The Impact of Bank's Determinants on Liquidity Risk: Evidence from Islamic Banks in Bahrain

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Abstract:
The current decline in oil prices has had a negative impact on the banking industry across Gulf Cooperation Council (GCC) countries and Bahrain is no exception. Over the last three years, Bahrain has been going through significant liquidity pressure, leading to the shrinking of bank liquidity, thus inducing liquidity risk in Bahraini banks. Therefore, the aim of this paper is to identify the association between liquidity risk proxied by cash to total assets and specific determinants in Bahraini Islamic Banks (IBs) in order to better mitigate and manage this critical financial risk. Panel data analysis was used on a sample of seven Bahraini IBs, which represent the Bahraini Islamic banking sector over the period of 2007 to 2011. The econometric results illustrate that the liquidity risk ofBahraini IBs is dependent on idiosyncratic factors.We found that liquidity risk is positively related toreturn on average assets (ROAA). On the other hand, non-performing loans (NPLs) and capital adequacy ratio (CAR) affect liquidity risk negatively and significantly. Lastly, bank size and the financial crisis show a negative and insignificant association with liquidity risk.

The main limitation of this study is the bank's specific factors, covering one country and IBs only. Therefore, it is recommended that future studies should expand the sample by considering IBs from other GCC countries and also include conventional banks and macroeconomic factors. Finally,since NPLs (credit risk) and CAR have a significant impact on liquidity risk, it is recommended that the relationship between liquidity risk and credit risk in Bahrain and in the GCC environment be further investigated. Future studies should also consider examining the impact of the two new ratios suggested by the Basel Committee on liquidity risk in the GCC banking industry.
Keywords:
Liquidity Risk, Bahraini Islamic Banks, Panel Data Analysis

1. Introduction

Liquidity is a significant component forbank's survival and success. In an analogical sense, liquidity to the bank is like blood to the body (Talekar, 2005). Liquidity plays a vital role in the successful functioning of a firm. Therefore, a study of liquidity is of major importance to both the internal and the external analysts because of its close relationship with daily operations of a business (Ibe, 2013; Bhunia, 2012). However, in studying liquidity risk, it is firstlyvital to define liquidity and liquidity risk.

Liquidity is defined as the ability of the bank to fund increasing assets and meet its obligations on time, without experiencing unacceptable losses (Sheefeni & Nyambe, 2016). Simply put, when the bank is unable to perform these two main tasks (funding assets and paying its obligations), it faces liquidity risk. To Islamic banks (IBs), liquidity risk is the possible loss due to their inability to meet their obligations as they fall due without incurring intolerable costs or losses (Shaikh, 2015). These definitions show the significance of liquidity, where it essentially involves the availability of cash whenever needed. Furthermore, key components of liquidity management, like cash management and cash equivalent, have been found to make a significant contribution toward enhancing the wealth of the shareholders (Manab & Ghazali, 2013). In addition, when it comes to the banking sector, the role of liquidity cannot be overemphasized.

In the banking industry, liquidity gains importance due to the central functions performed by the banks for economic and financial development. Vital banking functions aredeveloped in the process of financial intermediation; therefore, an effective banking sector with sound financial health is imperative for ensuring economic stability and development. According to the financial intermediation theory, the foremost responsibility of modern banks is to offer liquidity and other financial services (Akkizidis & Khandelwal, 2008).

This substantial role is played on both levels: at the levels of the bank and the economy. At the bank level, the bank's competitiveness and survival can be determined by its liquidity. Bryant (1980) and Diamond and Dybvig (1983) contended that banks create liquidity on the balance sheet by funding fairly illiquid assets with relatively liquid liabilities. However, for many banks, the challenge is to have balanced liquidity amount at the right time; otherwise, it can have negative consequences on the banks.

Therefore, liquidity surplus is seen as a drag on the competitiveness while liquidity scarcity is considered the bank's killer. Accordingly, banks need to strike the right liquidity balance if they are to be successful. However, for IBs, the most important factor for their success is liquidity management (Chagwiza, 2014; Al Faris & Al Zararee, 2011; Halling & Hading, 2006). In addition, liquidity has been shown to be a significant factor in a firm's bankruptcy. Manab, Theng & Md-Rus (2015) found that liquidity is an important determinant of bankruptcy in Malaysian companies.

At the economy level, liquidity creation which is provided by liquidity function is very vital for economic operations. This liquidity creation is considered as the mainframe of economic well-being which is provided by banks but it is also their key reason for risk (Akkizidis, et al., 2008; Diamond & Dybvig, 1983). Given the importance of liquidity, Basel

III imposed new banking requirements on liquidity and capital. This development will have a great effect on banks since they are obliged now to keep larger amounts of capital and liquidity, which will certainly also affect liquidity creation function performed by banks.On the other hand, the management of risks, including liquidity risk, in financial firms is crucial for the efficient performance of the entire economy (Akkizidis & Khandelwal, 2008).

It has been more or less a decade now since the last financial crisis of 2007-2008. However, liquidity risk is gaining even more significance. With that in mind, today, liquidity risk has resurfaced as a hot topic for the banks as well as for other financial institutions. On the other hand, in the case of inefficient liquidity management, there can be a banking crisis, which may even result in sudden cash flight and liquidation. This was obvious during the financial crisis of 2007 which revealed weaknesses in liquidity risk management in the Gulf Cooperation Council (GCC) (Hasan & Dridi, 2010; Akkizidis, et al., 2008).

Linking this to Bahrain, an oil-dependent economy, the recent fall in oil prices has caused liquidity to dry up at both the levels of the national economy and banking. As a result of this, GCC banks as well as Bahraini banks have been downgraded by the rating agencies, like Moody's and Fitch over the last two years. This shows that nowadays, liquidity risk is a hot topic. All of these developments have led to one conclusion, i.e., liquidity risk is currently a hot topic in the GCC as well as in Bahrain.

There are convincing reasons to study liquidity risk determinants in IBs, in general, and in Bahrain, in particular. Generally, extant literature shows that several studies have been conducted on credit risk but not enough attention has been paid to other types of risks in IBs. This argument is supported by Kabir & Sirago (2017) who stressed that empirical studies on IBs are required for other types of risks other than credit risk. In addition, although it is believed that Islamic institutions are enjoying liquidity surplus, Aliyu, Hassan, MohdYusof, & Naiimi (2017) emphasized that the liquidity excess of IBs cannot assure the creditworthiness, existence or affluence of these banks. These arguments necessitate the study of liquidity risk determinants which would help the IBs to better understand the relationship between the bank's internal variables and their impact on liquidity risk.

In addition to the above discussion, it is vital to conduct the current research due to the following reasons which are idiosyncratic to the GCC and Bahraini environments. First, Abu Hussain & Al-Ajmi (2012) emphasized that liquidity risk is among the most important risks confronting both conventional banks and IBs in Bahrain; second, due to liquidity pressure on Bahraini banks created by the low oil prices, Bahraini banks (conventional and Islamic) are being downgraded by international rating agencies, like Moody's and Fitch. Downgrading carries vigilant interpretations and consequences on the downgraded banks. It is the standard indicator used in signaling evolving threat which hurts cash flow and liquidity position of the downgraded banks (Adalsteinsson, 2014; Castagna & Fede, 2013); and third, nowadays, academic researchers (e.g., Kabir et al., 2017) are calling for research on liquidity risk determinants of IBs which previous researchers have neglected

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in Bahrain and that negligence has generated a gap in the literature. Although this is currently a hot topic, most of the existing studies have emphasized merely on limited zones without considering neither Bahrain nor the GCC. The main input of this study is the liquidity determinants of IBs in Bahrain and their relationship.

In the GCC region, most of the previous studies have focused on bank profitability and other types of financial risk (Saif-Alyousf, Saha, & Md-Rus, 2017a, 2017b; Al-Tamimi, Miniaoui & Elkelish, 2015; Al-Wesabi & Ahmad (2013); Abu Hussain et al., 2012; Al-Khouri, 2011; Hassan, 2009 and Al-Tamimi and Al-Mazrooei, 2007). Saif-Alyousf et al. (2017a) analyzed and compared the profitability of domestic and foreign banks in Saudi Arabia over the period of 2000-2014. However, Saif-Alyousf et al. (2017b) investigated shareholders' value of Saudi commercial banks by using capital adequacy, asset quality, management quality, earning ability and liquidity (CAMEL) parameters to compare Islamic and conventional banks over the period of 2000-2015. Nevertheless, these studies mainly focused on profitability and shareholders' value and not liquidity risk. Furthermore, the study of Saif-Alyousf et al. (2017a) included only conventional banks and ignored IBs. Furthermore, these studies concentrated only in Saudi Arabia and ignored other GCC countries, like Bahrain.

The current study differs from the previous work of Al-Tamimi et al. (2015), Abu Hussain et al. (2012); Al-Khouri (2011); and Al-Tamimi et al. (2007), who approached liquidity risk from different angles. The current research is specifically dedicated to the impact of bank's internal variables on the liquidity risk of IBs in Bahrain. Its peculiarities are in the treatment of liquidity risk as the dependent variable, with the focus being on IBs in Bahrain.

Thus, this study fills important gaps in the literature by exploring the association between liquidity risk and IBs' internal variables in Bahrain. To the best knowledge of the authors, no single study exists today on the liquidity risk determinants in Bahrain, which has become a hot topic over the last few years in Bahraini banks. Therefore, this could be the first empirical study to examine the determinants of liquidity risk in Bahrain and in the GCC region. Hence, it makes significant contributions to various stakeholders in the academic, industrial and regulatory areas.

The current study has theoretical and practical contributions. It makes contribution to liquidity risk literature in IBs. It is designed to relatively decrease the gap in the literature in the field of liquidity risk management. In terms of application, identifying the nature and the direction of the relationship between the bank's specific variables and liquidity risk will provide a better understanding of this association which should help in planning and managing liquidity risk in Bahraini IBs. Furthermore, the findings of the current study should give ideas to policymakers and business community participants, like investors and practitioners, to better manage and mitigate liquidity risk by redesigning the risk management framework and supervision.

Consequently, this could enable the IBs to continue their positive role in the economic development of Bahrain as the country is dependent on the banking sectorto diversify its economy and move away from oil dependency. Moreover, the results can be valuable to

the rest of the GCC countries and other Islamic countries that have a dual banking system.

The paper is organized as follows: section 2 presents an overview of the Bahraini banking sector, section 3 discusses the literature review. The methodology is explained in section 4, the empirical results are presented in section 5, and the final section offers some conclusions and recommendations based on the study's findings.

2. Overview of the Bahraini Banking Sector

The Kingdom of Bahrain is a member of the GCC, besides Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates (UAE). The year 1923 witnessed the birth of banks in the kingdom, it all started with the first branch of Standard Chartered Bank. Later, HSBC commenced its operation in 1945; this was followed by National Bank which was the first locally incorporated bank in 1957. As for IBs, Bahrain Islamic Bank was established in 1978 (Abo Hussain & Al-Saleh, 2009).

According to Financial Stability Report (FSR) issued by Central Bank of Bahrain (CBB) February 2017:

"Bahrain's banking sector represented 6.2 times GDP by the end of the third quarter of 2016. The banking sector started as 13.4 times GDP in 2007 and despite the global financial turmoil, the size remained at 11.5 times of GDP from 2008 until 2010. In 2013, the size of the banking sector fell become 5.9 times of GDP due to drop in the wholesale banking sector in Q3 2013 and reaching 3.5 times by Q3 2016" (FSR,2017, p.24).

Figure 1 shows the percentage of retail banks' assets in 2007 and 2016, where Bahraini banks' share shows an increase by 12.3 (from 43.2% to 55.5%).

Figure 2.1 Islamic banks growth from 2007 to 216

Chart 2-3: Retail Banks' Assets (%) by Geographical Classification (2007)*
others 3.9%
Asia 13.2%
Western Europe, 8.6%
Americas 4.2%
Other Arab, 1.3%
GCC 25.6%
Bahrain 43.2%

Chart 2-5: Retail Banks' Assets (%) by Geographical Classification (November 2016)*
Asia 8.9%
Western…
Americas 4.4%
Other Arab, 2.9%
Other 1.3%
GCC 21.6%
Bahrain 55.5%
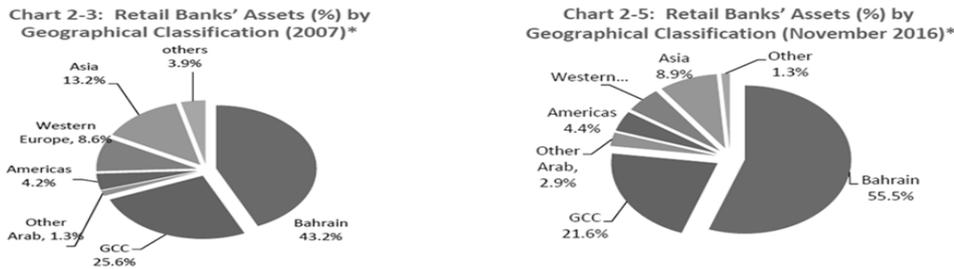
* For conventional and Islamic retail banks, Source: Central Bank of Bahrain, 2017

Bahraini banks represented almost 10% of the wholesale banks'assets by geographical classification in 2016 compared to 8% in 2007 which is a small increase compared to the 12% increase in the size of Bahraini retail banking. However, the growth of IBs, in particular, has been incredible, with total assets in this segment jumping from US$ 1.9 billion in 2000 to US$ 25.4 billion by August 2012,a growth of over 12 times. The market

share of IBs correspondingly increased from 1.8% of total banking assets in 2000 to 13.3% in August 2012 (FSR, 2017; CBB, 2017). Appendix A shows the aggregate balance sheet of IBs in Bahrain starting from 2007 to September 2017. Over the period of 2007-2017, the total assets of IBs increased from 16,430 to reach 26,843 (in millions US $), an increase of about 63 %.

In addition, the historical growth of IBs has been significant where total assets of IBs grew by 37.7% over the period of 1998-2008. This beats the total assets growth rate of the traditional banks. While these statistics show the capability of IBs to nurture at a higher pace than their counterparts, it also highlights the obstacles confronting Bahrain IBs in their efforts to increase their share in the market (CBB, 2017).

The kingdom has adopted a strategic plan to increase the participation of other sectors in order to diversify its economy. This strategy has raised the share of financial sector, where it increased its portion of GDP by 27% over the period of 1980 - 2007. The financial industry's growth was boosted by well-established regulations, fixable business environments and the convenience of the required supporting services at the disposal of the banks. The banking sector in Bahrain has 105 banks, 76 wholesale banks and 29 retail banks. The total of Bahraini IBs is 26 banks, 7 Islamic retail banks and 19 Islamic wholesale banks, (CCB, 2017).

With this large number of banks, Bahrain has positioned itself as an international financial center.

2.1 Bahrain as an International Financial Center

Over the last few years, Bahrain has established itself as an international center for the Islamic banking and finance industry. According to the latest report of the Islamic Financial Services Board (IFSB), Bahrain has one of the most open economies in the GCC and is recognized as a regional financial center. With the beginning of the twenty-first century, the country has become a main regional financial center, which has been instrumental in the growth of its financial industry and economy. The kingdom's financial sector is considered as one of the most well-developed and diversified in the region. It accounts for almost 17% of Bahrain's GDP and it is the largest non-oil component of its economy. Bahrain has also established an attractive, inexpensive operating atmosphere for provincial and global institutions serving this region (Islamic Financial Services Industry Stability Report (IFSISR), 2017).

In addition, the country is home to the renowned international standard-setting bodies and other reputed institutions, like the Islamic International Rating Agency, Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI), Liquidity Management Centre (LMC), International Islamic Financial Market and the Bahrain Institute of Banking and Finance.

Furthermore, in 2015, Bahrain was considered as one of the emerging leaders in the Islamic financial industry by the Islamic Finance Country Index (IFCI), (Economic and Commercial Cooperation for the Organization of Islamic Cooperation (COMCEC), 2017). Besides, Bahrain won the fourth position out of 40 states based on the IFCI ranking in

2014, the Global Islamic Finance Report (GIFR, 2014). Moreover, in the same year, Bahrain was recognized as having the best governance in Islamic finance in the world with a well-established regulatory framework covering all segments.

Moreover, based on the ICD-Thomson Reuters Islamic Finance Development Indicator (2015), Bahrain was recognized as a primary Islamic finance market and globally classified second out of 92 countries. Also, the country recorded additional accomplishment with the recognition of its dynamic role in the global economy in the fifth Global Islamic Finance Awards (GIFA) in 2015. Given its creditable presence at the regional and global stages, it is worthwhile to investigate bank's liquidity in this country especially since it has been suffering in the recent few years.

2.2 Recent Challenges:

Severe economic consequences and new economic realities are now facing the oil-rich countries due to the recent fall in oil prices. Being one of the GCC countries, Bahrain is an oil exporter and slight fluctuations in the oil prices directly impact the country's fiscal revenues and subsequently its GDP growth, government budget, development programs and exports. In view of this, being heavily oil-dependent exposes these economies to exterior shocks that can, in fact, threaten the banking system's stability as well as the stability of financial markets. This relationship generates risks and brings substantial liquidity volatility for financial institutions (Al-Hassan, Oulidi & Khamis, 2010; Callen, Khandelwal, Miyajim & Santos, 2015; Alodayni, 2016). This was apparent with the dropin oil prices in the last quarter of 2014. The current decline in oil prices has resulted in weak bank balance sheets, shrinkage in the bank's liquidity and credit growth in the GCC. Gulf regimes' deposits are the core source of finance for Islamic banks.When they withdrew these large state deposits, it led to negative impact on the liquidity of IBs (Khandelwal, Miyajima, & Santos, 2016; Mahmoud, 2016).

The recent decline in oil prices has indeed imposed harsh economic conditions in Bahrain. Table 1 shows the key economic indicators of Bahrain over the period 2014 – 2017. The major changes brought by the fall in oil prices are severe deteriorations in GDP, fiscal balance and current account balance as shown in Table 1. The GDP has decreased by 55.5% from 2014 to 2017, another hit is on the fiscal balance, where it reached fiscal deficit of 15.3% in 2017. Moreover, the government has also raised the public debt ceiling to 10 billion Bahraini Dinar (around 80% of GDP) to enable additional borrowing (World Bank, 2017).

Table. 2.1 Key Economic Indicators

	2014	2015e	2016p	2017p
Real GDP Growth (%)	4.5	3.2	2.2	2.0
Inflation Rate (%)	2.7	1.8	3.2	2.3
Fiscal Balance (% of GDP)	-3.3	-12.5	-16.9	-15.3
Current Account Balance (% of GDP)	4.5	-3.2	-8.2	-7.2

Sources: World Bank, 2016

The outlook of Bahraini banking systems has been rated as "negative" by Moody's since 2009, underpinned by the challenging domestic operating environment, amid ongoing social unrest, which has affected investors' confidence and led to elevated levels of non-performing loans/financing (NPLs/NPF), thus affecting the banking sector's profitability (IFSISR, 2015). Moreover, although the banking sector in Bahrain expanded by approximately 1.5% , the latest report by (IFSB) states that Bahrain was the only GCC country whose Islamic banking share experienced a setback in the 2Q 2016 – declining to 13.3% (IFSISR, 2017). It should be noted that by late 2014, the fall in oil prices caused all Gulf States to suffer liquidity shortages to different degrees. However, Bahrain and Oman were the most affected by the drop in oil prices. A dropin oil price immediately means adecrease in state oil revenues. This drop also affects banks' balance sheet in GCC countries (Khandelwal, et al., 2016; Alodayni, 2016). Consequently, the country has witnessed downgrading by international rating agencies.

More recently, in 2017, the global rating agency, Moody's, downgraded the Bahraini government's long-term issuer rating to B1 from Ba2 and maintained the negative outlook for the country (https://www.moodys.com, 2017). By the same token, in May 2017, Moody's downgraded four Bahraini banks, including Bank of Bahrain and Kuwait (BBK) and National Bank of Bahrain. Following similar moves by Moody's, Fitch downgraded Bahrain's sovereign rating to non-investment grade (BB+). The rating agency explained that due to the decline in oil prices which imposes pressure on certain sectors, credit quality across the banking industry in Bahrain will deteriorate slightly over the coming years. Consequently, downgrading by rating agencies hurts the banks' cash flow and its liquidity (Castagna, et al., 2013). Downgrading can be interpreted as an indicator of a real evolving threat (Adalsteinsson, 2014). He stressed that the most common answer to the question of how to spot an emerging threat is a rating downgrade.

Similarly, Bahrain's credit growth in the private sector marginally switched to negative. Though the banking industry has stayed sound, sluggish growth is putting pressure on its profitability and liquidity coupled with a challenging work atmosphere. Bahrain's banking (retail banking and wholesale banking) sector is large with substantial regional exposure and could be impacted by shocks in other GCC States and instability of the international financial market. Both the wholesale and retail banking sectors are also mostly concentrated where a small number of banks control each market segment (World Bank, 2017).

Above all, the positions of liquidity worsened in Islamic retail banks while it declined in Islamic wholesale banks in Bahrain (FSR, 2017). Similarly, in 2016, the CBB stressed the decline of liquidity for IBs (FSR, 2016). Besides the economic deterioration, banks in Bahrain are facing an exceptional challenge in managing their risk exposure as a result of the continual social and political unrest which erupted on 14 February 2011 (Abu Hussain et, al., 2012).

Given the significant position of Bahrain as an international center of Islamic finance and bankingand the home of the LMC as well as the liquidity deterioration over the past few years, it is even more vital to investigate the liquidity determinants of IBs in Bahrain.

3. Literature Review

Liquidity risk literature can be divided into two groups. The first group is concerned with identifying the determinants and the variables that have a relationship with liquidity risk. The aim here is to identify the nature (positive/negative) of this relationship and its influence (significant/insignificant). In this group, liquidity risk is the dependent variable and a key variable in the study. In this category, profitability can be among the independent variables where the objective is to examine its effect on liquidity risk.

The second group deals with the impact of liquidity risk on performance or profitability. In this group, liquidity risk is merely treated as one of the independent variables. However, regardless of the type of liquidity risk literature groups, the GCC countries, including Bahrain, have been mostly overlooked by prior researchers.

Past as well as recent research on the Middle East (Zaghdoudi & Hakimi, 2017; AbdulGaniyy, Ogunbado, & Ahmad, 2017; Abdul Ganiyy, Zainol, & Ahmad, 2017; Saif-Alyousf, Saha, & Md-Rus, 2017; Al-Tamimi, Miniaoui, & Elkelish, 2015; Almumani, 2013; Abu Hussain & Al-Ajmi, 2012; Masa'deh et al., 2012; 2013; 2014; Vratskikh, et al., 2016) have ignored the study of liquidity risk in the GCC as a whole and Bahrain as an individual country.

Prior researchers have identified several specific variables of banks that can impact liquidity risk. Several researchers (Anam et al., 2012; Anjum Iqbal, 2012; Abdullah et al., 2012; Ariffin, 2012; Al-Khouri, 2012; Sulaiman et al., 2013; Ahmad Azam et al., 2013; Ramzan et al., 2014; Jedidia et al., 2015; Nemati et al., 2015; Iqbal, Ibrahim, and Murtaza, 2015; Yaacob, Rahman, and Karim, 2016; and more recently, Zaghdoudi and Hakimi, 2017; Abdul Ganiyy, Zainol, and Ahmad, 2017) have studied the link between the specific determinants and liquidity risk in banks, mainly IBs.

All these researchers have conducted empirical research and have shown that specific variables of banks, namely NPLs, bank size, CAR, and profitability, have significant relationships with the bank's liquidity risk. However, what is less clear is the nature of the relationship between the bank's internal variables and liquidity risk in Bahraini banks. These studies have reported conflicting and inconsistent findings, which indicate there is a need for additional research on the topic of liquidity risk in IBs. Following the aforementioned researchers who have investigated the association between bank's specific variables and liquidity risk, the same variables can be used in the current study.

In the following paragraphs, the related literature is discussed on a country and regional basis.

In Bahrain, studies by AbdulGaniyy, Ogunbado, & Ahmad (2017); Zolkifli, Hamid, & Janor (2015); Abu Hussain & Al-Ajmi (2012); and Samad (2004) are the only studies so far found to have mainly examined liquidity risk. However, none of these studies has investigated the determinants of liquidity risk in Bahraini banks. This has generated a gap in the literature that needs to be filled, which is the aim of the current study.

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The research conducted by Samad (2004) could be the first research to address liquidity risk in Bahrain. He compared the performance of IBs to conventional banks in Bahrain. The author reported that the there is no major difference in profitability and liquidity between IBs and conventional banks. He used only descriptive statistics to measure liquidity by using three financial ratios as the main indicators of liquidity. This study did not identify liquidity risk determinants nor the factors that affect liquidity and liquidity risk in Bahraini banks.

Recently, Zolkifli, Hamid, & Janor (2015) investigated the relationship between liquidity risk and performance of banks in Bahrain and Malaysia. They analyzed the relationship between liquidity risk interbank ratio, volatility deposit, volatility loan, and bank capitalization, loans to deposit ratio, the growth of total assets, management efficiency and bank size. They also used liquidity risk as the independent variable and measured profitability using Return on Equity (ROE). While they tested the impact of liquidity risk on profitability, the current study investigates the determinants of liquidity risk in Bahrain. Different from the study by Zolkifli et al. (2015), the current study focuses mainly on the determinants of liquidity risk in IBs. On the contrary, the current study tests the impact of profitability as one of the independent variables on liquidity risk and by using Return on Average Equity (ROAE) which is less subject to deterioration compared to ROE (Rivard & Thomas, 1997).

Abu Hussain & Al-Ajmi (2012) investigated risk management practices by distributing a questionnaire to conventional and Islamic bankers. They reported that credit, liquidity and operational risks faced by conventional banks and IBs, are the most importantrisks. Furthermore, IBs differ significantly from the conventional banks in understanding risk and its management. The researchers argued that liquidity risk is among the most important risks facing both conventional banks and IBs. They documented that liquidity risks, along with operational, residual and settlement risks, are higher in IBs than in conventional banks.

More recently, AbdulGaniyy, Ogunbado, & Ahmad (2017) studied the Islamic perspective of liquidity risk management practices of IBs in Malaysia and Bahrain. The study aimed to shed light on liquidity risk management based on the Qur'an and Hadith as the key sources of Shariah guidelines which are the foundation of the theory of Islamic banking and finance. The main limitation of this study lies in its nature; it is non-empirical research and therefore, does not provide empirical evidence on liquidity risk determinants.

In GCC context, Saif-Alyousf, Saha, & Md-Rus (2017a); Al-Tamimi, Miniaoui, & Elkelish (2015); and Al-Khouri (2012) studied liquidity and liquidity risk from different aspects. Saif-Alyousf et al., (2017a) investigated the profitability of Saudi commercial banks. The researchers compared the profitability in domestic and foreign banks using CAMEL parameters over the 2000-2014 period. They studied the impact of liquidity, among other independent variables, on profitability. The authors found that liquidity risk, when measured by liquid assets to total assets, negatively affects profitability when the latter is measured by net interest margin (NIM) and ROE. However, liquidity risk, when proxied by net loan to total deposits, impacts the ROA and NIM positively and significantly.

There are certain limitations in the study of Saif-Alyousf et al (2017a). First, the study does not focus mainly on liquidity risk, and the main dependent variable is profitability. Second, the study includes only conventional banks and ignores IBs. Another shortcoming of this study is found in the scope, where the study concentrates only on Saudi Arabia and ignores other GCC countries, including Bahrain. Unlike the study of Saif-Alyousf et al. (2017a), this study analyzes the determinants of liquidity risk where the impact of profitability on liquidity risk is tested along with other specific variables of the banks.

In addition, Saif-Alyousf et al. (2017b) investigated shareholders' value of Saudi commercial banks by using CAMEL parameters to compare Islamic and conventional banks. The sample included seven conventional banks and four IBs over the period of 2000-2015. The researchers reported that liquid assets to total assets (liquidity risk) are negatively and significantly related to shareholders' value for conventional banks. However, it has a positive but insignificant relationship for IBs. Again, the focus of this study is the shareholders' value and not liquidity risk.

Ghenimi and Omri (2015) studied liquidity risk management in conventional banks and IBs in GCC over the period of 2006 -2013. They found that in IBs, NPLs, bank size, ROA and GDP have a negative relationship with liquidity risk. The authors also reported that ROE, NIM, CAR and inflation rate have a positive association with liquidity risk in IBs.

Al-Tamimi, Miniaoui, & Elkelish (2015) studied the relationship between performance and financial risks of IBs in GCC. The sample covered 11 IBs over the period of 2000-2012. The study included four risks, mainly credit risk, liquidity risk, operational risk and capital risk. They documented a significant relationship between profitability and capital risk and operational risk. The authors recommended that liquidity risk should be given more attention since it isa determinant of IBs' profit in the GCC. Likewise, Al-Wesabi & Ahmad (2013) examined credit risk of IBs in GCC countries. They established that the IBs and conventional banks share similar determinants of credit risk, and these variables are liquidity, management's quality and portfolio's risk assets.

The study by Al-Khouri (2012a) investigated bank's characteristics and liquidity transformation in GCC banks. The researcher found that within the GCC banking industry, the lion's share of liquidity is produced by big banks with large capital. In addition, Al-Khouri (2011b) investigated the link between risk and performance of banks in the GCC. The author reported that liquidity risk is the only risk that affects the profitability when measured by ROE.

In addition to the abovestudies, past and current empirical studies on the GCC have emphasized more on oil price and performance (Hesse & Poghosyan, 2009; Khandelwal, et al., 2016; Alodayni, 2016). They have neglected the testing of liquidity risk of the banking sector in this region.

In Jordan, three studies are found on liquidity, namely the studies by Al Nimer, Warrad, & Al Mari (2015), Alshatti (2014) and Almumani (2013). Al Nimer et al. (2015) examined the

impact of liquidity on Jordanian banks' profitability through ROA. The study included 15 Jordanian banks over the period of 2005-2011. The authors reported that liquidity significantly impacts the profitability of Jordanian banks when measured by ROA. Equally, Alshatti (2014) established that liquidity (quick ratio and the investment ratio) showed a positive impact on the profitability while capital ratio and the liquid assets ratio showed a negative effect on the profitability of the Jordanian commercial banks. Almumani (2013) compared the liquidity risk between Saudi and Jordanian listed banks during the period of 2007-2011. He found that liquidity risk of Jordanian banks is higher compared to their Saudi counterparts.

Alzoubi (2017) and Jedidia & Hamza (2015) studied several countries in different regions. Alzoubi (2017) investigated liquidity risk determinants in IBs in 15 countries using 45 banks over the 2007-2014 period. He documented a negative relationship between liquidity risk and cash ratio and bank's equity, while high-profit assets show a positive relationship with liquidity risk. Jedidia & Hamza, (2015) examined the determinants of liquidity of IBs in the Middle East and North Africa (MENA) and Southeast Asian countries. Their main finding is that CAR and investment show a significant and statistically negative relationship with liquidity risk and profitability has a positive association with liquidity risk.

Zaghdoudi, et al. (2017) documented a significant and positive association between credit risk and liquidity risk in Tunisian banks. The researchers explained that an increase in credit risk causes the bank's liquidity to fall which leads to higher liquidity risk and eventually that jeopardizes the sustainability of banks. Within the Malaysian environment, a few studies have been dedicated to liquidity and liquidity risk.

Yaacob, Rahman, & Karim (2016) investigated the determinants of liquidity risk of IBs in Malaysia using panel data. The researchers used a sample of 17 IBs in Malaysia over the period of 2000-2013. They used Basel III ratios for liquidity, coverage ratio (LCR) and Net Stable Funding Ratio (NSFR) as proxies for liquidity risk. The authors found that CAR and financing are significantly related to liquidity risk and both macroeconomic variables, i.e., GDP and inflation, are significant with both liquidity measurements proposed by Basel III.

AbdulGaniyy, Zainol, & Ahmad (2017) investigated the determinants of liquidity risk in Malaysia and Sudan. The authors found that the different environments where the IBs operate determine the significance of liquidity risk determinants. There are conflicting effects of bank's specific (micro) factors, including bank size, CAR as well as macroeconomic variables, like GDP and money supply on the liquidity of IBs. However, the study concludes that management efficiency, proxied by deployment ratio, is a common factor in the two settings.

Researchers from Pakistan have conducted many empirical studies on liquidity risk (Ahmed, Ahmed, & Naqvi, 2011; Abdullah & Khan, 2011; Ahmed, Akhtar, & Usman, 2011; Akhtar, Ali, & Sadaqat, 2011; Iqbal, 2012; Shaikh, 2015). Ahmed et al. (2011) found that asset management has a positive and significant relationship with liquidity risk. The debt-equity ratio and NPL ratio have a negative and significant relationship with liquidity. In addition, CAR has a positive association with liquidity risk. Similarly, Akhtar et al. (2011)

reported an insignificant and positive association between liquidity risk and net working capital to net assets and bank size in Islamic and conventional banks. The ROA in IBs is found to have a positive and significant relationship with liquidity risk. Iqbal (2012) documented a significant and positive association of CAR, ROA, ROE and bank size with liquidity risk, whereas NPL is negatively related to liquidity risk. Shaikh (2015) established that while deposits to total capital ratio increases liquidity risk, capital to financing ratio and improvement in efficiency reduce liquidity risk. Furthermore, the author reported that the larger the spread, the larger the liquidity risk.

 In Europe, Cucinelli (2013) and Vadovà (2011) investigated liquidity risk and its determinants in European commercial banks. Cucinelli (2013) examined the association that exists between liquidity risk and bank internal variables. The study included 1,080 Eurozone banks in the sample. The findings showed that larger banks are more exposed to liquidity risk, while in the long-term, banks with high capital present better liquidity. Finally, in the course of the financial crisis, liquidity risk fluctuates only over a short period of time. Vodovà (2011) studied the liquidity determinants in 22 Czech banks over the2006-2009 period. The findings show that liquidity has a positive association with bank's capital adequacy and interest rates. Moreover, liquidity appears to have a positive connection with capitalization and size.

Faced with the lack of consensus regarding the impact of bank's specific variables on liquidity risk and due to the significant role of liquidity in the survival of banks, the main objective of this paper is to identify the key internal determinants of liquidity risk in Bahraini IBs so that they can manage this risk properly to avoid the drying up of liquidity and bankruptcy.

4. Methodology
4.1 Data Sample
The sample includes seven fully-fledged IBs over five years (2007-2011). Appendix B depicts the list of the banks under investigation. This produces a total of 35 observations using unbalanced panel data. The panel data method provides a good potential analysis by tracing single behavior over time. In addition, panel data also has the advantage of increasing the sample size, which enlarges the degree of freedom and curtails collinearity issue among explanatory variables, thus, improving the findings (Zaghdoudi, et al., 2017). Data for bank characteristics were obtained from Bank scope database, while country variables were collected from the Central Bankof Bahrain, World Bank and IMF databases.

4.2 Definition of Variables and Model Specification
Liquidity risk is treated as the dependent variable and it is measured by Cash to Total Assets (CTA). CTA has been used in past studies on liquidity risk by previous researchers (Akhtar, et al., 2011; Sheridan, et al., 2012; Ramzan, et al., 2014; Jedidia, et al., 2015; Iqbal, et al., 2015). Salman (2013) stressed that CAT provides a fast image about the available amount of liquidity within a bank. Appendix C shows the variables, their proxies and the previous researchers who have used these measurements. There are four independent variables, namely, ROA, NPL, CAR, bank size and one dummy variable

(financial crisis). Previously, the Bahraini banking sector, especially the wholesale banking, was badly affected by the global crisis of 2007-2008 (Al-Hassan, et al., 2010).

To understand how liquidity risk behaved during the financial crisis of 2007-2008, it is important to use dummy variables to differentiate between the period of financial crisis and the time after the crisis. The dummy variable of the financial crisis has the value of '1' for the 2007-2008 period, and '0', otherwise. Earlier researchers have used the financial crisis in their investigation of liquidity risk in the banking sector (Vadovà, 2011; Cucinelli, 2013; Jedidia & Hamza, 2015; Zaghdoudi, et al., 2017).

To test the impact of the bank's specific variables on liquidity risk, we used the following econometric model:

$$LR_{it=} \beta 0 + \beta 1\, ROAA_{it} + \beta 2\, NPL_{it} + \beta 3\, CAR_{it} + \beta 4\, SIZE_{it} + \beta 5 FinCrs_{it} + \pounds_{it}$$

Where: LR is the liquidity risk for bank i at time t, ROAA is the return on average assets, NPLs is the non-performing loans, CAR is capital adequacy ratio, FinCrs is the financial crisis and £ is the error term.

5. Empirical Result
5.1 Descriptive Statistics and Correlation

Table 5.1 below summarizes the descriptive statistics of the variables used in this study. It shows the mean, standard deviation, maximum and minimum values for IBs in the study. The average liquidity risk is equal to 397.4% with standard deviation of 397.

Table 5.1 Descriptive Statistics

Variables	Observations	Mean	Std. Dev.	Min	Max
LR	35	3.974	3.977	0.097	16.122
ROAA	35	-0.939	9.796	-27.530	18.500
NPL	35	27.903	34.741	0.710	100.000
CAR	35	36.851	28.286	10.700	99.780
SIZE	35	6.818	1.057	5.071	8.544
FinCrs	35	0.400	0.497	0.000	1.000

The correlation matrix is shown in the table 5.2below which provides information on the degree of correlation among the explanatory variables. All the values are below 0.9, which indicates there is no multicollinearity.

Table 5.2 Correlation Table

	LR1	ROAA	NPL	CAR	SIZE	FinCrs
LR1	1					
ROAA	0.4557	1				
NPL	-0.7134	-0.3682	1			
CAR	-0.2785	0.2246	-0.0566	1		
SIZE	-0.2017	-0.1016	0.086	0.1528	1	
FinCrs	0.2078	0.5724	-0.1907	0.1467	0.0803	1

5.2 Regression Analysis on Determinants of Liquidity Risk

The estimation results are reported in table 5.3 below.

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Table 5.3 Estimation results

	Pooled-OLS	Random Effects Model	2SLS
Dependent Variable = Liquidity Risk			
VARIABLES			
ROAA	0.0738	0.0738	0.0738
	(0.0520)	(0.0520)	(0.0520)
NPL	-0.0429***	-0.0429***	-0.0429***
	(0.0131)	(0.0131)	(0.0131)
CAR	-0.123*	-0.123**	-0.123*
	(0.0600)	(0.0600)	(0.0600)
SIZE	-0.190	-0.190	-0.190
	(0.623)	(0.623)	(0.623)
FinCrs	-0.190	-0.190	-0.190
	(1.044)	(1.044)	(1.044)
Constant	9.210*	9.210**	9.210*
	(4.356)	(4.356)	(4.356)
Observations	35	35	35
R-squared	0.696	0.696	0.696
Number of banks	7	7	7
Hausman Test P-value		0.9097	

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
*, **, *** denote the coefficients are significant at the 10%, 5% and 1% levels of confidence respectively.

The value of R-squared is 69.6% which indicates the explanatory power of this model is higher; meaning almost 70% of liquidity risk is explained by the chosen independent variables. To add robustness to the model, we used three estimators, namely Ordinary Least Squares (OLS), random effect model and two Stage-Least Squares (2SLS). However, the regression results of the three estimators are the same. The random effect model was chosen over the fixed effect based on the Hausman test (0.9097).The estimation results show that all variables of the model are negatively correlated with liquidity risk (dependent variable), except profitability (ROAA).

ROAA shows a positive but insignificant relationship with liquidity risk. This result is supported by the findings of previous researchers; Akhtar, et al. (2011) and Ramzan, et al. (2014) also found a positive and insignificant relationship between liquidity risk and profitability. In contrast, Jedidia et al. (2015) established that profitability (ROA) has a positive and significant association with liquidity risk at 5%. NPLs show a significant and negative association with liquidity risk at 1%, 5% and 10% levels of significance, meaning if the NPLs increase by 1%, liquidity risk decreases by 4.29%. This shows the strong influence of credit risk (proxied by NPLs) on liquidity risk in Bahraini IBs. This reverse linkage between NPLs and liquidity risk is based on the fact that poor asset quality results in lesser profitability and low liquidity or higher exposure to liquidity risk (Ganić, 2014). This result confirms the finding of Ghenimi (2015) and Akhtar & Usman (2011).

Similarly, CAR has a significant and negative association with liquidity risk, which means that if CAR increases by 1%, liquidity risk decreases by 12.3%. Similar results were reported by AbdulGaniyy, et al. (2017); Yaacob, et al. (2016); Jedidia, et al. (2015); Ahmad Azam (2013); and Anjum Iqbal (2012). This negative and significant association could mean that an increase in CAR for IBs in Bahrain leads to a reduction in liquidity risk. Repullo (2004) stressed that capital enables the bank to handle additional liquidity risk.

On the contrary, Zaghdoudi, et al. (2017) found that CAR shows a positive and significant association with liquidity risk in Tunisian banks. Size of the bank demonstrates inverse but insignificant linkage with liquidity risk and this finding agrees with the findings of previous researchers (AbdulGaniyy, et al., 2017) in the case of Malaysian IBs & Moussa (2015) in the case of Tunisia. It differs from Zaghdoudi et al. (2017) who found a negative and significant impact of bank size on liquidity risk. On the contrary, Ramzan, et al. (2014) reported a positive and significant relation between bank size and liquidity risk. Similarly, AbdulGaniyy, et al. (2017) found a positive association between bank size and liquidity risk in Sudan.

Finally, our results on the financial crisis show a negative and insignificant effect on liquidity risk in IBs in Bahrain. This result concurs with the findings of Jedidia, et al. (2015); Noraini (2012); and Vadovà (2011), who found that the financial crisis has little influence on the liquidity risk in the IBs and conventional banks.

Conclusion and Recommendation

This paper investigates the bank's factors that affect the liquidity risk of IBs in Bahrain, using panel data for seven IBs over the period of 2007-2011. The methodologies used in the analysis are pooled OLS, random effects and 2SLS regression using panel data. The findings illustrate that the liquidity risk of Bahraini IBs relies on idiosyncratic factors. Liquidity risk is positively related to bank's profitability (ROAA). On the contrary, NPLs and CAR impact liquidity risk negatively and significantly. Finally, size of the IBs and the financial crisis displays negative and insignificant links with liquidity risk.

The findings of the current research should enhance the understanding of the link between liquidity risk and internal determinants of banks, and the direction and influence of these vital factorson liquidity risks. The main limitation of this study is its sample, the specific factors of the banks covering one country and IBs only. Therefore, it is recommended that future studies should expand the sample by considering IBs in other GCC countries and also the inclusion of conventional banks and macroeconomic factors. Finally, since NPLs (credit risk) and CAR show a significant impact on liquidity risk, it is recommended that the relationship between liquidity risk and credit risk in Bahrain and in the GCC environment be further investigated. Similarly, future studies should consider examining the impact of the two new ratios suggested by Basel Committee on liquidity risk in the GCC banking industry.

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Appendix A

الميزانية الموحدة للمصارف الإسلامية: مصارف قطاع التجزئة ومصارف قطاع الجملة

Aggregated Balance Sheet of the Islamic Banks: Retail Banks and Wholesale Banks

الموجودات

Assets

U.S. Dollar Million — مليون دولار أمريكي

End of Period	Domestic Assets						Foreign Assets						Total Assets 1/	Off Balance Sheet 3/
	Cash	Invest. with Banks 2/	Invest. with Private Non-banks	Invest. with Govt.	Others	Total	Invest. with Banks	Invest. with Private Non-banks	Securities	H.O. & Affiliates	Others	Total		
2007	17.9	4,288.9	3,590.6	144.3	1,462.5	9,504.2	1,409.9	2,437.8	1,156.4	1,676.8	244.9	6,925.8	16,430.0	N/A
2008	37.1	3,578.5	6,079.3	332.9	1,811.9	11,839.7	2,621.0	3,241.3	2,392.6	4,463.9	93.7	12,812.5	24,652.2	N/A
2009	58.2	4,123.3	6,320.7	318.2	1,397.9	12,218.3	2,015.6	3,372.7	2,632.6	5,080.2	200.1	13,301.2	25,519.5	N/A
2010	62.2	3,515.0	6,372.0	340.1	2,074.0	12,363.3	1,730.2	2,414.5	3,042.5	5,440.6	365.4	12,993.2	25,356.5	N/A
2011	67.2	3,809.9	6,559.0	556.2	1,654.2	12,646.5	1,588.0	1,821.6	2,341.2	5,961.7	338.3	12,050.8	24,697.3	N/A
2012	94.3	3,515.4	6,684.1	673.9	1,855.8	12,823.5	1,390.0	1,777.1	2,539.4	6,105.0	927.0	12,738.5	25,562.0	N/A
2013	108.2	3,708.6	7,307.0	635.2	1,723.7	13,482.7	1,654.3	1,712.8	2,530.6	2,970.1	948.3	9,816.1	23,298.8	N/A
2014	115.2	3,890.9	7,786.1	754.7	1,870.2	14,417.1	1,641.0	2,112.1	2,777.3	3,077.4	870.1	10,477.9	24,895.0	N/A
2015	135.2	3,240.4	8,634.8	1,398.2	2,319.2	15,727.8	1,624.6	2,158.1	2,372.0	2,762.1	697.9	9,614.7	25,342.5	N/A
2016	120.2	4,105.3	9,137.1	1,934.1	1,619.2	16,915.9	1,651.4	1,860.8	2,585.2	2,694.8	582.4	9,374.6	26,290.5	N/A
2015 Q4	135.2	3,240.4	8,634.8	1,398.2	2,319.2	15,727.8	1,624.6	2,158.1	2,372.0	2,762.1	697.9	9,614.7	25,342.5	N/A
2016 Q1	121.7	3,412.3	8,493.4	1,612.7	1,982.6	15,622.7	1,843.7	1,837.0	2,520.9	2,402.5	760.7	9,364.8	24,987.5	N/A
Q2	144.0	3,758.5	8,811.7	1,637.7	2,031.4	16,383.3	1,839.8	1,687.5	2,549.8	2,460.3	765.5	9,102.9	25,486.2	N/A
Q3	145.3	3,638.0	9,010.7	1,661.4	1,810.0	16,265.4	1,727.9	1,610.9	2,577.4	2,670.6	842.9	9,429.7	25,695.1	N/A
Q4	120.2	4,105.3	9,137.1	1,934.1	1,619.2	16,915.9	1,651.4	1,860.8	2,585.2	2,694.8	582.4	9,374.6	26,290.5	N/A
2017 Q1	123.5	5,534.0	8,672.8	2,010.3	1,414.1	17,754.7	1,393.4	1,604.4	2,182.4	2,421.2	507.4	8,108.8	25,863.5	N/A
Q2	156.4	4,086.0	9,180.3	2,009.9	2,022.7	17,455.3	1,940.9	1,606.3	2,200.1	2,367.7	719.7	8,834.7	26,290.0	N/A
Q3	160.7	4,175.2	9,362.9	2,393.0	1,832.0	17,923.8	1,929.2	1,657.5	2,104.9	2,292.1	935.5	8,919.2	26,843.0	N/A
2016 Sep.	145.3	3,638.0	9,010.7	1,661.4	1,810.0	16,265.4	1,727.9	1,610.9	2,577.4	2,670.6	842.9	9,429.7	25,695.1	N/A
Oct.	129.4	3,572.9	9,022.1	1,901.2	1,826.0	16,451.6	1,660.2	1,611.7	2,610.7	2,640.9	868.0	9,391.5	25,843.1	N/A
Nov.	135.0	3,694.2	9,137.2	1,942.4	1,833.8	16,742.6	1,795.5	1,665.9	2,638.1	2,669.8	752.1	9,521.4	26,264.0	N/A
Dec.	120.2	4,105.3	9,137.1	1,934.1	1,619.2	16,915.9	1,651.4	1,860.8	2,585.2	2,694.8	582.4	9,374.6	26,290.5	N/A
2017 Jan.	111.4	5,500.9	8,416.6	1,953.2	1,355.2	17,337.3	1,566.1	1,770.9	2,274.6	2,411.1	460.4	8,483.1	25,820.4	N/A
Feb.	124.9	5,460.3	8,510.8	1,977.7	1,420.9	17,494.6	1,357.5	1,664.1	2,208.5	2,467.2	519.2	8,216.5	25,711.1	N/A
Mar.	123.5	5,534.0	8,672.8	2,010.3	1,414.1	17,754.7	1,393.4	1,604.4	2,182.4	2,421.2	507.4	8,108.8	25,863.5	N/A
Apr.	139.0	5,584.1	9,063.8	2,028.8	1,513.4	18,329.1	1,853.2	1,659.9	2,202.5	2,411.1	701.2	8,627.9	26,957.0	N/A
May	134.2	5,461.3	9,132.2	2,014.4	1,618.8	18,360.9	1,861.1	1,632.0	2,179.3	2,434.3	793.1	8,839.8	27,200.7	N/A
Jun.	156.4	4,086.0	9,180.3	2,009.9	2,022.7	17,455.3	1,940.9	1,606.3	2,200.1	2,367.7	719.7	8,834.7	26,290.0	N/A
Jul.	149.9	4,053.3	9,248.1	2,134.3	2,000.8	17,586.4	2,058.5	1,644.7	2,127.7	2,239.0	687.9	8,757.8	26,344.2	N/A
Aug.	162.9	4,096.6	9,326.0	2,051.2	1,848.8	17,485.5	1,801.9	1,667.3	2,218.6	2,233.9	867.6	8,789.3	26,274.8	N/A
Sep.	160.7	4,175.2	9,362.9	2,393.0	1,832.0	17,923.8	1,929.2	1,657.5	2,104.9	2,292.1	935.5	8,919.2	26,843.0	N/A

Source: Central Bank of Bahrain, (http://cbb.complinet.com, 2017)

Appendix B: List of the banks in the study

1. Al-Salam Bank-Bahrain
2. Acapita Bank
3. GFH Group
4. Ibdar Bank
5. Bahrain Islamic Bank
6. Khaleeji Commercial Bank
7. Shamil Bank of Bahrain
Sources: Bankscope

Appendix C: The variables and their proxies

Symbol	Variables	Proxies/ Measurements	Used by previous researchers
LR	Liquidity risk	Cash to / Total Assets	Akhtar et al. (2011), Sheridan et al. (2012), Ramzan (2014), Jedidia et al. (2015), Iqbal et al. (2015).
ROAA	Return on Average Assets	Net income / by Average Assets	Hassan et al. (2003), Sufian et al., (2009). Grassa (2012), Wasiuzzaman et al. (2013), Ferrouhi (2014) and Garcia et al. (2016)
NPLs	Non-Performing Loans	Impaired loans / gross loans	Akhtar et al. (2011), Anjum et al. (2012), Arif et al. (2012); Vodová (2013); Sohaimi (2013); Ghenimi et al. (2015); Shaikh (2015)
CAR	Capital Adequacy Ratio	Total equity / total assets	Zaghdoudi et al. (2017), Azam et al.(2013), Cucinelli (2013) ,Akhtar et al Iqbal (2012) Anjum et al. (2012)
SIZE	Bank's size	Natural logarithm of total assets	Zaghdoudi et al. (2017), Alzoubi, (2017),Yaacob et al. (2016), , Jedidia et al. (2015),Cucinelli (2013), Akhtar et al. (2011)
FinCrs	Dummy variable		
Sources: Own research based on various literature			