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# Original Research Article

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## Abstract

This study aims to assess the determinants of liquidity risk in the full-fledged Islamic banking system of Sudan, using panel data regression. The dependent variable in this research is the liquidity risk, which is determined as the extreme excess or extreme shortage of liquidity in each bank, based on the VaR approach, and the independent variables are bank size, investment, profit, and the budget deficit during the period 2012-2016. The authors' findings indicate the bank-specific variables such as the size, investment, and profit are statistically significant, whereas the budget deficit variable is negatively associated with liquidity risk but is insignificant. The insignificance of the budget deficit variable is an indication of the government reliance on its deficit financing on debt financing, i.e., excessive money creation, as contrary to equity financing. Also indicated in the paper is that the investment variable has a positive and significant effect on liquidity risk, indicating that Islamic banks' investment portfolios are dominated by short-term securities (sikook). This result supports the findings in the literature that investment portfolios in Islamic banks are likely to be dominated by short-term investment securities as a result of the absence of risk-hedging tools in the Islamic banking system, in general. The finding in the paper also indicates a positive and significant sign of profit coefficient with liquidity risk, which is similar to the positive association between higher risk and higher earnings relationships portrayed in the literature of corporate finance. The effect of the size indicator on liquidity risk reveals a positive and significant association, implying that larger banks are more likely to face liquidity risks of shortage as well as excess liquidity.

**Keywords:** Liquidity; Banks; Islamic; Risk.

## 1. INTRODUCTION

Islamic banks provide financial intermediation services that comply with shariah principles. The two main principles Islamic banks should adhere to are the prohibition of interest (riba) and excessive uncertainty (gharar). On the other hand, their activities are based on profit and loss sharing (pls). Banks, whether Islamic or conventional, are subject to many types of risks that can negatively affect their operations and performance. Among all types of risks, liquidity risk can be considered as the most influential risk banks are exposed to because it can lead to bank collapse, which causes instability to the whole banking system. The international financial crisis, in 2008, highlighted the lack of sound liquidity risk management at financial institutions. Under Basel III, individual banks will have to maintain higher and better quality liquid assets to better manage their liquidity risk. Liquidity risk can be described in terms of inability to transform assets into cash in a timely manner and at low cost. It can also be explained as a maturity mismatch between assets and liabilities. Liquidity risk emanates from many sources; the most important one is the nature of the banking business, i.e., banks utilize short-term funds in long-term investments. Liquidity risk can be of two types: It is either a shortage of liquidity wherein banks are unable to pay their customers withdrawals when needed or when they are due. The second kind is excessive liquidity due to underutilization of available financial resources. Although the first type seems more dangerous because it directly harms the existence of the bank, the second one is no less harmful as it affects the profitability of the bank and its existence in the long

run in a competitive environment. Both types of risks should be managed effectively to ensure the stability of the banking system and its ability to assume a crucial role in the economy. This could be accomplished by striking a balance between safety and profitability. There are a number of tools and instruments that conventional banks use to manage their liquidity risk, but most of these instruments are interest-based, which are incompatible with shariah principles.

In theory, Islamic banks rely on Islamic modes of finance that are based on profit and loss sharing, which dominates both sides of their balance sheet, i.e., the assets and liabilities. As a result, depositors who share the risk with the bank on the liabilities side absorb any shocks occurring on the assets side of the bank. Sudanese banks are subject to liquidity risk, which is difficult to manage due to several factors; more specifically, it is the limited number of shariah instruments to cater to the liquidity risk management and the underdevelopment of the financial market, in general.

This study aims to address liquidity risk management issues in banks operating in Sudan, which follow the full-fledged Islamic system. They dominate the financial sector activities; therefore, they have a crucial role to play in the economic development of Sudan. Therefore, preserving and developing the Sudanese banking system are of paramount importance. One way to achieve this is by addressing and then proposing solutions for the liquidity risks it faces.

The remainder of the study is organized as follows: section 2 provides the literature review. Section 3 describes the data and the methodology. Section 4 presents the analysis and the empirical results, and Section 5 concludes the study.

## 2. LITERATURE REVIEW

There are two concepts of liquidity, the market liquidity and the funding liquidity. Crockett (2008) defines market liquidity as the speed with which an asset can be converted into cash at low cost, i.e., without significant change in the asset price. As a result, the concept of market liquidity includes the cost, quantity, and the speed at which a financial asset can be traded. However, the International Monetary Fund (IMF, 2008) defined funding liquidity as the ability of a solvent institution to honor its obligations timely as they are due. Drehman and Nikolaou (2013) define it as the ability of an institution to pay what it owes with immediacy; they state that funding liquidity risk is the failure of a financial institution to settle the amount it owes others as they fall due, with immediacy over a given time period. Another definition for liquidity risk provided by Saunders and Cornett (2008) is that the unexpected rise in withdrawals by depositors that may force banks to liquidate their assets in the shortest time period. Liquidity risk arises due to several reasons including a rapid increase in the sudden demand of the bank's depositors and an inadequate market depth or market disruption (Santomero, 1997; Saunders and Cornett, 2008).

There are many studies that indicate the idea that market liquidity and funding liquidity are interrelated, Shleifer and Vishny (1997) and Gârleanu *et al.* (2009) point out that market liquidity and funding liquidity are mutually reinforcing and that the relationship between the two is nonlinear. Berger and Bouwman (2009) indicate that a downward liquidity spiral could start with a bank that is liquidity-constrained and fails to access the shortage from the interbank market. Then, the bank is forced to sell some of its assets to settle its obligations. In practice, selling a large volume of securities in the market induces negative pressure on the prices of these assets (Alfonsi and Blanc, 2016). Lower asset prices imply that even if the bank wants to borrow against these assets instead of selling, they have to post higher margins; when more margins are called it implies more cash outflows.

There are, however, limited empirical studies devoted to the liquidity risk of Islamic banks. Islamic banks liquidity is influenced by many internal and external factors. Moreover, previous research focusing on Islamic banks within the same country stress on different conclusions.

Considering a sample of 12 conventional and Islamic banks in Pakistan from 2006 to 2009, the study of Akhtar *et al.* (2011) highlights a positive and significant relation between return on asset and Islamic bank liquidity risk. However, the size of the bank and the net-working capital to net assets have positive but insignificant relationship with liquidity risk faced by Islamic banks.

Ahmed *et al.* (2011) studied a sample of 6 Islamic banks in Pakistan in the period from 2006 to 2009, and they suggested that the bank size is directly associated to liquidity risk, and the capital adequacy is positively

associated. Furthermore, there is a negative and significant association between the gearing ratio, the non-performing loans ratio, and the liquidity risk.

Muharam and Kurnia (2012) investigated Islamic and conventional banks' liquidity in Indonesia for the period 2007-2011. They highlight a positive and significant impact of net interest margin and return on equity on the liquidity risk of Islamic bank. However, liquidity gaps and risky liquid assets to total assets have insignificant effects.

Ramzan and Zafar (2014) investigated relationships between internal bank's characteristics and liquidity risks of Islamic banks in Pakistan over the period 2007-2011. The study finds a positive and significant correlation between banks' size and liquidity risk. In contrast, capital adequacy ratio, the return on equity, return on assets, and networking capital have insignificant relationships with liquidity risk.

Iqbal (2012) investigated liquidity risk on a sample of 5 conventional and 5 Islamic banks from 2007 to 2010. The findings showed that nonperforming loans have a negative relationship with liquidity risk, while capital adequacy ratio, return on assets, return on equity, and size have a positive relationship with liquidity risk.

Chen *et al.* (2009) measured liquidity risk and its causes in a sample of 12 countries during the period from 1994 to 2006. He found that liquidity risk is endogenous to the performance of banks and depends on liquid assets and external funding, and macroeconomic, regulatory, and supervisory factors.

Alzoubi (2017) analyzes the determinants of liquidity risk using a panel data analysis on a sample of 42 Islamic banks from 15 countries between 2007 and 2014. The results show a negative correlation between liquidity risk and cash ratio and securities held by the bank as the cash balance can be used to meet liquidity demands from customers. Also, the banks can sell securities to meet any liquidity shortages. Bank size also has a negative relationship with liquidity risk, as larger banks tend to have more stability and customers feel safer dealing with large banks. Bank's equity also has a negative correlation with liquidity risk, as equity is a more stable source of funding for banks. However, there is a positive relationship with high-profit assets. As banks shift their portfolio toward more profitable assets in order to increase their earnings, they face greater liquidity risk. A positive relationship also exists with bad finance provision.

Jedidia and Hamza (2015) used a panel of 60 Islamic banks in MENA and southeastern Asian countries from 2004 to 2012. The analysis illustrates that the profitability bank indicator positively affects the exposure to liquidity shortage; the capital adequacy ratio and the ratio of bank's investment have a significant negative relationship with the liquidity risk. Nevertheless, the bank size does not matter probably because both small and large Islamic banks have difficulties to manage their liquidity risk. The real growth rate of gross domestic product has a negative but irrelevant association with liquidity risk.

Bunda and Desquilbet (2008) have stated that a higher capitalization ratio and the presence of prudential regulation positively influence liquidity risk of the banks. Deléchat *et al.* (2012) have reported that the liquidity ratios are positively related to bank size and negatively related to loan loss provision, capitalization, and credit-to-GDP ratio. In the Middle East and Africa, political instability in Egypt has forced the banking sector to increase their liquidity reserve (Fielding and Shortland, 2005). Fadare (2011) has found that the monetary policy, interest rate, and loan-to-deposit ratio are significant determinants of liquidity risk in Nigerian banks. Chagwiza (2014) has explored the impact of micro- and macroeconomic variables on the level of liquidity in commercial banks in Zimbabwe from 2010 to 2011 and has reported that the capital adequacy, total assets, growth rate of gross domestic product, and bank rate have positively impacted the liquidity position of the banks. Inflation rate has also exhibited a negative impact on the banks' liquidity. Ben Moussa (2015) has found that liquidity in Tunisian banks is significantly impacted by the inflation rate and growth rate of GDP.

Mohamad *et al.* (2013) have investigated the liquidity behavior of 17 Malaysian Islamic banks from 1994 to 2009. Their findings reveal that the macroeconomic variables, total investment, and total asset (size) are inversely related to liquidity, while profitability is positively related to banks' liquidity. Islam and Chowdhury (2009) have compared the liquidity positions of a conventional bank and an Islamic bank in Bangladesh from 2003 to 2006. The study has reported that the investment ratio, return on assets, earnings per share, price earnings ratio, and net interest margin/profit margin are the important determinants of banks' liquidity gap.

Rashid, Ramachandran, and Fawzy (2017) examine the determinants of liquidity in Islamic banks in Malaysia and the Gulf Corporation Council countries using panel data fixed effect models. Their sample constitutes 39 Islamic banks from 2009 to 2014. The findings reveal that liquidity risk management in Islamic

banks is primarily contingent upon three bank-specific variables—past liquidity condition, size of the bank, and loan loss provision, and two industry specific variables—growth of broad money and growth of GDP.

### 3. METHOD(S)

The study used data from the financial statements of banks in Sudan. The sample of the research covers 25 banks operating in Sudan for the period of 5 years from 2012 to 2016.

The main analytical tool that has been used to identify the determinants of banks' liquidity is panel data regression. A panel data regression can be conducted on pooled time series and cross-sections with both the time dimension and the cross-section dimension as follows:

$$Y_{it} = X_{it}B + w_{it}, \quad i = 1, \dots, N \text{ and } t = 1, \dots, T$$

where:

$$X_{it} = [X_{1it} \dots X_{kit}]_{K \times 1},$$

$$B = \begin{bmatrix} B_1 \\ \dots \\ B_k \end{bmatrix}_{(k \times K)}$$

where  $Y_s$  are the liquidity indicators, and the  $X_s$  are the determinants, including banks' size, nonperforming loans, profitability, modes of Islamic finance used by the banks, and other variables that will be extracted from the literature.

A compact matrix representation for individual entities is as follows:

$$Y_i = X_i B + w_i, \quad i = 1, \dots, N$$

where:

$$Y_i = \begin{bmatrix} y_{i1} \\ y_{i2} \\ \dots \\ y_{iT} \end{bmatrix}_{T \times 1}, \quad X_i = \begin{bmatrix} X_{i1} \\ \dots \\ X_{iT} \end{bmatrix} = \begin{bmatrix} X_{1i1} \dots X_{ki1} \\ \dots \\ X_{1iT} \dots X_{kiT} \end{bmatrix}_{T \times K}$$

and

$$w_i = \begin{bmatrix} w_{i1} \\ \dots \\ w_{iT} \end{bmatrix}_{T \times 1}$$

For any individual entity,  $Y_i$  is a  $(T \times 1)$  vector for  $T$  observations of the dependent variable,  $X_i$  is a  $(T \times K)$  matrix of the independent variables or regressors with  $K$  being the number of independent variables and  $B$  is a  $(K \times 1)$  vector of coefficients.

### 4. RESULTS AND DISCUSSION

Table 1 includes results of panel data regression for the sample of 25 Islamic banks in Sudan during the sample period 2012-2016 using pooled, fixed, and random effect models to explain the determinants of liquidity risk. The dependent variable in this analysis is the liquidity risk, which is the extreme excess and extreme shortage of liquidity in each bank, based on the VaR approach. The independent variables are bank size (measured by total deposits), investment, profit, and the budget deficit. The findings of the three models in Table 1 indicate that bank-specific variables, the size, investment, and profit, are statistically significant, whereas the budget deficit variable is negatively associated with liquidity risk, but nonsignificant. This could be due the lagged effect of the budget deficit on banks liquidity, as the transmission effect of budget deficit on liquidity status of banks passes through a number of variables, which have delayed effect on banks liquidity. For example, when the government finances its deficit mainly by resorting to debt financing (money creation),

**Table 1. The Determinants of Liquidity Risk.**

Variable	Pooled		Fixed Effect		Random Effect	
	Coefficient	p-Value	Coefficient	p-Value	Coefficient	p-Value
C	4.83E+08	0.1267	4.83E + 08	0.1267	5.86E+08	0.0013
+X1 (Size)*	0.754801	0.0000	0.754801	0.0000	0.704261	0.0000
X2 (Investment)	0.575454	0.0000	0.575454	0.0000	0.442686	0.0007
X3 (Profit)	3.057523	0.0475	3.057523	0.0475	2.642070	0.0333
X5 (Budget deficit)	-0.028761	0.4894	-0.028761	0.4894	-0.000874	0.9710

\*Size is measured by the total deposits.

the transmission of such deficit financing on banks liquidity may take place via its impact on banks deposits, which may not take place in the same year. However, if the deficit is financed via security issuing (sikook), the effect on banks liquidity could be for a shorter period as banks adjust their portfolios in a shorter period of time (within the same year of the deficit). However, the impact of the investment portfolios on banks' liquidity is reflected by the effect of the x2 variable, which is positive and significant as well. This implies that the type of the investment, included under the variable x2 dominated by short-term securities, like Islamic bonds (known in Sudan as Shehama Sukook), augments banks' excess liquidity. However, if the investment variable is dominated by long-term investment securities, we could have expected a nonsignificant effect of this variable on the liquidity risk, because of the time lag effect explained earlier. This result supports the findings in the literature that investment portfolios in Islamic banks are dominated by the short-term investment securities due to the absence of Islamic risk-hedging tools in Islamic banking system in general. The positive and significant signs of profit coefficient imply that higher profits entail higher liquidity risk. This relationship is similar to the positive association between higher risk and higher earnings, portrayed in the literature of corporate finance. However, in the case of liquidity risk in the Islamic banking sector, the positive association of profit with liquidity risk implies that higher profits can be generated via more investment activities that reduce cash holdings to a minimum level. The effect of the size indicator on liquidity risk is reflected in the coefficient of the variable x1, which is positive and significant as well. This result implies that banks with larger deposits are more likely to face liquidity risk because they are in a better position to finance investment projects, entailing less cash holdings.

## 5. CONCLUSION

This study employs panel data regression using pooled, fixed, and random effect models to assess the determinants of liquidity risk for a sample of 25 Islamic banks in Sudan during the period 2012-2016. The dependent variable in this research is the liquidity risk, which has been determined as the extreme excess and extreme shortage of liquidity in each bank, based on the VaR approach. The independent variables are bank size (measured by total deposits), investment, profit, and the budget deficit. The findings of the three models in Table 1 indicate that bank specific variables, the size, investment, and profit, are statistically significant, whereas the budget deficit variable is negatively associated with liquidity risk, but insignificant. The insignificance of the budget deficit variable is an indication of the government reliance on its deficit financing on debt financing, i.e., excessive money creation, as contrary to security issuing. Also indicated in the paper is that the investment variable has a positive and significant effect on liquidity risk, indicating that banks' investment portfolio is dominated by short-term securities (Islamic sikook), which augments banks' excess liquidity. However, if the investment variable is dominated by long-term investment securities, one could have expected insignificant effect of this variable on the liquidity risk, because of the time lag effect explained earlier. This result supports the findings in the literature that investment portfolios in Islamic banks are likely to be dominated by short-term investment securities as a result of absence of risk-hedging tools in the Islamic banking system in general.

The authors' finding also indicates a positive and significant sign of profit coefficient with liquidity risk, which is similar to the positive association between higher risk and higher earnings relationship portrayed in the literature of corporate finance. However, in the case of liquidity risk in the Islamic banking sector, the positive association of profit with liquidity risk implies that higher profits can be generated via more investment activities that reduce cash holdings to a minimum level. The effect of the size indicator on liquidity risk reveals a positive and significant association. This result implies that banks with larger deposits are more likely to face liquidity risk because they are in a better position to finance investment projects, entailing less cash holdings.

#### Author Contributions

Both authors contributed equally to this original study.

#### Conflict of Interest

None.

#### References

- Ahmed N, Akhtar MF, Usman M. 2011. Risk management practices and Islamic banks: an empirical investigation from Pakistan. *Interdisciplinary Journal of Research in Business* 1(6): 50-57.
- Akhtar MF, Ali K, Sadaqat S. 2011. Liquidity risk management: a comparative study between conventional and Islamic banks of Pakistan. *Interdisciplinary Journal of Research in Business* 1(1): 35-44.
- Alfonsi A, Blanc P. 2016. Dynamic optimal execution in a mixed-market-impact Hawkes price model. *Finance and Stochastics* 20(1): 183-218.
- Alzoubi T. 2017. Determinants of liquidity risk in Islamic banks. *Journal of Banks and Bank Systems* 12(3). doi: 10.21511/bbs.12(3).2017.10
- Ben Moussa MA. 2015. The determinants of bank liquidity: case of Tunisia. *International Journal of Economics and Financial Issues* 5(1): 249-259.
- Berger AN, Bouwman CH. 2009. Bank liquidity creation. *Review of Financial Studies* 22(9): 3779-3837.
- Bunda I, Desquilbet JB. 2008. The bank liquidity smile across exchange rate regimes. *International Economic Journal* 22(3): 361-386.
- Chagwiza W. 2014. Zimbabwean commercial banks liquidity and its determinants. *International Journal of Empirical Finance* 2(2): 52-64.
- Chen T-K, Liao H-H, Lee, A, and Lu, C-W. August 18, 2009. Internal liquidity risk in REIT excess returns. 22nd Australasian Finance and Banking Conference 2009. Available at SSRN: <<https://ssrn.com/abstract=1457511>> or <http://dx.doi.org/10.2139/ssrn.1457511> <<https://dx.doi.org/10.2139/ssrn.1457511>>
- Crockett A. 2008. Market liquidity and financial stability. *Banque de France Financial Stability Review* 11(1): 13-17.
- Deléchat C, Henao C, Muthooru P, Vtyurina S. 2012. The determinants of banks' liquidity buffers in Central America. IMF Working Paper WP/12/301.
- Drehmann M, Nikolaou K. 2013. Funding liquidity risk: definition and measurement. *Journal of Banking & Finance* 37(7): 2173-2182.
- Fadare SO. 2011. Banking sector liquidity and financial crisis in Nigeria. *International Journal of Economics and Finance* 3(5): 3-11.
- Fielding D, Shortland A. 2005. Political violence and excess liquidity in Egypt. *Journal of Development Studies* 41(4): 542-547.
- Gârleanu N, Pedersen LH, Poteshman AM. 2009. Demand-based option pricing. *Review of Financial Studies* 22(10): 4259-4299.
- International Monetary Fund. 2008. Global Financial Stability Report. Author: Washington, DC.
- Iqbal A. 2012. Liquidity risk management: a comparative study between conventional and Islamic banks of Pakistan. *Global Journal of Management and Business Research* 12(5). ISSN 2249-4588. Available at: <<https://journalofbusiness.org/index.php/GJMBR/article/view/677>>
- Islam MM, Chowdhury HA. 2009. A comparative study of liquidity management of an Islamic bank and a conventional bank: the evidence from Bangladesh. *Journal of Islamic Economics, Banking and Finance* 5(1): 89-108.
- Jedidia KB, Hamza H. 2015. Determinants of liquidity risk in Islamic banks: a panel study. *Islamic Management and Business* 2(2): 137-146.

- Mohamad AAS, Mohamad MT, Samsudin ML. 2013. How Islamic banks of Malaysia managing liquidity? An emphasis on confronting economic cycles. *International Journal of Business and Social Science* 4(7): 253-263.
- Muharam H, Kurnia HP. 2012. The influence of fundamental factors to liquidity risk on banking industry: comparative study between Islamic bank and conventional bank in Indonesia. *Conference in Business, Accounting and Management (CBAM)* 1(2): 359-368.
- Ramzan M, Zafar MI. 2014. Liquidity risk management in Islamic banks: a study of Islamic banks of Pakistan. *Interdisciplinary Journal of Contemporary Research in Business* 5(12): 199-215.
- Rashid M, Ramachandran J, Fawzy TSBTM. 2017. Cross-Country panel data evidence of the determinants of liquidity risk in Islamic banks: a contingency theory approach. *International Journal of Business and Society* 18(1): 3-22.
- Santomero AM. 1997. Commercial bank risk management: an analysis of the process. *Journal of Financial Services Research* 12(2-3): 83-115.
- Saunders A, Cornett M. 2008. *Financial Institutions Management: A Risk Management Approach*. 6th ed. McGraw-Hill/Irwin: New York.
- Shleifer A, Vishny RW. 1997. The limits of arbitrage. *The Journal of Finance* 52(1): 35-55.