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Systematic and unsystematic determinants of liquidity risk in the Islamic banks in the middle east

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ABSTRACT

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Liquidity risk (LR) is a concern in Islamic banks and may lead to major problems if not managed appropriately and planned, due to the lack of external liquidity sources for Islamic banks. However, the purpose of this article is to look at the factors that affect liquidity risk in Middle Eastern Islamic banks. To arrive at a substantial and compelling conclusion, the cross-sectional data from 30 Islamic banks was gathered between 2011 and 2022. The random effect regression model, GMM, and fixed effect regression model were all utilized. According to the report, Islamic banks in the Middle East have safe levels of liquidity. It also demonstrates how the financing-to-deposit ratio, inflation, economic growth, and return on assets all have a favorable impact on Islamic banks' liquidity risks. Furthermore, the study discovered that non-performing financing, capital sufficiency, operational effectiveness, and scale had no bearing on the liquidity issues associated with Islamic banks. This paper provided guidance regarding liquidity risk management procedures and systems in Islamic banks in order to design banking liquidity risk management policies. To avoid liquidity risks in Islamic banks, the optimal level of financing to deposit ratio must be determined, maintaining the quality of financing, reducing the non-performing loan ratio to the lowest possible level, and enabling Islamic banks to benefit from the central bank as a last resort for liquidity.

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1. Introduction

Banks play an essential role in economic progress and development by providing liquidity. Banks, as providers of liquidity, may stimulate the economy by supplying demand deposits and cash. The banking sector is an essential element of the economic system in developing countries, especially in financial intermediation (Akhter, 2023). Banks attract financial resources from surplus units to transfer them to deficit units (Antony, 2023). Therefore, banks occupy an important position in the financial sector, and their stability is important to protect the interests of all parties. Hence, the work of banks is subject to regulation and oversight by local and international bodies to maintain their stability and, thus, the stability of the financial and economic systems. Liquidity is an important indicator of bank performance, as it indicates the ability of banks to fulfill their obligations on time, while liquidity risk indicates the possibility of not fulfilling these obligations (Cakmak & Sunal, 2024). Accordingly, liquidity risk management refers to the bank's application of strategies that achieve a balance between demand for liquidity and supply of liquidity. Liquidity problems occur if the bank fails to achieve this balance, lacks internal liquidity reserves, or fails to obtain funds from external sources (Can & Bocuoglu, 2022). Banking liquidity plays an important role in the success of banks' work, as the 2008 global financial crisis revealed liquidity management problems in banks (Zaghdoudi & Hakimi, 2017). As a result, a new measure of risk and new requirements for liquidity emerged in Basel III to be able to control liquidity, face losses, and enhance the financial position (Hugonnier & Morellec, 2017). Moreover, liquidity risks affect the stability of Islamic banks, so decision-makers and researchers pay attention to liquidity risks to avoid the inability of banks to pay their obligations and finance their assets. Liquidity risks increase if they lead to insolvency risks and

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the inability of banks to meet withdrawal requests from depositors immediately (Ghenimi et al., 2021). With the expansion of the economy of Islamic countries, the role of Islamic banking in the world has increased. Islamic banking is characterized by the inference of the provisions of Islamic Sharia. It applies financing and investment methods based on sharing return and risk and invests in real assets (Al-Jarrah et al., 2023). In recent decades, Islamic finance has developed a lot, where the size of IBs' assets grew from USD1.6 trillion at the end of 2018 to USD 2.1 trillion at the end of 2022 (IFSB, 2022), with a growth rate of more than 30%, and Table 1 summarizes the development of Islamic financial services based on World level in 2021.

Table 1
Global Islamic Financial Services for 2021 (\$ billion)

Area	IBs assets	Sukuk	Investment Funds	Tkāful	Total	%
Gulf Cooperation Council	1212.5	332.3	46	12.7	1603.5	52.4
Southeast Asia	285.5	390.3	37.5	4.7	720	23.5
South Asia and Middle East	477.1	26.9	22	5.6	531.6	17.4
Africa	58.2	1.8	4	0.6	64.6	2.1
Others	68.8	24.4	45.1	0.7	139	4.5
Total	2104.1	775.7	154.6	24.3	3058.7	100
%	68.7	25.4	5.1	0.8	100	

IFSB, 2022.

The study aims to explore liquidity risk determinants in IBs in the Middle East. In this case, the study attempts to identify both unsystematic determinants, which are the bank-specific determinants, and systematic determinants, which are the macroeconomic determinants.

To conduct the research, 30 IBs in 12 countries in the Middle East were taken over 12-year periods, from (2011 – 2022). Specifically, the study attempts to investigate the following questions:

- Do unsystematic factors such as return on assets, capital adequacy, financing-to-deposit ratio, non-performing financing, operating efficiency, and size affect liquidity risk in Islamic banks in the Middle East?
- Do systemic factors such as economic growth and inflation affect liquidity risk in Islamic banks in the Middle East?

2. Literature Review

2.1 Theoretical Background

For a long time, theoretical studies have shown that banks perform a financial intermediation function, providing liquidity and transferring risks. Banks accept liquid deposits and convert them into assets in the form of loans. Banks must balance their assets and liabilities to maintain the best level of liquidity, to meet liabilities (Yitayaw, 2021). In fact, bank liquidity refers to the bank ability to provide funds to always meet financial obligations or outstanding obligations at a reasonable rate to meet the withdrawal needs of customers (Waemustafa & Sukri, 2016; Al-Zaqeba et al., 2023; Al-Taani et al., 2024). Liquidity risk for banks arises from financing long-term assets with short-term liabilities, which makes liabilities vulnerable to recurring refinancing risks (Yitayaw, 2021). Usually, liquidity risks have an individual nature, but in certain cases it may put the liquidity of the financial system at risk (Tabash, 2018). In banks, managing liquidity risk entails keeping an eye on the possibility of meeting depositor demands and financing larger assets as they mature without suffering major losses or expenses. (Can & Bocuoglu, 2022). An unfavorable scenario is less likely to occur when liquidity risk is well managed, protecting the bank's capacity to pay its debts when they become due (Ahmad, 2009). In Islamic banks, management of liquidity risk is more crucial than management of operational risk (Abdel Majeed, 2017). Islamic banks are more vulnerable to liquidity risks because they rely heavily on themselves to obtain the necessary liquidity (Abdul Rahman et al., 2018). Islamic banks cannot borrow from the central bank or other banks because usurious loans are not compatible with the basis of their work (Iqbal, 2012). Islamic banks cannot obtain liquidity due to the limited number of Islamic financial instruments in financial markets (Hussain et al., 2022). Hassan et al. (2013) argued that the Islamic financial system favors equity-based instruments over debt-based ones, but because there is a dearth of Islamic capital and inadequate capital markets, the development of Islamic financial products has been sluggish. Thus, liquidity risk presents a significant opportunity for Islamic banks, and it is crucial to comprehend the factors that influence it.

2.2 Previous Studies

Liquidity risk is the opposite of liquidity, as a higher liquidity ratio indicates a lower level of liquidity risk (Ghenimi et al., 2021). The ratio of cash and cash equivalents to total assets is used to calculate liquidity risk (Mohamad et al., 2013). It is also measured by the liquidity indicators the ratio of loans to assets (Roman & Sargu, 2015). The ratio expresses the ability of banks to absorb a liquidity shock and to absorb excessive withdrawal of funds (Gafrej & Abbes, 2017).

2.3 Liquidity Risk Determinants

Essentially, liquidity risk in banks is affected by unsystematic risks, which are bank-specific factors, and systematic risks, which are factors related to surrounding economic conditions. The literature review documented findings showing systematic and unsystematic liquidity risk determinants. The literature review on the determinants of liquidity risk is divided into

unsystematic risks, which are bank-specific factors, and systematic risks, and systematic risks, which are factors related to surrounding economic conditions. Some studies have examined both types, such as Hussain et al. (2022) and Linh et al. (2018). Some studies examined bank-specific determinants only, such as Addou and Bensghir (2021) and Alzoubi (2017).

2.3.1 *Unsystematic Determinants*

2.3.1.1 *Capital Adequacy*

The ratio of capital adequacy CAR shows the amount of risky assets financed by the bank's capital (Chowdhury et al., 2018). Capital adequacy contributes to maintaining banking security and facing the risks of unexpected losses, so higher capital increases the ability of banks to absorb risks (Yitayaw, 2021). Liquidity risk is associated with losses resulting from the inability to sell assets or raise funds at a moderate economic cost to cover liabilities (Mazur & Szajt, 2015). The ratio is measured by Tier1 and Tier2 capital ratio to total Risk Weighted Assets (Al-Homaidi et al., 2019).

In empirical studies, Hussain et al. (2022), Addou and Bensghir (2021), Elouali and Oubdi (2020), Chowdhury et al. (2018), Anggun and Waspada (2018), Linh et al. (2018), Amran and Ahmad (2017), and Yaacob et al. (2016) indicated that capital adequacy has a positive effect on banks' liquidity risk in Islamic banks. In contrast, Shamas et al. (2018), Irawati and Puspitasari (2018), AbdulGaniyy et al. (2017), Jedidia and Hamza (2015), and Ahmed et al. (2011) demonstrated that the risk of banks' liquidity in Islamic banks is negatively impacted by capital sufficiency. Conversely, Mennawi and Ahmed (2020), Alzoubi (2017), and Ramzan and Zafar (2014) showed that capital adequacy has no impact on banks' liquidity risk in Islamic banks.

H₁: Adequacy of capital has a positive effect on Liquidity Risk.

2.3.1.2 *Profitability*

Profitability and liquidity are two contradictory goals. The desire to increase profit requires investing more money, and this may reduce liquidity, increase liquidity risk, and affect the financial solvency of the bank (Moussa, 2015). Profitability is measured by ROA which is measured by the ratio of net profit after taxes to total assets (Waemustafa & Sukri, 2016). In empirical studies, Hussain et al. (2022), Abdo and Onour (2020), Shamas et al. (2018), Chowdhury et al. (2018), Anggun and Waspada (2018), Alzoubi (2017), Rashid et al. (2018), and Jedidia and Hamza (2015) presented that the ROA has a positive effect on banks' liquidity risk in Islamic banks. In contrast, Addou and Bensghir (2021) showed that the return on assets has a negative impact on banks' liquidity risk in Islamic banks. As shown by Mennawi and Ahmed (2020), Elouali and Oubdi (2020), Irawati and Puspitasari (2018), Amran and Ahmad (2017), Yaacob et al. (2016), Ramzan and Zafar (2014), and Ahmed et al. (2011) that the return on assets has no impact on banks' liquidity risk in Islamic banks.

H₂: ROA has a positive effect on Liquidity Risk.

2.3.1.3 *Non-Performing Finance*

The ratio of non-performing financing to total financing is used to calculate the non-performing financing ratio. A higher percentage indicated significant bad debt and eventually resulted in bank losses (Chowdhury et al., 2018). In empirical studies, Mennawi and Ahmed (2020), Elouali and Oubdi (2020), Shamas et al. (2018), Alzoubi (2017), Yacob et al. (2016), and Shaikh (2015) showed that non-performing finance has a positive effect on banks' liquidity risk in Islamic banks. In contrast, Hussain et al. (2022), Addou and Bensghir (2021), and Linh et al. (2018) showed that non-performing loans have a detrimental effect on Islamic banks' liquidity risk. However, Chowdhury et al. (2018) demonstrated that in Islamic banks, non-performing financing has no effect on the risk to the banks' liquidity.

H₃: Non-Performing Finance has a positive effect on Liquidity Risk.

2.3.1.4 *Finance-to-deposits ratio*

The ratio of total financing to total deposits is known as the financing to deposit ratio (Yaacob et al., 2016). A high ratio indicates the difficulty of meeting banks' financial needs due to lack of liquidity (Chowdhury et al., 2018). However, in empirical studies conducted by Abdo and Onour (2020), Chowdhury et al. (2018), and Irawati and Puspitasari (2018), it was found that the ratio of finance-to-deposit has a positive effect on banks' liquidity risk in Islamic banks. This implies that as the ratio of finance-to-deposit increases, the liquidity risk faced by Islamic banks also increases. On the other hand, Yaacob et al. (2016) and Jedidia and Hamza (2015) presented contradictory findings, suggesting that the finance-to-deposit ratio has a negative impact on banks' liquidity risk in Islamic banks. This suggests that as the ratio of finance-to-deposit increases, the liquidity risk faced by Islamic banks decreases.

H₄: Finance-to-deposit ratio has a positive effect on Liquidity Risk.

2.3.1.5 Operating Efficiency

Operating efficiency shows how much the bank spends to generate revenue from operational activities (Ali, 2019). The ratio is calculated using the Cost-to-income ratio (Elouali & Oubdi, 2020). The ratio of operating expenditures to operating income is used to determine operational efficiency (Kablay & Gumbo, 2021). This ratio measures the bank's productivity compared to the inputs used; A high ratio indicates higher expenses, which leads to lower profits (Lotto, 2018). In empirical studies, Elouali and Oubdi (2020) and Shaikh (2015) showed that the Operating efficiency has a positive impact on banks' liquidity risk in Islamic banks.

H5: *Operating efficiency has a positive impact on Liquidity Risk.*

2.3.1.6 Bank Size

The size of the bank shows the bank's benefit from economies of scale. It is measured by the logarithm of total assets (Shah et al., 2018). In empirical studies, some studies such as Hussain et al. (2022), Abdo and Onour (2020), and Elouali and Oubdi (2020) showed that bank size has a positive impact on banks' liquidity risk in Islamic banks. In contrast, Linh et al. (2018), Rashid et al. (2018), Amran and Ahmad (2017) have shown that Islamic bank's size has a detrimental effect on the liquidity risk of the institution. Nevertheless, Alzoubi (2017) and Jedidia and Hamza (2015) showed that bank size has no effect on banks' liquidity risk in Islamic banks.

H6: *Bank Size has a positive impact on Liquidity Risk.*

2.3.2 Systematic Determinants

2.3.2.1 Inflation

Inflation is the consumer price index. It is used to determine the true value of wages, salaries and pensions. The price index covers all goods and services acquired by households. The Consumer Price Index (CPI) is calculated as the average annual price change for goods and services (Wysocka, 2023). In empirical studies, Linh et al. (2018), Rashid et al. (2017), and Yaacob et al. (2016) found that inflation has a positive effect on banks' liquidity risk in Islamic banks. In contrast, Ghenimi et al. (2021) showed that inflation has a negative effect on banks' liquidity risk in Islamic banks. On other hand, Hussain et al. (2022), and Gafrej and Abbes (2017) showed that inflation has a no impact on banks' liquidity risk in Islamic banks.

H7: *Inflation rate has a positive impact on Liquidity Risk.*

2.3.2.2 Economic Growth

The gross domestic product's yearly percentage change is indicative of economic growth. It serves as a gauge of the state of a nation's economy (Anginer et al., 2013). When the economy is expanding, banks increase their investments and reduce their liquid assets (Yitayaw, 2021). In empirical studies, El Massah et al. (2019) showed that economic growth has a positive effect on banks' liquidity risk in Islamic banks. In contrast, Linh et al. (2018), Rashid et al. (2017), and Jedidia and Hamza (2015) showed that economic growth has a negative impact on banks' liquidity risk in Islamic banks. On other hand, Hussain et al. (2022), and AbdulGaniyy et al. (2017) showed that economic growth has no impact on banks' liquidity risk in Islamic banks.

H8: *Economic Growth has a negative effect on liquidity risk.*

3. Design of the Research

3.1 Sampling Design

The study sample consists of 30 Islamic banks from 12 countries in the Middle East (Table 2) during the period 2011 - 2022. The study is based on annual bank data for 11 years.

Table 2
Sample distribution

Country	Banks	%	Country	Banks	%
Jordan	3	10	Kuwait	4	13.3
Palestine	1	3.3	Qatar	3	10
Syria	2	6.7	Bahrain	2	6.7
Lebanon	1	3.3	UAE	3	10
Iraq	3	10	Yemen	1	3.3
KSA	4	13.3	Turkey	3	10

Authors' survey.

3.2 Data Collection

In this paper, Secondary data was gathered from the Middle Eastern annual reports of a few chosen Islamic banks. Data were collected from banks' annual reports, banks' websites, and the World Bank's website. Moreover, the selection of appropriate variables was done by reviewing previous articles. According to previous studies such as Hussain et al. (2022), Linh et al. (2018) and Alzoubi (2017) the estimation equation has taken the following form:

$$LR_{it} = \beta_0 + \beta_1 CAR_{it} + \beta_2 ROA_{it-1} + \beta_3 NPF_{it} + \beta_4 FDR_{it} + \beta_5 OE_{it} + \beta_6 Z_{it} + \beta_7 INF_{it} + \beta_8 EG_{it} + \varepsilon_{it}$$

where:

LR: Ratio of Liquidity	NPF: Non-Performing Finance	Z: Bank Size
CAR: Ratio of Capital Adequacy	FDR: Finance-to-Deposit Ratio	INF: Inflation Rate
ROA: Return On Assets	OE: Operating Efficiency	EG: Economic Growth

3.3 Methods and Analysis

To begin the paper, a multicollinearity test, descriptive statistics, and a correlation matrix are utilized. After that, regression analysis is performed on cross-sectional data. In addition, the study included three regression models: random effect model, fixed effect model, and GMM. After the fixed effect regression model was implemented, post hoc tests were performed for diagnostic reasons to confirm heterogeneity, autocorrelation, and cross-sectional independence.

3.4 Measurement of the Variables

According to the literature review, this paper selects many variables to measure liquidity risk and the factors affecting it (Table 3).

Table 3
Variables selection

Variables		Elaboration	Expected Sign
Dependent variables			
Liquidity Risk	LR	Liquid Assets to Total Assets	
Independent variables			
Bank-Specific variables			
Capital Adequacy	CAD	Equity Capital to Total Assets	+
Return On Assets	ROA	Net Income to Total Assets	-
Non-Performing Finance	NPF	Non-Performing Finance to Assets	+
Finance-to-Deposits Ratio	FDR	Total Finance to Total Deposits	+
Operating efficiency	OE	Log of (Total Assets - Total Equity)	+
Bank Size	Z	Log of Total Assets	
Macroeconomic Variables			
Inflation	INF	Annual average inflation rate (%)	
Economic Growth	EG	Annually change in GDP	

Author's Contribution.

4. Analysis and Results

4.1 Descriptive analysis

Table 4 summarizes the selected factor dataset for the period from (2011 – 2022). The average-value of liquidity risk is 40.59%, with a range of 19.36% to 61.39%. The range indicates that the change in liquidity risk of Islamic banks is sufficient. A relatively high mean and low standard deviation indicate reasonable liquidity risk. Moreover, the average capital adequacy is 15.55% with a range of 10% to 22%. The average indicates the banks' compliance with Basel III decisions, and the low standard deviation indicates the stability of the ratio. The average return on assets is 1.64% with a range ranging from -0.27% to 3.3%. This means that the profitability of Islamic banks is reasonable. Furthermore, the average NPL ratio is 1.77% with a range of 0.9% to 2.12%. The mean and range indicate relatively high banks' asset quality, which means effective credit risk management. The average financing to deposit ratio is 77.32% with a range of 38.45% to 98.86%. The average indicates a high proportion of deposit investment in financing, and the remainder is bank liquidity. On the other hand, the average operating efficiency is 64.98% with a range of 40.16% to 109.39%. The average indicates relatively high operating expenses in Islamic banks. The average logarithm of bank assets is 3.52 with a range from 1.35 to 5.24. This indicates that the variation in bank sizes is sufficient to explain the effect of changing size on liquidity risk. Regarding macroeconomic variables, the average inflation rate is 9.05% with a range from -3.7% to 171.2%. This indicates a Middle East inflationary environment. The average economic growth is 2.5% with a range of -28% to 13.9%. Which indicates a relative weakness in economic growth in Middle Eastern countries.

Table 4

Descriptive statistics for the variables

Variables	Obs.	Mean	Std. Dev.	Min	Max
LR	360	0.4059	0.0879	0.1936	0.6139
CAR	360	0.1555	0.0213	0.1000	0.2200
ROA	360	0.0164	0.0060	-0.0027	0.0330
NPF	360	0.0177	0.0780	0.0092	0.0212
FDR	360	0.7732	0.0780	0.3845	0.9868
OE	360	0.6498	0.1258	0.4016	1.0939
Z	360	3.5198	0.9079	1.3522	5.2430
INF	360	0.0905	0.2336	-0.0370	1.7120
EG	360	0.0250	0.0599	-0.2800	0.1390

Authors' Computation.

4.2 Multicollinearity Test

To check multicollinearity, the study applies a unit root test, correlation analysis, and variance inflation factor.

4.2.1 Unit Root Test

Table 5 provides the results of the panel unit root test according to the Levin, Lin and Chu test. The test showed that some variables are stable at level $I(0)$ and all variables are stable at 1st difference $I(1)$. Which means that the data is free of the unit root at the 1st difference.

Table 5

Unit root test

Variables	Levin, Lin and Chu test			
	Level		1 st Difference	
	Statistic	Prob.	Statistic	Prob.
LR	-9.7589	0.0000	-12.7712	0.0000
CAR	-0.8373	0.2012	-3.5963	0.0002
ROA	-5.4934	0.0000	-10.7504	0.0000
NPF	-0.5169	0.3026	-3.3063	0.0005
FDR	-0.5302	0.7020	-6.6621	0.0000
OE	-0.8683	0.1926	-1.7249	0.0423
Z	0.7417	0.7709	-3.2199	0.0006
INF	-1.8440	0.0326	-2.0865	0.0185
EG	-6.3098	0.0000	-8.2625	0.0000

Authors' Computation.

4.2.2 Correlation Analysis

Table 6 presents the matrix of correlation coefficients between all study variables for the period 2011-2022. The results show that the correlation values between all study variables range between -54.68% to 63.52%. This means that there is no linear correlation problem between the variables. Moreover, the results show a positive correlation of liquidity risk with return on assets, financing-to-deposit ratio, and bank size. The results also show a negative correlation of liquidity risk with capital adequacy, non-performing financing, operating efficiency, economic growth, and inflation.

Table 6

Correlation analysis

	LR	CAR	ROA	NPF	FDR	OE	Z	INF	EG
LR	1								
CAR	-0.1102	1							
ROA	0.1726	-0.3440	1						
NPF	-0.2854	0.1866	-0.5468	1					
FDR	0.3839	-0.4746	0.5277	-0.4161	1				
OE	-0.0611	0.1969	-0.2570	0.1962	-0.2368	1			
Z	0.2739	-0.3543	0.6352	-0.5187	0.5328	-0.2121	1		
INF	-0.2102	0.0255	-0.1872	0.3299	-0.2203	0.0698	-0.3169	1	
EG	-0.0913	-0.0559	0.0964	-0.2031	0.1319	-0.0028	0.2141	-0.3117	1

Authors' Computation.

4.2.3 Variance Inflation Factor Model

Table 7 presents the relationship between the independent variables using the Variance Inflation Factor VIF. The VIF results indicate that there is no multicollinearity problem among the independent variables. All VIF values are less than 6 which indicates that the problem of multicollinearity between independent variables does not exist in this study.

Table 7

Test of multicollinearity

Variables	VIF	Tolerance
CAR	1.366	0.732
ROA	2.060	0.485
NPF	1.655	0.604
FDR	1.767	0.566
OE	1.098	0.911
Z	2.043	0.490
INF	1.201	0.821
EG	1.046	0.956

Authors' Computation.

4.3 Hausman Test

Table 8 presents comparison tests between the regression models to choose the appropriate model. The L-M test showed that the general effects model was not optimal for the analysis; Because the probability value is less than 5%, the choice is therefore limited between the fixed and random effects model, as well as the Hausman test is preferable to the fixed effects model because the probability value is less than 5%.

Table 8

Appropriate Model Tests

Test Summary	Stat.	Prob.
Breusch and Pagan Lagrange multiplier test	Chi ²	120.216
Hausman test / Cross-Section Random	Chi ²	32.6095

Authors' Computation.

4.4 Empirical Models

To get the best findings possible, the study used three models: the Generalized Method of Moments (GMM), the Fixed Effect Model (FEM), and the Random Effect Model (REM). Table 9 presents the model results. It is noted that the level of the experimental models was less than 5%. It was also found that the F test and the Wald chi2 test were statistically significant and significant. The study found that changes in liquidity risk were 12.36% under REM and 61.47% under FEM. The first difference of LR in the GMM model has a significant and statistically significant effect on LR. This result is relevant to Yitayaw (2021) who showed that liquidity risk is consistently affected by liquidity risk in previous periods.

4.4.1 Unsystematic determinants

4.4.1.1 Capital adequacy CAR

The results indicated that the CAR has no significant effect on liquidity risk according to the three models used. This finding is consistent with the findings of previous studies conducted by Mennawi and Ahmed (2020), İncekara and Çetinkaya (2019), Alzoubi (2017), and Ramzan and Zafar (2014).

4.4.1.2 Return on Assets (ROA)

The results show that ROA has a positive impact on LR at the 1% level according to the three models. This finding is similar to that of Hussain et al. (2022), Abdo and Onour (2020), Shamas et al. (2018), Chowdhury et al. (2018), Anggun and Waspada (2018), Linh et al. (2018), Amran and Ahmad (2017), and Yaacob et al. (2016). It has been shown that an increase in profit increases liquidity risk because achieving higher profits requires more money invested (Abdo & Onour, 2020). According to Hussain et al. (2022), It is necessary to pay attention to using property rights to improve profitability without increasing liquidity risk.

4.4.1.3 Non-Performing Finance (NPF)

The results show that NPF has no effect on LR according to the three models. This result is similar to that of Chowdhury et al. (2018), Mohammad et al. (2020), and Gafrej and Abbes (2017).

4.4.1.4 Financing to Deposit Ratio (FDR)

The Financing to Deposit Ratio (FDR is a measure used to assess the proportion of a bank's funds that are being utilized for financing activities relative to its total deposits. In the context provided, researchers examined the relationship between FDR and liquidity risk (LR) using three different models: Random Effects Model (REM), Fixed Effects Model (FEM), and Generalized Method of Moments (GMM). The results of their analysis indicated that FDR has a positive impact on liquidity risk at varying levels of significance: at the 5% level according to the REM, at the 10% level according to the FEM, and at the 1% level according to the GMM. This suggests that as the FDR increases, indicating a higher proportion of funds being allocated to financing activities relative to deposits, liquidity risk also tends to increase. This finding aligns with similar conclusions drawn by previous studies conducted by Abdo and Onour (2020), Chowdhury et al. (2018), and Irawati and Puspitasari (2018). These studies also found that an increase in the Financing to Deposit Ratio is associated with heightened

liquidity risk in banking institutions. One interpretation of this result is that as Islamic banks allocate more funds towards financing activities, they may face increased liquidity risk. Abdo and Onour (2020) propose that Islamic banks mitigate this risk by investing more heavily in short-term financing, which allows for greater flexibility in managing liquidity challenges. However, it's essential to recognize that the relationship between FDR and liquidity risk may be influenced by various factors, including the specific characteristics of the banking sector, regulatory frameworks, and market conditions. Therefore, while this result provides valuable insights into the dynamics between FDR and liquidity risk, further research may be needed to fully understand the underlying mechanisms and implications for Islamic banking practices.

4.4.1.5 Operating efficiency (OE)

The results show that OE positively affects LR at the 5% level according to the REM and does not affect LR according to FEM and GMM. This result is similar to the result of Elouali and Oubdi (2018) and Shaikh (2015). Higher operating efficiency means a higher ratio of expenses to revenues, and thus banks use more liquidity for operational expenses.

4.4.1.6 Bank size (Z)

The findings indicate that Z positively affects LR at the 1% level according to the REM and does not affect FEM and GMM. This result is similar to the results of Mennawi and Ahmed (2020), Shamas et al. (2018), Alzoubi (2017), Jedidia and Hamza (2015), and Ahmed et al. (2011).

4.4.2 Systematic determinants

4.4.2.1 Inflation (INF)

The results showed a positive effect of INF on LR at the 1% level according to the REM and the GMM, and at the 10% level according to the FEM. This result is similar to the result of Hussain et al. (2022) and Gafrej and Abbes (2011). This result reflects the banks' increase in investing more liquidity available in the event of inflation to exploit the economic expansion.

4.4.2.2 Economic growth (EG)

The findings indicate a positive effect of EG on LR at the 1% level according to the FEM, and at the 10% level according to the REM, and no effect of EG on the LR according to the GMM. This result is similar to the result of El Massah et al. (2019). According to Rashid et al. (2017) The government role is important for effective liquidity risk management for Islamic banks, meaning that a stable economic situation helps increase the liquidity risk management efficiency, and this is enhanced by establishing the presence of a strong local money market that is compatible with the provisions of Islamic Sharia.

Table 9

Empirical models

LR	Random Effect		Fixed Effect		GMM	
	Coefficient	Std. Err	Coefficient	Std. Err	Coefficient	Std. Err
LR(-1)					0.4172***	0.0081
CAR	-0.0905	0.0994	-0.0955	0.1021	0.0288	0.0436
ROA	1.4734***	0.4213	1.5537***	0.4271	0.8775***	0.0794
NPF	-4.6184	3.0052	-3.8385	3.3891	-1.2570	1.5274
FDR	0.0776**	0.0336	0.0669*	0.0341	0.0769***	0.0140
OE	-0.0195**	0.0169	-0.0205	0.0172	-0.0017	0.0138
Z	0.0067***	0.0064	0.0053	0.0074	0.0021	0.0032
INF	-0.0169***	0.0079	-0.0155*	0.0082	-0.0178***	0.0060
EG	-0.0508**	0.0266	-0.0449*	0.0267	-0.0061	0.0113
C	0.4094**	0.0654	0.4089***	0.0688		
R ²	0.1236		0.6147			
Wald chi ² (8)	27.3044***		110.7234***		34.8308***	
F(8, 322)	3.4130***		13.8404***		4.3539***	

Authors' Computation.

5. Conclusion

IBs are an essential participant in the economy of Middle Eastern countries, and its number has increased in recent years. IBs contribute to productive investment and economic sustainability of countries. Therefore, the stability of the banking sector is crucial to economic development and resilience to financial crises. Liquidity risks threaten the stability of IBs. IBs face significant restrictions in managing liquidity risks, such as: Islamic banks cannot provide their liquidity from the central bank, the inability to benefit from the interbank market, and money market tools compatible with Islamic Sharia are limited. Finding bank-specific and macroeconomic variables that impact the liquidity risks of 30 IBs in the Middle East between 2011 and 2022 was the study's primary goal.

The descriptive analysis's findings indicate that IBs' average liquidity ratio in the Middle East is 40.59%, meaning that 40.59% of the total assets of IBs are liquid and semi-liquid assets. Moreover, the results of this paper confirmed that; ROA, financing-to-deposit ratio, inflation, and economic growth had a statistically significant positive impact on liquidity risk in IBs.

Furthermore, the results showed that risk liquidity of IBs in the Middle East was affected by both systematic and unsystematic factors. It is possible to improve IBs liquidity by paying attention to the unsystematic factors that banks can influence and control, and trying to benefit from changes in systemic factors.

To avoid liquidity risks, IBs must have an effective policy to balance the two main goals of profit and liquidity, determine the optimal level of ratio for liquid assets, and compare the benefits and costs of holding them. This helps ensure that IBs are not exposed to future liquidity crises. Moreover, banks must monitor the financing-to-deposit ratio and maintain it at safe levels. IBs must also maintain the quality of financing and reduce the non-performing financing ratio to the lowest possible level. Moreover, there must be a correction in the relationship between the central bank and IBs so that they can benefit from the function of the central bank as a liquidity resort of last resort.

On the other hand, the role of external parties, such as governments and international Islamic institutions, must be activated to improve the tools of local Islamic financial markets, improve the tools of international Islamic financial markets, and enhance cooperation between IBs globally.

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