit and Banking*, 40 (2-3), 295-317.

Kishian, R. P. and Opiela, T. P. (2000). “Bank Size, Bank Capital, and the Bank Lending Channel”, *Journal of Money, Credit, and Banking*, 32 (1), 121-141.

Kiyotaki, N. and Moore, J. (1997). “Credit Cycles”, *Journal of Political Economy*, 105 (2), 211–248.

Klomp, J. and de Haan, J. (2012). “Banking Risk and Regulation: Does One Size Fit All?”, *Journal of Banking and Finance*, 36, 3197–3212.

Kosmidou, K. (2008). “The Determinants of Banks’ Profits in Greece during the Period of EU Financial Integration”, *Managerial Finance*, 34 (3), 146-159.

Laeven, L. and Levine, R. (2009). “Bank Governance, Regulation and Risk Taking”, *Journal of Financial Economics*, 93, 259–275.

Lakstutiene, A. and Krusinskas, R. (2010). “Lithuanian Banks Liquidity Creation in 2004 – 2008”, *Economics and Management*, 15, 986-991.

Lang, M. and Maffett, M. (2011). “Transparency and Liquidity Uncertainty in Crisis Periods”, *Journal of Accounting and Economics*, 52, 101–125.

Liang, S. X. and Wei, J. K. C. (2012). “Liquidity Risk and Stock Returns around the World”, *Journal of Banking and Finance*, 36, 3274-3288.

Lin, H.; Wang, J. and Wu, C. (2011). “Liquidity Risk And Expected Corporate Bond Returns”, *Journal of Financial Economics*, 99, 628–650.

Lloyd-Williams, D.; Molyneux, P. and J. Thornton (1994). “Market Structure and Performance in Spanish Banking”, *Journal of Banking and Finance*, 18, 433-443.

Lou, X. and Sadka, R. (2011). “Liquidity Level or Liquidity Risk? Evidence from the Financial Crisis”, *Financial Analysts Journal*, 57 (3), 51-62.

Luthan, F. and Davis, T. R. V. (1982). “An Idiographic Approach to Organizational Behavior Research: The Use of Single Case Experimental Designs and Direct Measures”, *Academy of Management Review*, 7 (3), 380-391.

Maddala, G. S. (1992). *Introduction to Econometrics*. New York: Macmillan Publishing Company.

Martin, A. and Parigi, B. M. (2013). “Bank Capital Regulation and Structured Finance”, *Journal of Money, Credit and Banking*, 45 (1), 87-119.

Martínez, D. and Repullo, R. (2006). *Does Competition Reduce the Risk of Bank*

*Failure?* Mimeo, CEMFI, Madrid.

Martinez, M. A.; Nieto, B.; Rubio, G. and Tapia, M. (2005). “Asset Pricing and Systematic Liquidity Risk: An Empirical Investigation of the Spanish Stock Market”, *International Review of Economics and Finance*, 14, 81–103.

Matutes, C., and Vives, X. (2000). “Imperfect Competition, Risk, and Regulation in Banking”, *European Economic Review*, 44, 1-34.

Matz, L. (2008). *Liquidity Risk: New Lessons and Old Lessons*. SUNGARD, Bancware Risk Monthly. Available at: <[http://sungard.com/~media/financialsystems/whitepapers/ambit\\_insights\\_liquidity\\_risk\\_new\\_lessons\\_and\\_old\\_lessons.ashx](http://sungard.com/~media/financialsystems/whitepapers/ambit_insights_liquidity_risk_new_lessons_and_old_lessons.ashx)>, Access Date 23<sup>rd</sup> March, 2012.

Matz, L. and Neu, P. (2007). *Liquidity Risk Measurement and Management: A Practitioner’s Guide to Global Best Practices*. Singapore: John Wiley and Sons (Asia) Pte Ltd.

Merrouche, O. and Schanz, J. (2010). “Banks’ Intraday Liquidity Management During Operational Outages: Theory and Evidence from The UK Payment System”, *Journal of Banking and Finance*, 34, 314–323.

Micco, A. and Panizza, U. (2006). “Bank Ownership and Lending Behavior”, *Economics Letters*, 93, 248–254.

Mishkin, F. S. (2001). *Prudential Supervision: What Works and What Doesn’t*. Chicago and London: The University of Chicago Press.

Mishkin, F. S. (2001). *The Economics of Money, Banking, and Financial Market*. New York: Addison Wesley.

Mishkin, F. S. (2006). “How Big a Problem is Too Big to Fail? A Review of Gary Stern and Ron Feldman’s Too Big to Fail: The Hazards of Bank Bailouts”, *Journal of Economic Literature*, XLIV, 988–1004.

Mitusch, K. and Nautz, D. (2001). “Interest Rate and Liquidity Risk Management and the European Money Supply Process”, *Journal of Banking and Finance*, 25, 2089-2101.

Molyneux, P.; Altunbas, Y. and Gardener, E. P. M. (1992). “Determinants of European Bank Profitability: A Note”, *Journal of Banking and Finance*, 16, 1173-1178.

Molyneux, P. and Thornton, J. (1992). “Determinants of European Bank Profitability: A Note”, *Journal of Banking and Finance*, 16, 1173-1178.

Morrison, A. D. (2011). “Systemic Risks and the ‘Too-Big-To-Fail’ Problem”, *Oxford Review of Economic Policy*, 27 (3), 498–516.

Morton, W. A. (1939). “Liquidity and Solvency”, *The American Economic Review*, 29 (2), 272-285.

- Naceur, S. B. and Kandil, M. (2009). “The Impact of Capital Requirements of Bank’s Cost of Intermediation and Performance: The Case of Egypt”, *Journal of Economics and Business*, 61, 70-89.
- Naceur, S. B. and Omran, M. (2011). “The Effects of Bank Regulations, Competition, and Financial Reforms on Banks' Performance”, *Emerging Markets Review*, 12, 1–20.
- Ng, J. (2011), “The Effect of Information Quality on Liquidity Risk”, *Journal of Accounting and Economics*, 52, 126–143.
- Obaidullah, M. (2005). *Islamic Financial Services*. Jeddah: Scientific Publishing Centre, King Abdulaziz University.
- Ongena, S.; Popov, A. and Udell, G. F. (2013). “‘When The Cat’s Away the Mice Will Play’: Does Regulation at Home Affect Bank Risk-Taking Abroad?”, *Journal of Financial Economics*, 108, 727–750.
- Ourir, A. and Snoussi, W. (2012). “Markets Liquidity Risk Under Extremal Dependence: Analysis with VaRs Methods”, *Economic Modelling*, 29, 1830–1836.
- Pana, E.; Query, J. T. and Park, J. (2010). “The Impact of Bank Mergers on Liquidity Creation”, *Journal of Risk Management in Financial Institutions*, Forthcoming. Available at SSRN: <<http://ssrn.com/abstract=1488604>> Access Date 22<sup>nd</sup> August 2010.
- Papavassiliou, V. G. (2013). “A New Method for Estimating Liquidity Risk: Insights from a Liquidity-Adjusted CAPM Framework”, *Journal of International Financial Markets, Institutions and Money*, 24, 184–197.
- Pasiouras, F. and Kosmidou, K. (2007). “Factors Influencing the Profitability of Domestic and Foreign Commercial Banks in the European Union”, *Research in International Business and Finance*, 21, 222–237.
- Pasiouras, F.; Gaganis, C. and Zopounidis, C. (2006). “The Impact of Bank Regulations, Supervision, Market Structure, and Bank Characteristics on Individual Bank Ratings: A Cross-Country Analysis”, *Review of Quantitative Finance and Accounting*, 27, 403-438.
- Perrini, F.; Rossi, G. and Rovetta, B. (2008). “Does Ownership Structure Affect Performance? Evidence from the Italian Market”, *Corporate Governance*, 16 (4), 312-325.
- Pokutta, S. and Schmaltz, C. (2011). “Managing Liquidity: Optimal Degree of Centralization”, *Journal of Banking and Finance*, 35, 627–638.
- Poon, W. P. H. and Firth, M. (2005). “Are Unsolicited Credit Ratings Lower? International Evidence From Bank Ratings”, *Journal of Business Finance & Accounting*, 32 (9-10), 1741-1771.
- Postlewaite, A. and Vives, X. (1987). “Bank Runs as an Equilibrium Phenomenon”. *Journal of Political Economy*, 95 (3), 485-491.
- Prasad, A., Arvai, Z. and Fayad, G., Ribeiro, A. and Sidahmed, R. (2012). United Arab Emirates: Selected Issues and Statistical Appendix. IMF Country Report No. 12/136.

Washington, D.C.: International Monetary Fund.

Rajan, R. G. (1996), "Comment on Interbank Lending and System Risk", *Journal of Money, Credit and Banking*, 28 (4), 763-765.

Ratnovski, L. (2009). "Bank Liquidity Regulation and the Lender of Last Resort", *Journal of Financial Intermediation*, 18, 541–558.

Rauch, C.; Steffen, S.; Hackethal, A. and Tyrell, M. (2011). Determinants of Bank Liquidity Creation. *European School of Management and Technology, Working Paper*.

Rauch, C.; Steffen, S.; Hackethal, A. and Tyrrel, M. (2010). *Determinants of Bank Liquidity Creation*. Available at: <[http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1343595](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1343595)>. Access Date: 15<sup>th</sup> July 2013.

Repullo, R. (2004). "Capital Requirements, Market Power, and Risk-Taking in Banking", *Journal of Financial Intermediation*, 13, 156–182.

Sadka, R. (2010). "Liquidity Risk and the Cross-Section of Hedge-Fund Returns", *Journal of Financial Economics*, 98, 54-71.

Sadka, R. (2011). "Liquidity Risk and Accounting Information", *Journal of Accounting and Economics*, 52, 144-152.

Said, A. (2013). "Risks and Efficiency in the Islamic Banking Systems: The Case of Selected Islamic Banks in MENA Region", *International Journal of Economics and Financial Issues*, 3 (1), 66-73.

Santos, J.A.C. (2001). "Bank Capital Regulation in Contemporary Banking Theory: A Review of the Literature", *Financial Markets, Institutions and Instruments*, 10 (2), 41-84.

Saunders, A., and Cornett, A. M. (2006). *Financial Institutions Management: A Risk Management Approach*. Boston: McGraw-Hill.

Saunders, A., and Cornett, A. M. (2007). *Financial Markets and Institutions: An Introduction to the Risk Management Approach*. Boston: McGraw-Hill.

Saunders, M.; Lewis, P. and Thornhill, A. (2009). *Research Methods for Business Students*. Harlow: Financial Times Prentice Hall.

Sawada, M. (2010). "Liquidity Risk and Bank Portfolio Management in a Financial System without Deposit Insurance: Empirical Evidence from Prewar Japan", *International Review of Economics and Finance*, 19, 392–406.

Schaub, N. and Schmid, M. (2013). "Hedge Fund Liquidity and Performance: Evidence from the Financial Crisis", *Journal of Banking and Finance*, 37, 671–692.

Shin, F. S. (2011). "Determination of Bank Lending Behavior: Empirical Analysis in the Case of Japan in the 2000s", *International Research Journal of Finance and Economics*, 78, 41-47.

- Shirur, S. (2013). “Are Managers Measuring the financial Risk in the Right Manner? An Exploratory Study”, *VIKALPA*, 38 (2), 81-94.
- Siddiqi, M. N. (1983). “Banking Without Interest”, *J. Res. Islamic Econ.*, 1 (2), 85-90.
- Silva, M. S. D. and Divino, J. A. (2013). “The Role of Banking Regulation in an Economy Under Credit Risk and Liquidity Shock”, *North American Journal of Economics and Finance*, 26, 266–281.
- Soedarmono, W.; Tarazi, A.; Agusman, A.; Monroe, G. S. and Gasbarro, D. (2012). *Loan Loss Provisions and Lending Behaviour of Banks: Asian Evidence During 1992-2009*. Available at <<http://ssrn.com/abstract=2049217>> Access Data: 12<sup>th</sup> March 2013.
- Spiegel, M. M. (1992). “Concerted Lending: Did Large Banks Bear the Burden?”, *Journal of Money, Credit and Banking*, 24 (4), 465-482.
- Surroca, J.; Tribo, J. A. and Waddock, S. (2010). “Corporate Responsibility and Financial Performance: The Role of Intangible Resources”, *Strategic Management Journal*, 31, 463–490.
- Tabak, B. M.; Fazio, D. M. and Cajueiro, D. O. (2012). “The Relationship Between Banking Market Competition and Risk-Taking: Do Size and Capitalization Matter?”, *Journal of Banking and Finance*, 36, 3366–3381.
- Tallman, E. W. and Moen, J. R. (2012). “Liquidity Creation Without a Central Bank: Clearing House Loan Certificates in the Banking Panic of 1907”, *Journal of Financial Stability*, 8, 277–291.
- Tayyebi, A. (2009). “Eclipsed by the Crescent Moon: Islamic Finance Provides Some Light in the Global Financial Crisis”, *Financial Services Review*, June, 14-16. Available at: <[http://www.acca.co.uk/pubs/members/publications/sector\\_magazines/financial\\_services\\_review/archive/2009/90/islamic.pdf](http://www.acca.co.uk/pubs/members/publications/sector_magazines/financial_services_review/archive/2009/90/islamic.pdf)>. Access Date: 30<sup>th</sup> November 2012.
- Teo, M. (2011). “The Liquidity Risk of Liquid Hedge Funds”, *Journal of Financial Economics*, 100, 24-44.
- Thakor, A. V. (1996). “Capital Requirements, Monetary Policy, and Aggregate Bank Lending: Theory and Empirical Evidence”, *Journal of Banking and Finance*, 11 (1), 279-324.
- The World Bank (2010), *Economic Integration in the GCC*. Washington DC: The International bank of Reconstruction and Development/The World Bank.
- Tsai, J-Y. and Hung, W-H. (2013). “Bank Capital Regulation in a Cap Option Framework”, *International Review of Economics and Finance*, 25, 66–74.
- Waddock, S. A. and Graves, S. B. (1997). “The Corporate Social Performance–Financial Performance Link”, *Strategic Management Journal*, 18(4), 303–319.
- Wagner, W. (2007). “The Liquidity of Bank Assets and Banking Stability”, *Journal of Banking and Finance*, 31, 121–139.

- Wagner, W. (2010). “Loan Market Competition and Bank Risk-Taking”, *Journal of Financial Services Research*, 37, 71–81.
- Wang, J.; Chunchi Wu, C. and Zhang, F. X. (2008). “Liquidity, Default, Taxes, and Yields on Municipal Bonds”, *Journal of Banking and Finance*, 32, 1133–1149.
- Weiß, G. N. F. and Supper, H. (2013). “Forecasting Liquidity-Adjusted Intraday Value-At-Risk With Vine Copulas”, *Journal of Banking and Finance*, 37, 3334–3350.
- Williamson, S. D. (1988). “Liquidity, Banking, and Bank Failures”, *International Economic Review*, 29 (1), 25-43.
- Wooldridge, J. M. (2013). *Introductory Econometrics*. USA: South-Western-CENGAGE Learning.
- Zidulina, M. V. T. (2009). “Bank Liquidity Risk and its Contagion Effects in the Baltic Financial Sector”, *Scientific Journal of Riga Technical University*, 18, 105- 115.
- Zidulina, T. (2010). “Regulatory Response to Liquidity and Systemic Risks”, *Scientific Journal of Riga Technical University*, 20, 164- 171.