We compare the effect of liquidity on risk-taking between Islamic and conventional banks in the MENA region over the period 2005-2017. Using the fixed effect panel model with panel-corrected standard error, we found that funding liquidity in both Models significantly affects conventional banks' risk-taking behaviour, but the effect on the Islamic counterpart is insignificant. However, liquidity risk and bank activities represented by loans significantly affect Islamic bank risk-taking behaviour but show no significant effect on conventional banks. However, the effect varies with risk-taking proxies and the size of banks. This entails liquidity and bank risk-taking behaviour that differs with the type of banking system and the countries' peculiarities. Thus, liquidity regulation should be implemented with the consideration of other region and their peculiarities.

Keywords: Bank Risk-Taking, Islamic Banking, MENA Region

I. Introduction

Banks in the Middle East and North Africa (MENA) region have been considered highly vulnerable. MENA banks are exposed to liquidity risk because of the low-rated liquid assets and insufficient financial market instruments (Ibrahim & Rizvi, 2018; International Monetary Fund (IMF), 2017). Also, they are associated with high risk-taking due to the high
loan concentration, particularly in the oil and gas industry (Mairafi, 2019; Moody, 2015). Accordingly, Ali et al. (2021) provide evidence of the effect of loan concentration on the long-term liquidity management of banks. Likewise, the emergence of Islamic banking in the MENA region and its rapid growth has created competition between conventional and Islamic banks, exposing banks to more risk-taking. According to the Islamic Financial Services Board (IFSB) (2016), Islamic banking in the MENA region represents about 80 percent of the total Islamic banking system globally. Similarly, the issue of inadequate Sharia-compliant liquidity risk management tools has been identified as one of the challenges that Islamic banks face because of the slow development of Sharia-Compliant financial instruments (Abdullah, 2010; Ahmed, 2011; Bangsa, 2015). This further makes banks in the MENA region more vulnerable to liquidity risk, concentration risk, and default risk that could ultimately cause instability in the banking sector.

Evidence has shown that there was a high influx of liquidity into some banks in the MENA region, which helped them to absorb shocks during the 2007-2008 global financial crisis (GFC) (Boumediene & Caby, 2009; Khasawneh, 2016). Equally, there was the incessant failure of banks in the MENA region in the aftermath of the GFC, mostly in Bahrain (Elaf in 2013; Capinnova Investment bank in 2012; Capivest bank in 2012; BMI bank in 2014) and the United Arab Emirate (Dubai bank in 2012) (Zawya, 2015). Meanwhile, the theoretical assertion of Acharya and Naqvi (2012) and Wagner (2007) have shown that lower funding liquidity risk (proxied by higher deposits) could aggravate banks' high risk-taking behaviour that may eventually ignite crisis. Particularly that banks have the incentive to cover under the lower funding liquidity risk to involve in aggressive lending. This is because high deposits shield banks from bank runs. Accordingly, Dahir et al. (2017), Khan et al. (2017), Mairafi et al. (2022), and Smaoui et al. (2020) provided empirical evidence with the sample of banks from Brazil, Russia, India, China, and South Africa (BRICS) countries, the USA, MENA region, as well as the Islamic and conventional banks, respectively. Also, abundant liquidity in the US banks was believed to have been the main factor that led to the excessive lending that led to the 2007-2008 GFC, which led to the collapse of many banks across the globe (Mairafi et al., 2018a, 2018b). However, it is unclear whether the effect will be the same across the globe and whether the failure of banks in the MENA region in the aftermath of the GFC is associated with the influx of liquidity during the crisis period.

Although Mairafi et al. (2022) provided empirical evidence with sample banks from the MENA region, the sample was on the aggregate banks, which only reflects the peculiarities of the region while ignoring other peculiarities of the Islamic banks. Similarly, in the empirical evidence of Smaoui et al. (2020) on Islamic and conventional banks, the samples were selected from countries in different regions. These regions may have different levels of capital market development. As such, some may have high-quality liquid assets while others may have low-rated liquid assets. Countries in the MENA region have distinct characteristics that may increase the level of international trade and bank risk-taking among countries. The increased level of financial integration among world economies in recent times, especially bilateral trade relations between the developed and emerging
economies, has promoted the rapid contagion and spillover of the 2007-2008 GFC to other economies which hitherto thought they were insulated. Thus, international trade and investment inflows during financial crisis periods provide linkages for transmitting the crisis to the host economy (Dornbusch et al., 2000; Caporale et al., 2006; Mairafi, 2011). Therefore, in this paper, we expect that the effect of liquidity on bank risk-taking behaviour between Islamic and conventional banks in the MENA region would be different considering the region's distinct characteristics.

Following Mairafi et al. (2022), we assessed the effect of liquidity on bank risk-taking for 10 countries in the MENA region with Islamic and conventional banks from 2005-2017. However, our sample of 122 banks is generated from 37 Islamic and 85 conventional banks. We used the ratio of deposit to total assets, loans to deposits, and loans to total assets as proxies for funding liquidity, liquidity risk, and loans following studies by Acharya and Naqvi (2012), Dahir et al. (2017), Khan et al. (2017), Mairafi et al. (2022), and Smaoui et al. (2020). Accordingly, we used the "standard deviation of return on assets" and the "Z-SCORE" to proxy for bank-risk-taking (Dahir et al., 2017; Mairafi et al., 2019; 2020; 2022; Smaoui et al., 2020). The lower the Z-SCORE, the higher the banks' instability caused by the high risk-taking.

Using the aggregate sample of banks in the MENA region, Mairafi et al. (2022) have shown that funding liquidity, liquidity risk, and bank activities significantly affect MENA banks' risk-taking behaviour. However, when analysing the effect of liquidity on bank risk-taking between the Islamic and conventional counterparts our results show that the effect of funding liquidity on risk-taking behaviour is only on the conventional banks. On the other hand, the results of liquidity risk and bank loans significantly affect the Islamic bank risk-taking behaviour in the MENA region. Comparing whether bank size affects their risk-taking, the results for both the Islamic and conventional banks reveal that bank size has significant effects on both.

Our paper contributes to the literature on banks' liquidity and risk-taking behaviour with a focus on the MENA region in the following ways. Firstly, the study contributes to the existing literature on banks' liquidity and risk-taking behaviour (Berger & Bouwman, 2017; Dahar et al., 2017; Khan et al., 2017; Smaoui et al., 2020) with evidence from the MENA region. Countries in the MENA consist of developing and underdeveloped economies with peculiarities distinct from other regions, with which studies of this magnitude have been carried out before. For example, MENA countries are the major sources (the GCC) of world energy in terms of oil and gas. As such, using a new dataset by considering the MENA economies.

Secondly, our paper is important to sustainable economic development as banking sustainability is a major concern to various stakeholders. Banks' high risk-taking could lead to their failure, affecting various stakeholders such as shareholders, management, employees, financial institutions, customers, and the government. Banks' crisis and failure can cause adverse effects on the economic development of the region. Some of these effects
Our study follows the extant theoretical frameworks in the banks' risk-taking literature. On the one hand, Acharya and Naqvi (2012) theorised that abundant liquidity emanating from deposit inflows encourage banks to take the high risk due to agency problem. The bank managers' desire for higher compensation could motivate them to lower the loan standards to increase the volume of their loan disbursement. Thus, large deposit inflows give the bank managers confidence that they will not run out of liquidity to the extent that their compromising activities can be noticed. Consequently, banks' capital may be eroded due to aggressive lending which can eventually lead to the bank's collapse. Meanwhile, Wagner (2007) explained that higher bank liquidity increases their instability as it gives the banks an incentive to take more risk that affects them.

Thirdly, this study contributes to the literature on bank risk-taking by using more proxies of bank risk-taking to assess the effect of liquidity and bank risk-taking following theories such as by Acharya and Naqvi (2012) and Wagner (2007) and empirical evidence by Dahir et al. (2017), Khan et al. (2017) and Smaoui et al. (2020).

Lastly, our paper provides more understanding of the issues that drive banks' risk-taking so as to guide policymakers and regulators of the banking industry in the MENA region in formulating and implementing policies for the sustainability of the banking sector in different countries within the region. The policymakers and regulators will better understand the fundamental issues related to banks' liquidity and its effect on the banks’ risk-taking behaviour. Thus, the policymakers would consider a better framework for liquidity risk management that would prevent banks from taking high risks.

The layout of the paper is as follows. Section 2 provides theoretical motivation and reviews pertinent and relevant literature on bank liquidity and risk-taking. Section 3 describes the sample data and methodology employed for the study. Section 4 discusses the hypothesis test results and their implications, and section 5 concludes the paper and makes recommendations.

II. Theoretical Motivation

Our study follows the extant theoretical frameworks in the banks' risk-taking literature. On the one hand, Acharya and Naqvi (2012) theorised that abundant liquidity emanating from deposit inflows encourage banks to take the high risk due to agency problem. The bank managers' desire for higher compensation could motivate them to lower the loan standards to increase the volume of their loan disbursement. Thus, large deposit inflows give the bank managers confidence that they will not run out of liquidity to the extent that their compromising activities can be noticed. Consequently, banks' capital may be eroded due to aggressive lending which can eventually lead to the bank's collapse. Meanwhile, Wagner (2007) explained that higher bank liquidity increases their instability as it gives the banks an incentive to take more risk that affects them.

2.1 Empirical Review

Studies on the effect of liquidity on bank risk-taking received more attention due to the adverse effect witnessed during the 2007-2008 GFC and the introduction of liquidity standards in the regulatory framework for banks. Most existing studies have pointed out factors such as funding liquidity and liquidity risk as major liquidity components that significantly influence bank risk-taking. For example, Drehmann and Nikolaou (2013) used the banks' bid at the central bank as a measure for funding liquidity risk during the period...
Recently, studies by Dahir et al. (2017) and Khan et al. (2017) found a significant relationship between funding liquidity and bank risk-taking. Khan et al. (2017) examined the effect of banks' funding liquidity on their risk-taking by using the two stages of least squares and instrumental variable methods for data analysis. Using a sample of 4,749 US Bank Holding Company (BHC) during the period 1986-2014, their results showed that banks with higher funding liquidity have lower funding liquidity risk, thus, increasing their risk-taking. Conversely, banks with lower funding liquidity risk took on less risk during the 2007-2008 GFC. Moreover, they found that bank size and bank capital buffers generally prevented them from high risk-taking. Consistent with Khan et al. (2017), a study by Dahir et al. (2017) utilised data from a sample of 57 banks from 2006-2015 and assessed how funding liquidity risk affects banks' risk-taking in the BRICS countries. They found a significant and negative relationship between liquidity risk and risk-taking. Also, they found that funding liquidity risk has a significant effect on bank risk-taking in BRICS countries.

More recently, studies by Zheng et al. (2019), Smaoui et al. (2020), Ali et al. (2021), and Mairafi et al. (2022) also contributed to the literature on how liquidity affects bank risk-taking. Zheng et al. (2019) evaluated the role of capital ratios in influencing bank liquidity creation and failure risk in US commercial banks during 2003–2014. Their findings revealed that conditional on bank capital, bank liquidity creation is negatively related to bank failure risk, implying that funding liquidity risk is negatively related to banks' risk-taking. Accordingly, Smaoui et al. (2020) compared the effect of funding liquidity risk on the risk-taking between Islamic and conventional banks during 2004-2016. They found that lower funding liquidity risk leads to higher risk-taking behaviour by banks, and the effect is less on Islamic banks. Their findings further revealed that big banks tend to engage in less risk-taking when faced with lower funding liquidity risk. On the other hand, Ali et al. (2021) examined the effect of financing-specific sectors on bank liquidity management among Islamic and conventional banks. They showed that SPEC has a long-run effect on bank liquidity management. Then, Mairafi et al. (2022) examined the effect of liquidity on bank risk-taking behaviour in a sample of 122 banks from the MENA region from 2005-2017. Their results showed that funding liquidity, liquidity risk, and bank activity significantly influence bank risk-taking behaviour. However, the findings also revealed that the effect varies with risk-taking proxy.
Meanwhile, a study by Imbierowicz and Rauch (2014) examined the relationship between the two main factors such as liquidity risk and credit risk, which are related to the reasons for the banks ‘existence which are the sources of banks’ risks. They used the dataset of banks from the US during the period 1998-2010 to assess the relationship between the two main sources of the bank’s risks. They concluded that both liquidity risk and credit risk jointly or individually contribute to the bank’s probability of default even though they are not contemporaneous. This view is consistent with the finding of Hong et al. (2014), who examined the potential relation and the impact of Basel III liquidity coverage ratio and net stable funding ratio on the bank’s failures. Employing data from the US banks for the period 2001 to 2011, they reported that the two ratios potentially have limited impact on the probability of bank failures, but systemic liquidity risk significantly contributes to bank failures. On the other hand, Vazquez and Federico (2015) study a higher number of sample banks in the US and Europe from 2001 to 2009. They argued that higher funding stability measured by net stable funding ratio reduces the probability of bank failures. However, they further explained that only domestically smaller banks are more exposed to liquidity risk, while larger international banks are more exposed to solvency risk because of higher leverage.

III. Data and Variables

3.1 Data Description
Our sample consists of 37 Islamic banks and 85 conventional banks from 10 different countries in the MENA region, with 481 and 1,105 bank-year observations, respectively. Our sample selection was based on two criteria. Firstly, we select countries with both Islamic and conventional banks. Secondly, we choose banks with complete data from 2005-2017 to enable us to have balanced panel data. The Data were sourced from the BankScope DataStream and Fitch Connect Database and annual reports of various banks. The data regarding the macroeconomic variables (GDP and inflation) were sourced from the database of the IMF.

3.2 Variables
Risk-taking measures
Following Mairafi et al. (2022), we use two measures of bank risk-taking: the standard deviation of return on average assets (SDROAA) and the Z-SCORE. In addition, following studies such as those by Beck et al. (2013), Karim et al. (2019), and Mairafi et al. (2022), we used a three-consecutive-year rolling window to compute the SDROAA.

Accordingly, Roy’s (1952) $Z\text{-SCORE}$ is employed as the sum of return on assets and capital-to-total asset divided by the volatility of the asset returns as the standard deviation. The higher the $Z\text{-SCORE}$, the better the banks’ stability.

$$Z\text{-SCORE}_t = \frac{ROAA_t + ETA_t}{(ROAA)_t}$$
Funding liquidity measures

Bank liquidity (FLIQY) is the total deposit divided by total assets (ratio of deposit to assets). It allows banks to be prompt and consistent in obtaining funding to discharge their obligations as financial intermediaries. This ratio was used by Dahir et al. (2017), El-Massah et al. (2019), and Khan et al. (2017) to measure banks funding liquidity.

Liquidity risk measures

Liquidity risk (LRISK) refers to the banks’ inability to liquidate assets without incurring losses and promptly finance cash outflows. Liquidity risk is measured by loans to core deposits, as used by Ahmad and Ariff (2004), El-Massah et al. (2019), and Smaoui et al. (2020).

Bank loans measures

Bank loans (LOANS) are part of bank assets that are lent out to borrowers as loans. It shows the extent to which a bank is exposed to default risk and excessive illiquidity. It is measured by the loans to total assets ratio. The ratio has been used Dahir et al. (2017), El-Massah et al. (2019), and Mairaﬁ et al. (2022).

Profitability

Profitability (PROFY) refers to the bank’s return on investment during a period. Profitability is measured by net income to total assets (ROA) (Athanassoglu et al., 2008; Jeon & Ryoo (2013; Mairaﬁ et al., 2019, 2020).

Capital

The bank capital (CAPTL) is measured as the financial worth of the banks that is provided as a buffer against asset malfunction. It is the equity ratio to the total asset (Berger & Bouwman, 2013; Dahir et al., 2017; Mairaﬁ et al., 2019; 2020).

Bank Size

The bank size (SIZE) is defined as the extent of the banks’ assets or the magnitude of the banks’ assets. Following the previous studies such as Agoraki et al. (2011), Berger and Bouwman (2013), Dahir et al. (2017), and Laeven and Levine (2009), bank size is measured by the natural logarithm of the total assets.

Economic Growth

Economic growth (GDP) is the increase in the capacity of an economy of a country to produce goods and services, compared from one period to another. Studies such as Ashraf
Inflation

Inflation \((INFL)\) is the general level of price rising for goods and services in a country. Following studies such as Dahir et al. (2017), Demirgüç-Kunt and Huizinga (2010), and Gonzalez et al. (2017), inflation is measured as the annual rate of inflation.

**Table 1. Summary of Variables and Measurements**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Measurement</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>SROAA</td>
<td>Volatility (three years rolling window) of net income/total assets.</td>
<td>Beck et al. (2013), Karim et al. (2019), Mairaﬁ et al. (2019, 2022).</td>
</tr>
<tr>
<td>Z-SCRORE</td>
<td>(Z = (ROAA + ETA)/SDROAA) (\text{ROAA} = \text{Net income/total assets} ) (\text{ETA} = \text{Equity capital to assets ratio} ) (\text{SDROAA} = \text{Standard deviation of return on average assets.})</td>
<td>Dahir et al. (2017), Khan et al. (2017), Mairaﬁ et al. (2022), and Smaoui et al., (2020).</td>
</tr>
<tr>
<td>FLIQY</td>
<td>Total deposits/total assets.</td>
<td>Dahir et al. (2017), El-Massah et al. (2019), Khan et al. (2017) and Smaouoi et al. (2020).</td>
</tr>
<tr>
<td>SIZE</td>
<td>Natural log of total assets.</td>
<td>Berger and Bouwmann (2013), Dahir et al. (2017), and Laeven and Levine (2009).</td>
</tr>
<tr>
<td>GDP</td>
<td>Annual percentage of GDP.</td>
<td>Ashraf et al. (2016), Dahir et al. (2017), and Mollah et al. (2017).</td>
</tr>
<tr>
<td>INFL</td>
<td>Annual Inflation rate.</td>
<td>Dahir et al. (2017), Demirgüç-Kunt and Huizinga (2010), and González et al. (2017).</td>
</tr>
</tbody>
</table>
3.3 Method of Analysis
Static panel data analysis was applied to compare the effect of liquidity and banks’ risk-taking between Islamic and conventional counterparts in the MENA region. The use of panel data allowed us to control for heterogeneity among the banks and the countries. This is because of the different characteristics of countries. According to Mairafi (2020), banks’ risk-taking varies with the country’s characteristics. Thus, a fixed effect model (FEM) is applied because of the distinct attributes of each bank. Previous studies that have used panel data include Beck et al. (2013), Mairafi et al. (2019, 2020, 2022), and Mollah et al. (2017). The regression model is as follows:

\[ \text{SDROAA}_t = \beta_0 + \beta_1 \text{FLIQY}_t + \beta_2 \text{LRISK}_t + \beta_3 \text{LOANS}_t + \beta_4 \text{PROFY}_t + \beta_5 \text{CAPITL}_t + \beta_6 \text{SIZE}_t + \beta_7 \text{GDP}_t + \beta_8 \text{INFL}_t + \epsilon_t \]

\[ Z - \text{SCORE}_t = \beta_0 + \beta_1 \text{FLIQY}_t + \beta_2 \text{LRISK}_t + \beta_3 \text{LOANS}_t + \beta_4 \text{PROFY}_t + \beta_5 \text{CAPITL}_t + \beta_6 \text{SIZE}_t + \beta_7 \text{GDP}_t + \beta_8 \text{INFL}_t + \epsilon_t \]

IV. Results and Analysis

4.1 Results and Discussion
Descriptive Statistics
Table 2 shows the summary statistics of the variables with common statistical data analysis, such as the mean, the standard deviation, and the maximum and minimum values for all the variables.

The table further shows that the differences for FLIQY, LRISK, and LOANS among the two types of banks are significant, with the conventional banks having more FLIQY and LOANS than the Islamic counterpart. In comparison, Islamic banks have more liquidity risk threats than their conventional counterpart. It is also observed that both Islamic and conventional banks have adequate funding liquidity, as indicated by their high mean values. Accordingly, looking at the mean values and standard deviations of FLIQY, LRISK, and LOANS for the two types of banks, it can be observed that the standard deviations are lower than their means. This suggests that their observations are not far away from their means. Likewise, the table shows lower standard deviations and high mean values in all the control variables for Islamic and conventional banks. It suggests that the observations are evenly spread over 2005-2017.
Table 2. Descriptive Statistics of Variables for Islamic and Conventional Banks, 2005-2017

| Variable | Islamic | | | | Conventional | | |
|----------|---------|---------|---------| |---------|---------|---------|
|          | Mean    | Std. Dev. | Max     | Min     | Mean    | Std. Dev. | Max     | Min     |
| SDROAA   | 1.012   | 0.846    | 2.240   | 0.057   | 0.461   | 0.550    | 2.240   | 0.057   |
| ZSCORE   | 59.528  | 68.934   | 232.513 | 9.247   | 82.176  | 72.711   | 232.513 | 9.247   |
| FLIQY    | 71.390  | 13.880   | 89.620  | 53.919  | 81.080  | 7.789    | 89.620  | 53.919  |
| LRISK    | 56.956  | 26.976   | 91.060  | 18.080  | 56.018  | 22.897   | 91.060  | 18.080  |
| LOANS    | 41.289  | 22.735   | 68.341  | 12.120  | 44.586  | 16.946   | 68.341  | 12.120  |
| PROFY    | 1.552   | 1.325    | 3.790   | 0.090   | 1.624   | 1.005    | 3.790   | 0.090   |
| INFL     | 3.833   | 2.944    | 11.265  | 0.662   | 4.955   | 3.617    | 11.265  | 0.662   |

Note: SDROAA is the standard deviation of average assets; Z-SCORE is the measure of insolvency risk, an indicator for banks’ probability of failure; FLIQY is total deposits to total assets, which indicates funding liquidity; LRISK is total loans to total assets; LOANS is total loans to deposits; PROFY is net income to total assets; CAPT is equity to total assets; LSIZE is the natural log of total assets; GDP is the annual percentage of GDP; INFL is the annual inflation rate.

4.2 Regression Results

We compare the impacts of liquidity on bank risk-taking between Islamic and conventional banks in the MENA region. To achieve the objective of this study, sample data were disaggregated to separate Islamic banks from their conventional counterpart. The estimates are made using FEM estimation in all models. The panel regression results for the comparative analysis between Islamic and conventional counterparts are presented in Tables 3 and 4, respectively.

The results in Table 3 and Table 4 show that the coefficients of FLIQY for Islamic banks in both models are statistically insignificant at all levels. The results indicate an insignificant relationship among FLIQY and SDROAA, and Z-SCORE suggesting that funding liquidity has an insignificant influence on the MENA Islamic banks’ risk-taking during 2005-2017. Additionally, the results suggest that high deposits inflow into MENA Islamic banks has an insignificant effect on their high risk-taking behaviour. These results are consistent with Ibrahim and Rizvi (2018), who reported no significant relationship between deposit growth and Islamic banks’ risk-taking.

However, these results diverge from the argument of Acharya and Naqvi (2012), Donalson et al. (2018), Rajan (1994), and Wagner (2007) that banks take a high risk whenever they have low funding liquidity, which resulted from an increase in deposit inflows that increase their funding liquidity. In addition, the results are not in accordance with Cornett et al. (2011), Dahir et al. (2017), and Khan et al. (2017) empirical findings using a sample of conventional from the BRICS countries and the US.
Conversely, the coefficients of FLIQY for conventional banks in both models reveal a statistically significant relationship with SDROAA and Z-SCORE. The results indicate a significant relationship between funding liquidity and conventional banks’ risk-taking at the five percent level. Using SDROAA, the results reveal a negative effect on funding liquidity and MENA conventional banks’ risk-taking behaviour. The results indicate that a one percent decrease in funding liquidity will increase the probability of instability of convention banks in the MENA region by 7.00 and 0.80 percent.

Regression Results for Liquidity and Risk-Taking using Z-SCORE

### Table 4. Results for Islamic and Conventional Banks Z-SCORE

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>z-value</th>
<th>p-value</th>
<th>Coefficient</th>
<th>z-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>FLIQY</td>
<td>-54.023</td>
<td>-1.430</td>
<td>0.151</td>
<td>93.285</td>
<td>2.120</td>
<td>0.034**</td>
</tr>
<tr>
<td>LRISK</td>
<td>-15.295</td>
<td>-1.220</td>
<td>0.223</td>
<td>-51.189</td>
<td>-1.140</td>
<td>0.252</td>
</tr>
<tr>
<td>LOANS</td>
<td>16.746</td>
<td>1.390</td>
<td>0.165</td>
<td>38.802</td>
<td>0.930</td>
<td>0.354</td>
</tr>
<tr>
<td>PROFY</td>
<td>-2.721</td>
<td>-0.660</td>
<td>0.507</td>
<td>-4.833</td>
<td>-1.110</td>
<td>0.268</td>
</tr>
<tr>
<td>CAPT</td>
<td>-0.237</td>
<td>-0.360</td>
<td>0.718</td>
<td>4.290</td>
<td>5.690</td>
<td>0.000***</td>
</tr>
<tr>
<td>LSIZE</td>
<td>11.241</td>
<td>2.620</td>
<td>0.009***</td>
<td>14.447</td>
<td>6.250</td>
<td>0.000***</td>
</tr>
<tr>
<td>GDP</td>
<td>-0.003</td>
<td>-0.000</td>
<td>0.999</td>
<td>-9.610</td>
<td>-3.600</td>
<td>0.000***</td>
</tr>
<tr>
<td>INFN</td>
<td>-1.822</td>
<td>-1.060</td>
<td>0.291</td>
<td>-3.142</td>
<td>-2.930</td>
<td>0.003***</td>
</tr>
<tr>
<td>CONSTANT</td>
<td>138.310</td>
<td>0.700</td>
<td>0.481</td>
<td>-283.73</td>
<td>-1.290</td>
<td>0.196</td>
</tr>
</tbody>
</table>

Note: ***, **, and * indicate 1%, 5% & 10% significant level.
On the other hand, using the Z-SCORE, the results reveal a positive effect of funding liquidity on conventional banks’ risk-taking in the MENA region. It suggests that a unit increase in funding liquidity increases the conventional banks’ default probability by 93.29 percent. Consistent with the findings of Mairafi et al. (2022), the results show that high risk-taking is motivated by the influx of deposits, which creates moral hazard and lead to the instability of conventional banks in the MENA region. Looking at the results in Table 3 and Table 4 respectively, it is observed that the influence of funding liquidity on banks’ risk-taking, as theorised by Acharya and Naqvi (2012), Rajan (1994), and Wagner (2007), is only significant for the conventional banking system.

This could result from differences in business models between Islamic and conventional counterparts. The Islamic banking system operates based on the principles of the Islamic shariah law, which prohibits payment and acceptance of interest in all financial transactions. In addition, IB operates on the principle of PSLB, based on venturing into real assets (Abedifar et al., 2013, 2015; Hassan & Aliyu, 2018; Beck et al., 2013; Hasan & Dridi, 2011).

On the other hand, the results in Table 4 show that the coefficients of LRISK for Islamic banks using the Z-SCORE are statistically insignificant. The results indicate an insignificant relationship among LRISK and SDROAE, and Z-SCORE. More so, the results suggest the relationship between liquidity risk and IB in the MENA region during 2005-2017. Conflictingly, the coefficient of LRISK for Islamic banks using the SDROAA reveals a statistically significant positive effect. Consistent with the results, Abdullah (2010) and Ali (2013) have shown that liquidity risk is one of the major challenges faced by Islamic banks as a result of the slow development of the Islamic capital markets. Accordingly, the result is contrary to the hypothesis of this study because Islamic banks are vulnerable to liquidity risk.

Accordingly, the coefficient of LRISK for conventional banks in all models reveals an insignificant effect on SDROAA and Z-SCORE. The results suggest that liquidity risk has an insignificant effect on conventional banks in the MENA region from 2005-2017. These results are inconsistent with the empirical findings of Dahir et al. (2017) and Khan et al. (2017), which showed a significant relationship between liquidity risk and bank risk-taking behaviour in CB from the BRICS countries and the US.

On the LOANS on risk-taking behaviour, the coefficient of LOANS using SDROAA reveals a negative and statistically significant effect for Islamic banks at the 10 percent level. This indicates that a percentage decrease in a level of MENA IB increases their risk-taking

### Table 1: Summary Statistics

<table>
<thead>
<tr>
<th></th>
<th>Conventional Banks</th>
<th>Islamic Banks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>2.56</td>
<td>2.34</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>1.23</td>
<td>1.17</td>
</tr>
<tr>
<td>Observations</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Note: ***, **, and * indicate 1%, 5% & 10% significant level.
behaviour by 1.77 percent from 2005-2017. The result supports the empirical findings of Alam and Tang (2012). However, the coefficients of \textit{LOANS} using the \textit{Z-SCORE} show an insignificant effect. Likewise, the coefficient of \textit{LOANS} for conventional banks using both \textit{SDROAA} and \textit{Z-SCORE} reveal an insignificant effect in the MENA region throughout the study. In addition, the results imply that the level of the two types of banking systems' involvement in market activities has no significant effect on their probability of failure. The results are consistent with the findings of Ibrahim and Rizvi (2018), who show that bank involvement in market activities has no significant impact on high risk-taking. Conversely, the result contradicts Alam and Tang (2012), Kabir and Worthington (2017), Khan et al. (2017), and Mollah et al. (2016) empirical findings.

Among the bank-specific variables used in this study, the coefficient of \textit{PROFY} for the two banking systems discloses an insignificant effect on bank risk-taking. The result is in contrast with the findings of Dahir et al. (2017) and Ibrahim and Rizvi (2018), who reported a significant and positive effect of profitability on risk-taking in BRICS countries and the dual banking systems. However, the coefficient for \textit{CAPT} and \textit{LSIZE} disclose a statistically significant effect on bank risk-taking for the two types of banking in the MENA region. These results are consistent with the findings of studies such as by Demirgur-Kunt and Huizingar (2010), Ibrahim and Rizvi (2018), and Kabir and Worthington (2017), who reported a significant effect of capital on bank risk-taking behaviour.

The results for IB and the conventional counterpart show that overall, all the models have quite fit. The probability $\chi^2$ for IB is less than 0.05, and the $R^2$ values are above zero. For conventional banks, the Probability $\chi^2$ also less than 0.05, and $R^2$ is more than zero.

\textbf{Table 5. Summary Results for Islamic and Conventional Banks}

<table>
<thead>
<tr>
<th>Dependent Variables</th>
<th>SDROAE Results</th>
<th>SDROAA Results</th>
<th>Z-SCORE Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>\textit{FLIQY}</td>
<td>Insignificant</td>
<td>Insignificant</td>
<td>Insignificant</td>
</tr>
<tr>
<td>\textit{LRISK}</td>
<td>Insignificant</td>
<td>Significant (+)</td>
<td>Insignificant</td>
</tr>
<tr>
<td>\textit{LOANS}</td>
<td>Insignificant</td>
<td>Significant (-)</td>
<td>Insignificant (+)</td>
</tr>
<tr>
<td>\textit{PROFY}</td>
<td>Insignificant</td>
<td>Insignificant</td>
<td>Insignificant</td>
</tr>
<tr>
<td>\textit{CAPT}</td>
<td>Insignificant</td>
<td>Significant (+)</td>
<td>Insignificant</td>
</tr>
<tr>
<td>\textit{LSIZE}</td>
<td>Significant (-)</td>
<td>Significant (+)</td>
<td>Significant (+)</td>
</tr>
<tr>
<td>\textit{GDP}</td>
<td>Insignificant</td>
<td>Insignificant</td>
<td>Insignificant</td>
</tr>
<tr>
<td>\textit{INFL}</td>
<td>Insignificant</td>
<td>Insignificant</td>
<td>Significant</td>
</tr>
</tbody>
</table>

\textbf{ISLAMIC BANKS}

\textbf{CONVENTIONAL BANKS}

<table>
<thead>
<tr>
<th>Dependent Variables</th>
<th>SDROAE Results</th>
<th>SDROAA Results</th>
<th>Z-SCORE Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>\textit{FLIQY}</td>
<td>Significant (-)</td>
<td>Significant (-)</td>
<td>Significant (+)</td>
</tr>
<tr>
<td>\textit{LRISK}</td>
<td>Insignificant</td>
<td>Insignificant</td>
<td>Insignificant</td>
</tr>
<tr>
<td>\textit{LOANS}</td>
<td>Insignificant</td>
<td>Insignificant</td>
<td>Insignificant</td>
</tr>
<tr>
<td>\textit{PROFY}</td>
<td>Insignificant</td>
<td>Insignificant</td>
<td>Insignificant</td>
</tr>
</tbody>
</table>
V. Conclusion

Overall, it can be concluded that the effects of liquidity on bank risk-taking behaviour are more associated with CB than the Islamic counterpart. This implies that a high influx of deposits into CB triggers their high risk-taking behaviour that can increase the probability of banks' failure. However, the results suggest that whenever the IB are faced with a low level of liquidity risk threat and loan default, they tend to exhibit high risk-taking behaviour. The findings indicate the implication of deposits inflow in explaining the risk-taking behaviour of Islamic and CB, supporting theories, and extant studies suggesting that liquidity significantly influences banks' risk-taking behaviour.

In view of the aforementioned objective, this study has provided additional insights into the effect of liquidity on bank risk-taking in a region with liquidity management challenges. Additionally, by using additional proxies of banks' risk-taking, the study shows how liquidity affects banks' risk-taking differently. Also, the study shows additional evidence on the extent to which the impact of liquidity differs amongst the two types of banking systems, Islamic and conventional banks. Hence, stakeholders such as policymakers, academicians, practitioners, investors, and the general public will have a more understanding of the effect of liquidity on bank risk-taking. Lastly, it is established that there are differences between Islamic and conventional banks, banks' risk-taking arising from their liquidity management strategies. Therefore, policy implications and recommendations should differ between the two banking systems and amongst regions to ensure stability and sustainability of the banking sector across the globe.

References


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