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Liquidity Risk Determinants of Islamic Banks

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Abstract: The purpose of this article is to examine the impact of bank-specific variables on the liquidity risk of Islamic banks operating in 12 countries over the period from 2014Q1 to 2019Q3. Using the fixed effects technique panel data regression, we find that there is a significant positive impact of capital adequacy, asset quality and bank size on the liquidity risk measure. Moreover, cost-to-income ratio has a significant and positive association with liquidity risk of Islamic banks. The study also concluded that bank profitability has an insignificant relationship with the liquidity risk for the Islamic banks.

Key Words: Liquidity risk, Bank-specific variables, Islamic banks, Panel data.

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1. INTRODUCTION

In the wake of the last financial crisis, liquidity risk measurement and management in banks has received increasing attention. In fact, the financial crisis has fundamentally affected and changed market conditions. In addition to this, there are also financial activities and instruments that are becoming increasingly diversified and complex. Consequently, liquidity risk could perhaps be much more important than other types of risks (Adalsteinsson, 2014). The objective is to avoid the incitement of other banking risks like insolvency risk or reputational risk.

The liquidity management dilemma and related risks are a major concern for Islamic banks and their conventional counterparts. Liquidity risk is found to be vital and mainly considered to be of major importance to Islamic banks (Abu Hussain and Al-Ajmi, 2012; Askari and al., 2011). So, Islamic banks should adopt an effective and systematic approach liquidity management considering both internal and external perspectives. However, Islamic banks face several obstacles to optimal liquidity management. Firstly, most of these institutions operate in an environment where Islamic interbank and money markets are non-existent or underdeveloped (Hesse and al., 2008). Secondly, these institutions are confronted with the absence of Islamic capital markets in general and, more particularly, secondary financial markets in accordance with the precepts of the Shari'a. These markets will provide new liquidity management momentum for Islamic banks while allowing them to buy or sell, at any time, securities or assets that they need or hold (Oubdi and Elouali, 2016). Similarly, the use of the central bank, as the lender of last resort for the entire banking system, is not allowed for Islamic banks because the instruments offered by the central bank do not accommodate the Shari'a.

These different reasons justify the implementation of this study to analyze the determinants of liquidity risk of Islamic banks. The literature review identifies two types of determinants of bank liquidity risk. First, there are the internal determinants which result from managerial decisions within the bank. Second, there are the external determinants which emanate from the direct environment of the banking sector. As part of this research, we will focus on the internal determinants of liquidity risk.

The rest of the paper is organized as follows. The next section reviews the existing literature related to Islamic banks liquidity risk. Section 3 describes the different variables used in the study. Section 4 presents the data and methodology, while section 5 summarizes and discusses the empirical results. Finally, section 6 concludes.

2. LITERATURE REVIEW

This section gives summary of the literature related to determinants of liquidity risk of Islamic banks. There are several empirical studies that have attempted to explore the determinants of Islamic banks liquidity risk. For example, Ahmed and al. (2011) studied the effect of firm's level determinants of liquidity risk of six Islamic banks in Pakistan during the period 2006 and 2009. The empirical findings showed that leverage and age are positively and significantly related to the liquidity risk of Islamic banks of Pakistan, while tangibility has a negative impact on liquidity risk. However, the profitability and the size of the bank have no significant relationship to liquidity risk.

In another study on the Pakistan banking sector, Akhtar and al. (2011) investigated liquidity risk on a sample of 6 Islamic and 6 conventional banks from 2006 to 2009. The findings revealed that return on assets (ROA) has a significant positive impact on Islamic banks' liquidity risk, while the return on equity (ROE) has a significant and negative impact on the liquidity risk of Islamic banks. They also found that there is no direct relationship between bank size, capital adequacy ratio and net-working capital to net assets with liquidity risk in Islamic banks.

Muharam and Kurnia (2012) examined liquidity risk through a comparative study between 3 conventional banks and 3 Islamic banks in Indonesia from the period 2007-2011. The results showed that net interest margin (NIM) and return on equity (ROE) have a positive and significant impact on the liquidity risk of Islamic banks, while ROA has negative and significant effects on dependent variable. Furthermore, capital adequacy ratio (CAR), liquidity gaps (LG) and risky liquid assets (RLA) have insignificant effect on the liquidity risk of Islamic banks in Indonesia.

The author Iqbal (2012) compared liquidity risk management between the Islamic and conventional banks in Pakistan from the period 2007-2010. He used the cash and cash equivalent to total assets to measure the liquidity risk of banks. The sample consisted of 5 conventional banks and 5 Islamic banks. The study indicated a strong positive relationship of CAR, ROA, ROE and size of the bank with the liquidity risk of Islamic and conventional banks, while non-performing loans ratio (NPLs) has significantly a negative impact on liquidity risk of both types of banks.

Mohamad and al. (2013) studied the liquidity management in a sample of 17 Malaysian Islamic banks for the period between 1994 and 2009. They found that bank profit (ROA) and growth of gross domestic product (GDP) have positive and significant effects on liquidity, while total of financing, total assets and inflation have a negative relationship with liquidity.

Ramzan and Zafar (2014) conducted a study to evaluate the liquidity risk management in five Islamic banks of Pakistan for the period 2007-2011. Furthermore, the liquidity risk was used as the dependent variable, while assets size, capital adequacy ratio, networking capital (NWC), return on assets and return on equity were used as the independent variables. As a result of the study, it was determined that only the size of the bank affected the Islamic bank liquidity risk positively, and all the other variables have insignificant relationship with the liquidity risk.

Ben Jedidia and Hamza (2015) studied a study in which they researched the determinants of liquidity of Islamic banks in the Middle East and North Africa (MENA) and Southeast Asian countries for the period from 2004 to 2012. They used loan to assets ratio and cash to total assets as liquidity risk indicators. The results of the study indicate that there is a significant and positive relationship between profitability (ROA) and liquidity risk, whereas, CAR and investment are negatively related to liquidity risk. Nevertheless, both bank size and GDP have statistically insignificant impacts.

Another study by Ghenimi and Omri (2015) examined the factors that affect the liquidity risk of both conventional and Islamic banks. Annual data covering the period 2006-2013 for banks operating in Golf countries have been used in the empirical analysis. The results of the study indicate that there is a positive relationship between ROE, NIM, CAR, inflation rate and liquidity risk in Islamic banks. The results also reveal that in Islamic banks, NPLs, bank size, ROA and GDP have a negative relationship with liquidity risk.

Rahman and Banna (2015) performed a study to compare liquidity risk management in 3 conventional and 3 Islamic banks in Bangladesh over the period 2007-2011. They found that, in the case of Islamic banks, all the dependent variables (bank size, net working capital, return on equity, capital adequacy and return on assets), are insignificant in affecting the liquidity risk for Islamic banks in Bangladesh.

Yaacob and al. (2016) studied the determinants of the liquidity risk in Islamic banking in Malaysia. They used data covering the period 2000-2013. They used liquidity coverage ratio (LCR) and net stable funding ratio (NSFR) as liquidity risk indicators. Estimating the fixed effect model, they concluded that financing and GDP have significant and positive impacts on liquidity risk. They also found that CAR and inflation have a significant and negative effect on liquidity risk, whereas, bank size, ROA, and non-performing financing (NPF) do not have any significant impact on liquidity risk for Islamic banks in Malaysia.

Similarly, Alzoubi (2017) examined liquidity risk determinants in Islamic banks in 15 countries. He used annual data covering the period 2007-2014. He found that profitability (ROA) and bad financing have a significant positive impact on Islamic banks' liquidity risk. He also found that cash ratio, investment in securities and equity ratio have a significant negative impact on liquidity risk of Islamic banks. He further concluded that bank size has no significant impact on liquidity risk.

Effendi and Disman (2017) compared Islamic and conventional banks' liquidity risk over the period 2009-2015. In the case of Islamic banks, the results of the regression (fixed effect model) showed that CAR, NPLs and financing quality affect positively the liquidity risk in Islamic banks, while financial expansion has a significant and negative impact on liquidity risk. The results also reported that the impact of ROA, NIM and bank size on liquidity risk is insignificantly related.

Rashid and al. (2017) examined the contingency determinants (firm and industry specific variables) of liquidity risk management in Islamic banks in Malaysia and the GCC countries. They used fixed effect regression method for a panel of 39 Islamic banks over the period from 2009 to 2014. They found that banks specific variables (bank size, ROA, loan loss provisions) and industry specific variables (growth of GDP, growth of broad money) are the important determinants of Islamic banks' liquidity.

More recently, many researchers have studied the liquidity risks in Islamic banks. Table 1 shows a non-exhaustive list of these empirical studies.

Table -1: Summary of recent studies on the determinants of Islamic banks liquidity

Author	Country	Sample	Period	Measure	Micro-determinants	Macro-determinants
Ghenimi et Omri (2018)	8 MENA countries	25 Islamic banks	2006-2014	Liquid assets to total assets	NIM (+); Bank size (-); Credit risk (-); Liquidity gaps (+); Capital adequacy (-); ROA (NS); ROE (NS).	Economic growth (+); Inflation (NS).
Shamas et al. (2018)	Bahrain	7 Islamic banks	2007-2011	Cash to total assets	Credit risk (-); Capital adequacy (-); ROAA (+); Bank size (NS).	Financial crisis (NS).
Tabash (2018)	UAE	5 Islamic banks	2000-2014	Cash to total assets	Bank size (+); Capital adequacy (+); ROA (NS); ROE (NS).	
Irawati et Puspitasari (2019)	Indonesia	13 Islamic banks	2010-201	Liquid assets to deposits and short-term funding	Asset quality (-); Capital adequacy (-); ROA (NS).	
Ben Jedidia (2020)	5 GCC countries	23 Islamic banks	2005-2016	Cash to total assets	Profit-sharing investment accounts (-); Capital adequacy (+); Bank size (NS); ROA (-).	GDP (NS); Financial crisis (-).
Mennawi et Ahmed (2020)	Sudan	11 Islamic banks	2012-2018	Total customers' deposits to liquid assets	Loan quality (+); Cash (-); Securities (-); Assets (+).	Economic cycle (NS).

"+" for a positive relationship, "-" for a negative relationship and "NS" for insignificant impact.

3. DETERMINANTS AND VARIABLES SELECTION

This section reviews the dependent and independent variables that we selected to examine their effects on bank liquidity risk.

Following the existing literature, the ratio of liquid assets to total assets is used in this study as a measure of liquidity risk. This popular proxy for bank liquidity risk is interesting because it provides information about the general liquidity shocks absorption ability of a bank.

Regarding the independent variables, we focus, in this research, on the determinants of liquidity risk for Islamic banks, using a set of bank-specific factors, namely, bank capitalization, asset quality, profitability, management quality and the size of the bank. The choice of these variables is motivated by the fact that they are under the control of the bank's management, so we could analyze how these internal factors influence bank liquidity risk. Table 2 shows the definitions and notation of variables which we have used in regression analysis.

Table -2: Variables definition

Variables	Notations	Measures	Predicted Sign
Dependent Variables			
Liquidity risk	LIQ	Liquid assets to total assets	
Independent Variables			
Bank Size	SIZE	Natural logarithm of total assets	+
Capital Adequacy	CAP	Total regulatory capital to risk-weighted assets	+
Asset Quality	QUAL	Gross nonperforming financing to total financing	+/-
Bank Profitability	ROA	Net profit to total assets	+/-
Management Quality	COST	Cost-to-income ratio	+/-

4. DATA AND RESEARCH METHODOLOGY

This section presents data, and describes the regression model used to investigate the effects of internal factors on liquidity risk.

4.1. Data and sample

To achieve the research objectives of this study, the empirical analysis uses a panel data for Islamic banks operating in 12 countries (Bahrain, Brunei Darussalam, Indonesia, Kuwait, Malaysia, Nigeria, Oman, Pakistan, Saudi Arabia, Sudan, Turkey, and United Arab Emirates). The bank specific data used in the study, which covers 23 quarters from 2014Q1 to 2019Q3, was obtained from the Prudential and Structural Islamic Financial Indicator (PSIFI) database of Islamic Financial Services Board (IFSB)[1]. This global database compiles country-level data from 23 IFSB member jurisdictions over the time period from 2013Q4 to 2019Q3.

4.2. Research Method

To examine the determinants of bank liquidity, we use panel data regression. This approach takes into account both the temporal dimension and the transversal dimension of the data. It gives more other advantages such as less multi-collenearity, better quality and more reliable results.

To test this effect, we consider the following basic model (1):

$$Y_{it} = \alpha_{it} + \beta_{it}X_{it} + \varepsilon_{it}$$

Where:

- Y_{it} represent the dependent variable (liquidity risk);
- i refers to individual dimension (countries);
- t indicates the time period (2014Q1- 2019Q3);
- α_{it} stands for the constant term;
- X_{it} is a vector of independent variables;
- β_{it}represent the coefficients for independent variables;
- $\varepsilon_{i}$is the error term.

Considering the liquidity risk as the dependent variable, and the independent variables defined before, the model (1) is established:

The model constructed for finding the determinants of ROA is as follows:

$$LIQ_{it} = \alpha_{it} + \beta_{it}CAP_{it} + \beta_{it}QUAL_{it} + \beta_{it}SIZE_{it} + \beta_{it}ROA_{it} + \beta_{it}COST_{it} + \varepsilon_{it}$$

5. EMPIRICAL RESULTS

In this section, the empirical results[2] concerning the determinants of the liquidity risk of Islamic banks are presented and discussed.

5.1. Descriptive statistics

Table 3 summarizes the descriptive statistics of the variables considered for the empirical estimation.

[1] All the PSIFIs data are accessible at the PSIFIs portal (https://psifi.ifsb.org) on the IFSB website.

[2]The various tests performed on the data as well as the different regressions are performed on the STATA software (Stata 14.2).

Table -3: Descriptive statistics of variables

Variable	Mean	Standard deviation	Min.	Max.
LIQ	26,73489	14,53844	-00,01496	72,37573
CAP	19,92487	8,93716	9,85872	78,15091
QUAL	4,28652	3,27849	-0,15956	14,88768
ROA	1,19837	1,17529	-4,78185	4,89018
CIR	64,12207	34,64079	18,04186	277,3952
SIZE	11.51737	3,306297	5,788984	19,59943

According to the table, the average ratio of liquidity is 26.73% for the study period. This testifies that Islamic banks of the studied countries have safety cushions in the form of liquid assets. Capital adequacy ratio (CAP) which is one of the important ratios for the banks amounts to 19.92% on average, while it varies between 9.85% and 78.15%. The management quality and return to asset ratio has a mean of 4.28% and 1.19% respectively. When the mean of cost-to-income ratio (CIR) is 64.12%, minimum value is 18.04% and maximum value is 277.39%. However, the standard deviation is 34.64, which is the highest value among independent variables.

Before conducting panel regression estimations, it is interesting to run a correlation analysis to ensure our data are free from severe multi-collinearity between the explanatory variables.

Table -4: Correlations matrix between independent variables

	LIQ	CAP	QUAL	ROA	COST	SIZE
LIQ	1.0000					
CAP	0.0704	1.0000				
QUAL	0.0387	-0.285	1.0000			
ROA	0.1761	-0.6571	0.2230	1.0000		
COST	-0.2383	0.6863	-0.0165	-0.7430	1.0000	
SIZE	-0.0912	-0.2845	0.2508	0.3103	0.0254	1.0000

Table 4 shows the levels of correlation between explanatory variables. The correlation coefficients between the independent variables have a minimum value of -0.7430 and a maximum of 0.6863. This shows that highest correlated variables are less than 0.80 (Kennedy, 1992)[3]. Consequently, we can conclude that there is not a significant problem of multi-collinearity in the data sets.

[3]According to Kennedy (1992), the serious problem of multi-collinearity occurs if the correlation coefficient is above 80% for each pair of variables.

5.2. Regression results

Before to run the regression, the model was tested on checking for normality (Jarqur Bara test), multi-colinearity (Variance Inflation Factor [VIF] test), and heteroscedasticity (Breush Pagan test or White test). After conducting the Hausman test, the empirical analysis is based on panel data fixed effects model.

The regression results between bank liquidity risk and the internal variables are shown in Table 5.

Table -5: Panel regression results (Fixed effects model)

LIQ	Coef.	Std. Err.	t	P> t
CAP	0.7654602	0.0794724	9.63	0.000*
QUAL	1.256017	0.211845	5.93	0.000*
ROA	0.5568701	0.5503496	1.01	0.313
COST	0.0468063	0.0217043	2.16	0.032**
SIZE	0.0888451	0.0119598	7.43	0.000*
_cons	-0.9989567	0.1460126	-6.84	0.000*

Note:
Capital adequacy (CAP), asset quality (QUAL), bank profitability (ROA), management quality (COST) and bank size (SIZE) are bank-specific factors.
*and**indicate significance level of 1% and 5% respectively.

Clearly, and as expected, the empirical evidence shows that the relationship between capital adequacy (CAP) and liquidity ratio is positive and significant, thus confirming the strengthened capital structure increased the liquidity risk of Islamic banks. In the same vein, Iqbal (2012), Ghenimi and Omri (2015), Effendi and Disman (2017), Tabash (2018) and Ben Jedidia (2020) found a significant positive relationship between capital adequacy ratio and liquidity risk ratio. This result is contrary to that of Ben Jedidia and Hamza (2015), Yaacob and al. (2016), Ghenimi and Omri (2018), Shamas and al. (2018) and Irawati and Puspitasari (2019) concluding that CAP has a significant and negative association with liquidity risk.

The results also reveal that the asset quality has positively influenced the liquidity risk of Islamic banks. This evidence contradicts the results of Irawati and Puspitasari (2019), but it is in line with those of Alzoubi (2017)andMennawi and Ahmed (2020). The positive relationship between asset quality and liquidity risk is explained by the fact that decreasing the non-performing financing of Islamic banks leads to an increase of liquidity levels and a decrease of liquidity risk. In other words, these results reveal that the accumulation of many bad financing decreases the asset's value, increases liquidity risks and makes Islamic banks unable to meet their financial obligations.

Bank profitability (ROA) shows a positive sign as expected but is insignificant. This is, however, different from other studies that reached a positive statistically significant relationship (Akhtar and al., 2011; Alzoubi, 2017; Ben Jedidia and Hamza, 2015; Iqbal, 2012; Mohamad and al., 2013; Rashid and al., 2017) or negative and statistically significant link (Ben Jedidia, 2020; Ghenimi and Omri, 2015; Muharam and Kurnia, 2012) between bank profitability and liquidity risk.

The estimated results also show that there is a positive and significant relationship between cost-to-income ratio, as a measure of management quality, and Islamic bank liquidity risk. Indeed, Islamic banks must consider reducing operating costs, ensuring sound liquidity in prompt payments to vendors, and effectively managing inventory, receivables and curtailing operating expenses.

Finally, in line with the expectation and previous studies, this empirical study determined that liquidity risk was positively affected by bank size (Iqbal, 2012; Ramzan and Zafar, 2014; Tabash, 2018). The positive relationship between size and liquidity risk suggests that bigger banks had a higher liquidity risk. In the case of conventional banks, this result can be supported by the principle of "too big to fail"; which suggests that banks with a large size are not motivated to increase their liquidity level, and in time of liquidity shocks they rely on the government intervention. For Islamic banks, the increase in their assets is done through specific operations (Murabaha, Moucharaka, Moudarabah, etc.) which are based on the principle of profit and loss sharing. Massive use of these operations leads to a decrease in liquid assets and consequently an increase in liquidity risk.

6. CONCLUSION

Management of liquidity risk is important for Islamic banks' stability and performance, especially in the changing environment of banking. This paper examined the impact of bank-specific factors on the liquidity risk of Islamic Banks operating in 12 countries over the period from 2014Q1 to 2019Q3. By using panel data method (fixed effects model), we deployed liquid assets to total assets as a dependent measure for bank liquidity risk.

The study concludes that liquidity risk in Islamic banks is more sensitive to bank specific factors. Therefore, capital adequacy, asset quality, bank size and management quality have statistically positive and significant associations with liquidity risk ratio, but bank profitability (ROA) does not affect the Islamic bank liquidity risk.

Based on the results of the study, it is crucial that Islamic banks implement efficient liquidity risk management practices in place to safeguard their financial performance. Also, the results of this study can help managers better understand the determinants of liquidity risk in Islamic banks and take a picture of Islamic banking developments in managing liquidity risk.

As any study, this research contains its own limitations. The most important limitation concerns the independent variables. For future research, more variables could be incorporated to explain Islamic banks liquidity risk such as market structure variables (concentration, competition, etc.), regulation variables, institutional quality variables (regulatory quality, political stability, control of corruption, etc.) and macroeconomic variables (GDP growth, inflation, and so on, so forth).

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