# Liquidity Risk Management Practices: Comparative Study of Conventional and Islamic Banks Operating in Palestine

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# Abstract

Banks face a multitude of risks that are inherent to their business models. One of the major financial risk is liquidity risk. Islamic Banks becomes a major player of providing banking services in many countries. These banks operate under the Shari’ah roles and principles, which create new landscape of opportunities and exposes them to new array of risks. This paper investigates whether liquidity risk management in Conventional banks is similar to that of Islamic Banks. Using a panel data of fourteen banks (11 conventional and 3 Islamic) operating in Palestine over the period from 2009 to 2018 and random effects regression after adjusting standard error using Driscoll-Kraay standard errors resistant estimator, we find that the liquidity risk practices differ substantially between Islamic and conventional banks. In terms of the four variables studied, all the variables show symmetrical response except of deposits-to-assets ratio that shows positive relationship with liquidity risk for conventional banks and a negative relationship for Islamic banks. This result can be attributed to the supposed fundamental differences in the business models of the two groups of banks where deposits in Islamic banks have investment component therefore of medium to long-term nature. In addition, two of the variables (ROE and capital adequacy ratio) are negatively related to liquidity risk, but they are significant at 5% level of significance for Islamic banks and insignificant for conventional banks. Our research provides empirical evidence that shows that Islamic banks and conventional banks needs to be treated differently with respect to their risk management activities.

**Keywords:** Risk Management, Liquidity Risk, Panel Data, Islamic Banks, Conventional Banks.

## Introduction

Banking institutions play a significant role in the financial development of a country and its economic growth. The financial intermediation exerted by banks has its rewards but exposes these institutions to significant risks that needs to be managed properly to maximize their value. Banks faces multitude of risks that hinder their activities and survival. The risks faced by financial institutions are grouped into three main areas namely: financial risks, business risks and operational risks. The financial risks category includes market, credit and liquidity risks (Salem, 2013).

Liquidity is defined as a bank’s ability to fund its assets side growth and fulfillment of both expected and unexpected requirements for cash obligations at reasonable cost and without incurring unacceptable losses (Kumar & Yadav, 2013). Bank’s liquidity has two dimensions: the first one is related to the availability of liquid assets that can be liquidated at short notice without loss of value. The second refers to the ability to obtain raise funds in the market at reasonable cost. The two concepts are interrelated and their interaction tends towards their mutual reinforcement (Kumar & Yadav, 2013).

Risk management can be defined as the general procedures that a financial institution use to establish the nature of risks and to develop the right strategy to mitigate those identified risks (Cumming & Hirtle, 2001). The risk management process aims to ensure that the correct sequence of procedures of identification, measurement, and management of the risks have been followed (Rosly, 2005).

Liquidity risk management represents one of the main risks that is expected to be a major risk area facing Islamic banks due to a number of reasons. First: Islamic banks lack Shari’ah compatible money market instruments that can be used to manage its liquid risk. This comes from the fact that Shari’ah prohibits securitization of debt other than at par value. Second: The absence of interbank market for Islamic banks makes it difficult for them to tap into the money and capital market for raising funds (Salem, 2013). On the other hand, when illiquidity problems arise, conventional banks turn to interbank or central bank lending. Therefore, Islamic banks hold higher levels of liquidity, which negatively affects their profitability measures (Brown, Hassan, & Skully, 2007).

Risk management in conventional banks has been researched extensively. On the other hand, risk management in Islamic banks still an infant area (Salem, 2013). This area deserves extensive research due to the fact that besides the need to be competitive in a business sense, Islamic banks need to comply with Shari’ah principles. These principles shape the opportunities landscape for these banks and at the same time contribute towards increasing their risk exposures. Risk management in Islamic banks consists of risk measurement, risk management and risk control (Van Greuning & Iqbal, 2007).

Islamic financial institutions currently face the challenge of understanding the inherent risks and designing an efficient risk management framework. Islamic banks clearly lack a standardized identification of the risks underlying Islamic financial contracts, such as in the case of murabaha where market risk is commonly misidentified (Salem, 2013). Additionally, designing a risk management framework for Islamic banks is highly challenged by the lack of standardization in financial reporting, the lack of applicable quantitative measures and the inadequate risk monitoring systems. For instance, having the financing facilities backed up by a physical asset give rise to ownership risk and thus increases operational risk by embedding a new risk element that did not exist in the conventional banking business.

(Ahmad & Hassan, 2007) test the liquidity positions of Islamic and conventional banks in Bangladesh during the period from 2003 to 2006. Long term liquidity position and short-term liquidity position are analyzed by using regression model and they find that Islamic banks perform better than conventional banks. (Dinger, 2009) suggests that in developing economies the risk of liquidity shortage is reduced due to the presence of international banks. (Islam, Farooq, & Ahmad, 2016) conduct a comparative performance evaluation of conventional and Islamic banks in Pakistan during the period from 2009 to 2016. The results show that conventional banks are more exposed to in liquidity risk. (Ika & Abdullah, 2011) compare Islamic and conventional banks in Indonesia during the period from 2000 to 2007 based on their profitability, liquidity and credit capabilities. They conclude that Islamic banks are more liquid than traditional banks. (Akhtar, Ali, & Sadaqat, 2011) conclude that conventional banks in Pakistan are more inclined to finance long-term projects. The study emphasize that Islamic banks have a better profitability and liquidity risk management based on the superior performance of assets and returns.

The number of studies conducted in Palestine is a rather limited. (Abdelkarim & Burbar, 2007) focus on concepts in risk management and financial risk management in Palestinian commercial and Islamic banks. Using field investigation through reciprocal interviews, the study shows that banks in Palestine have poor risk management system for monitoring, measuring, and mitigating risks. In addition, they find that banks lack adequate instruments for managing the risks faced.

As of the date of writing this paper, 14 Banks are operating in Palestine (11 conventional and three Islamic banks). As of December 31, 2018, the total assets of the Palestinian banking sector amounts to US$16.1 bln. The amount of facilities provided amount to US$ 8.3 bln, which represents 52% of the total assets. The total deposits of the banking sector reached US$12.8bln at the end of 2018. The banking sector represents 99.06% of the country’s gross domestic product (GDP) as of the end of 2018.

Liquidity risk management is one of the main risks that banks needs to manage properly in order to guarantee their profitability, growth and survivals. Due to structural differences in their business models, this paper aims to study the different characteristics of the liquidity risk management and compare the liquidity risk management between Islamic banks and conventional banks operating in Palestine. This study constitutes the first paper to compare the liquidity risk management between conventional and Islamic banks operating in Palestine using a long data series from 2009 to 2018.

This paper is organized as follows: In the next section we provide a background of the Palestinian Banking sector. The third section “Literature Review” discusses the theoretical framework, previous studies and the conceptual framework. The fourth section elaborates on the methodology used in this paper including data and configuration of the quantitative models used. The fifth section discuss the results and provide recommendations for future research.

## Banking Landscape in Palestine

Before 1994, three banks serviced the financial needs of Palestinian people (two Israeli bank and one Jordan Bank). This led to low financing being available to Palestinian people and under banking of the economy. After Paris Protocol in 1994, which allows the Palestine Authority (PA) to establish the Palestine Monetary Authority (PMA) to be responsible of chartering and supervising the banking sector. This resulted in increasing the number of banks chartered to operate in Palestine both local Palestinian banks and regional banks to reach 21 banks at the end of 2007.

The PMA has issued the Banking Law no. 9 of 2010 to regulated the workings of both conventional and Islamic banks. PMA obliges banks to follow international standards set by Basel Committee on Banking Supervision (BCBS) known as Basel Accord, which are designed to increase the safety and soundness of the international banking system to cope with potential risks.

The banking industry has gone into a consolidation phase due to the requirement of the PMA to increase the paid in capital of Banks operating in Palestine to US$75mn. The current number of banks is to 14 banks declining from 21 as of 2007. The latest acquisition occurred in 2019 when a local bank, the National Bank (TNB) acquired the Jordan Commercial Bank; a Jordanian Bank.

Table 1 highlights the time series of four main key performance indicators (KPIs) of the banking industry. The consolidated banking facilities (loans) have grown at a compound annual growth rate (CAGR) of 17% during the study period to stand at US$8.35bln at the end of 2018. On the other hand, the consolidated deposits have grown at a CAGR of 7% to stand at US$12.4bln. Over the study period the average deposits to assets is 79%, the average loans to deposits is 53% and the average loans to assets is 41%.

**Table 1: Main Banking Consolidated KPIs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ***Year*** | **Loans** | **Assets** | **Deposits** | **Profits** |
| **2009** | $2,086 | $8,084 | $6,545 | $104 |
| **2010** | $2,828 | $8,795 | $7,313 | $139 |
| **2011** | $3,495 | $9,337 | $7,361 | $129 |
| **2012** | $4,154 | $10,052 | $7,862 | $124 |
| **2013** | $4,444 | $11,191 | $8,699 | $143 |
| **2014** | $4,871 | $11,815 | $9,411 | $147 |
| **2015** | $5,806 | $12,600 | $9,965 | $133 |
| **2016** | $6,806 | $14,196 | $10,942 | $149 |
| **2017** | $7,947 | $15,850 | $12,325 | $169 |
| **2018** | $8,346 | $16,125 | $12,398 | $176 |
| ***CAGR*** | **17%** | **8%** | **7%** | **6%** |

*Source: PMA reports*

 Of the 14 banks operating in Palestine, three banks are local full-fledged Islamic and the remaining are conventional. All the three banks become subsidiaries of conventional banks, which reflects the opportunities provided by Islamic banks in Palestine. The names of the banks (conventional and Islamic) are included in appendix-1.

## Literature Review

### Theoretical Framework

Four theories have been identified in the literature that are considered relevant to the research problem.

#### Shiftability Theory

This theory is related to the first dimension of liquidity that is; the asset side. This theory introduced by Moulton (1915) who argues that liquidity of a bank is related to its asset’s marketability or its transferability. For an asset to be shift able, it should have to ability to be instantly transferrable with no unacceptable loss. The instruments that obey this definition are mainly short-term financial assets including Treasury bills, banker’s acceptance and commercial paper which could be easily converted in a secondary market (Summers, 1975). This theory provides a solution for liquidity shrinks in times of crisis as it suggests that shift able assets are is to be transferred to the central bank. (Dodds, 1982) mentions three criteria that must be present in a transferable asset: Appropriate mix of assets of the bank, liquidity management theory and liability management theory. However, in the event of systematic market risk, the ability of the banks to use the secondary market as a medium through which liquidity is obtained is jeopardized.

#### Liquidity Preference Theory

Liquidity preference refers to the quantity of liquid cash an individual/ institution would prefer to maintain at a given point in time. (Keynes, 1937) hypothesize that cash needs are influenced by three motives: speculative, precautionary and transactions motives. He further postulates that interest rate is the price paid to encourage abandoning of cash holdings.

#### Anticipated Income Theory

This theory states that banks should plan liquidation of its term loans based on the projected inflows of their clients. This theory advocates putting limitations (covenants) of the borrowers at the time of grating loans in order to ensure that the anticipated income is to be realized. It also addresses the main fundamental objectives of banks which are liquidity, safety and profitability (Chukwunulu, Ezeabasili, & Igbodika, 2019). (Akinwumi, Essien, & Adegboyega, 2017) state that this theory fails to meet emergency cash needs for the lending bank since repayment of loans are done on the basis of installments.

#### Commercial Loan Theory

This theory states that bank should only make short term, self-liquidating loans. This theory is built around maturity matching principle. As banks have obligations with short maturities that are payable on demand, financial assets must be of near-term maturities. High liquidity enhances efficiency and effectiveness in financial management (Maness & Zietlow, 1993).

This theory ignores that transferability feature of financial assets. The recommendation of this theory also ignores the critical function of bank in providing development long-term financing (Nwankwo, 1992)

### Previous Empirical Studies

(Gabbi, 2004) focus on the probability of reducing liquidity risk especially for large banks that are capable of both managing additional market information and influencing monetary policy functions. He concludes that the relationship between liquidity risk and bank size is negative. (Tarawneh, 2006) finds that capital adequacy ratio is insignificant in case of Islamic banks.

 (Khan, Bhatti, Rosly, & Zaini, 2008) use return on equity as a measure of liquidity risk to compare liquidity risk between commercial and Islamic banks. They find out positive and significant relation of Islamic banks, but positive and insignificant of conventional banks. These results are in accordance with the findings of (Siddiqui, 2008). (Isshaq; Isshaq & Bokpin, 2009) test the determinants of liquidity management of banks in Ghana during the period from 1991 to 2007. They show that size of the bank, return on assets, networking capital and target liquidity level are major determinates of liquidity management.

(Sawada, 2010) using cash to assets ratio finds a positive relation between size of bank and liquidity risk when this ratio is used as independent variable. (Ojo, 2010) uses capital adequacy ratio as defined in the Basel II as a measure of liquidity risk. He finds out that capital adequacy ratio has a positive and statistically significant relationship with liquidity risk for conventional banks. (Ismal, 2010) measured liquidity risk of Indonesian Islamic banks from 2000 to 2007. The results indicate that liquidity risk management awards the “good” grade for managing the liquidity risk in Indonesian Islamic banks.

Different liquidity risk measures have been used in the literature. (Chen, Shen, Kao, & Yeh, 2018; LeJeune, 2010), (Sukmana & Suryaningtyas, 2016) and (Almumani, 2013) use the proportion of liquid assets to total assets. (Mohamad, Mohamad, & Samsudin, 2013) use the proportion of total deposits in total assets. As well, other measures including return on equity (Mohamad et al., 2013) return on assets (Mohamad et al., 2013) capital adequacy ratio(Mohamad et al., 2013) and net working capital(Mohamad et al., 2013) have been implemented.

### Conceptual Framework

Based on the previous study and literature review, our conceptual model that will be guiding the empirical work of this thesis as follows:



**Figure 1: Conceptual Framework**

#### Hypotheses Development

Based on our conceptual framework and previous empirical studies, the distinction between the liquidity risk between Islamic banks and commercial banks are to be examined through the following hypothesis

H1: The relationship between the liquidity risk and cash ratio is significantly negative at 5% level of significance for Islamic Banks and Conventional Banks.

H2: The relationship between the liquidity risk and deposits to assets is significantly positive at 5% level of significance for Islamic Banks and Conventional Banks.

H3: The relationship between the liquidity risk and ROE is significantly positive at 5% level of significance for Islamic Banks and Conventional Banks.

H4: The relationship between the liquidity risk and capital adequacy ratio is significantly negative at 5% level of significance for Islamic Banks and Conventional Banks.

## Methodology

### Data and Sample Descriptions

The data that have been used in this thesis are microdata in nature, that is its related to specific Banks. For the purpose of construction of the study variables the financial statements of the banks (Conventional and Islamic) collected and constructed manually. The sources of the data include the published financial reports of the companies available from Association of Banks in Palestine. The study covers the period from 2009 till 2018. For Conventional Banks, we have 119 observations (T=10, N=12), whereas for Islamic Banks, we have 23 observations (T=10, N=3). It is worth mentioning that we have unbalanced data sets for the two groups of banks.

### Model Specification & Variables Definition

Following the work of (İncekara & Çetinkaya, 2019) two regression models are fit. One model for the conventional banks and the other for Islamic Banks. The econometrics models are:

|  |  |  |
| --- | --- | --- |
|  | $$LR\\_C\_{it}=α\_{0}+α\_{1}DA\_{it}+α\_{2}ROE\_{it}+α\_{3}CR\_{it}+α\_{4}CAR\_{it}+α\_{5}BS\_{it}+α\_{6}BS\_{it} + ε\_{it}$$ | **Equation 1** |
|  | $$LR\\_I\_{it}=α\_{0}+α\_{1}DA\_{it}+α\_{2}ROE\_{it}+α\_{3}CR\_{it}+α\_{4}CAR\_{it}+α\_{5}BS\_{it}+α\_{6}BS\_{it} + ε\_{it}$$ | **Equation 2** |

The models are to be estimated using panel regression (fixed effect and random effect)

### Variables Measurement

The table illustrates the variables’ theoretical and operational definitions that have been employed in our investigation.

**Table 2: Study Variables**

|  |  |  |
| --- | --- | --- |
| **Variable** | **Abbrev.** | **Measurement** |
| **1. Dependent Variable: Liquidity Risk Proxy**  |
| Liquidity Risk | LR | Total Customer deposits/Liquid Assets |
|  |
| **2. Independent Variables: Board Characteristics** |
| Deposits to Assets | DA | Total deposits to Assets |
| Return on Equity | ROE | Earnings Available for common stockholders/Common Stock Equity  |
| Cash Ratio | CR | cash and cash equivalents to total assets  |
| Securities | SEC | Short-term securities to total bank’s assets |
|  |
| **3. Control Variables** |
| Bank Size | BS | Logarithm of the Bank’s total assets in US dollars |

The Analysis which has been performed using a balanced panel regression includes five independent variables. While the majority are self-explanatory as indicated in Table ‎4‑1.

### Characteristics of Variables and the Model

**Liquidity Risk (LR):** it is the dependent variable in this study. It measured as the ratio of total customers’ deposits to liquid assets. The total deposits include the depositors’ funds (current, saving and investment accounts) while the liquid assets refer to the cash and cash equivalent plus the easily convertible assets to cash (such as short-term trading securities - Sukuk). The greater the ratio the higher exposure to liquidity risk, as it indicates low liquid assets availability to meet the depositors’ withdrawals at time of need. Such ratio used by (Shaikh, 2015) and (Gafrej & Abbes, 2017)

**Deposit to Assets (DA):** this ratio indicates the percentage of assets which are funded by customers’ deposits, and it considers inverse measure of liquidity (Milošević-Avdalović, 2018) as these deposits are subject to withdrawals. The increase in this ratio indicates a higher level of liquidity risk due to significant volume of financing the assets from the customers deposits. Such ratio used by (Milošević-Avdalović & Kalaš, 2016) and (Alzoubi, 2017).

**Cash Ratio (CR):** cash ratio is measured as cash and cash equivalents to total assets. It refers to liquidity buffer that maintained by bank’s expectations for meeting the quick obligations. The more cash and cash equivalents at bank the less exposure to liquidity risk. Such ratio applied by (Jedidia & Hamza, 2015) and (Alzoubi, 2017).

We used Return on equity as a comprehensive measure of profitability following (Khan et al., 2008).

**Return on Equity (ROE):**

Several studies have used return on equity a determinant of liquidity risk management. (Mohamad et al., 2013) and (Khan et al., 2008) find ROE as a differentiating factor where its related positively and significantly for Islamic banks and positively but insignificantly for conventional banks. As shareholders are looking for the maximum return, they would rather investing is risky assets, which may have high liquidity risk.

**Bank Size (BS):**

Bank size is commonly used as control variable. It aims to control for the differences between the banks’ different sizes. Larger banks can mobilize deposits from customers easily and therefore meet maturing obligations. As well, larger banks can obtain funding from different sources at lower cost. Therefore, bank size is expected to be negatively related to liquidity risk.

## Results and Discussions

### Exploratory Data Analysis

The Summary statistics of the study variables as well as the correlation matrices of conventional and Islamic Banks are presented below.

#### Summary Statistics

Summary statistics of the conventional banks are presented in Table 3. It is evident from the table that the variables are not normal as provided by Jarque-bera test. Most of the variables are positively skewed except of the DA variable.

Comparison with the summary statistics of the Islamic banks presented in Table 4ؤreveals that average liquidity risk of Islamic banks is larger than conventional banks

**Table 3: Summary Statistics- Conventional Banks**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Variables |  Obs |  Mean |  Std. Dev. |  Min |  Max |  p1 |  p99 |  Skew. |  Kurt. |
|  LR | 119 | 1.469 | .92 | .348 | 9.8 | .506 | 2.82 | 6.318 | 57.637 |
|  DA | 119 | .755 | .138 | .118 | .901 | .243 | .897 | -1.652 | 6.639 |
|  CR | 119 | .221 | .166 | .016 | .924 | .028 | .841 | 2.847 | 10.391 |
|  ROE | 119 | .125 | .187 | -.103 | 1.099 | -.093 | .862 | 3.09 | 13.158 |
|  BS | 119 | 20.014 | 1.041 | 18.315 | 22.309 | 18.392 | 22.262 | .426 | 2.342 |
|  CAR | 119 | .393 | .399 | .104 | 2.147 | .111 | 2.123 | 2.235 | 8.259 |
|  |

**Table 4: Summary Statistics of Study Variables-Islamic Banks**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Variables |  Obs |  Mean |  Std. Dev. |  Min |  Max |  p1 |  p99 |  Skew. |  Kurt. |
|  LR | 23 | 1.893 | .746 | .131 | 3.029 | .131 | 3.029 | -.435 | 3.11 |
|  DA | 23 | .785 | .172 | .159 | .879 | .159 | .879 | -2.704 | 9.411 |
|  CR | 23 | .229 | .121 | .021 | .59 | .021 | .59 | 1.299 | 5.031 |
|  ROE | 23 | .057 | .06 | -.047 | .138 | -.047 | .138 | -.328 | 1.92 |
|  BS | 23 | 19.918 | .679 | 18.282 | 20.823 | 18.282 | 20.823 | -.675 | 2.959 |
|  CAR | 23 | .293 | .285 | .121 | 1.289 | .121 | 1.289 | 2.519 | 8.532 |
|  |

The two table above make it clear that:

1. Islamic Banks have higher average liquidity as measured by total customer deposits by liquid assets.
2. Islamic Banks have higher average deposit to asset (DA) and higher cash ratio (CR) compared with conventional banks.
3. Conventional banks have higher average ROE and CAR compared with Islamic Banks.

In order to see whether the differences between the ratios are statistically significant at 5% level of significance, a two sample T-test is performed. The null hypothesis is:

$$H\_{o}: μ\_{Ci}=μ\_{Ii}$$

The alternative hypothesis is:

$$H\_{1}: μ\_{Ci}\ne μ\_{Ii}$$

Where $μ\_{Ci}$ is the average response of conventional banks for variable i and $μ\_{Ii}$ is the average response of Islamic banks for variable i.

Table 5 shows the results of these tests.

**Table 5: Difference Test – Two Samples T-test**

|  |  |
| --- | --- |
| **Variable** | **Result** |
| LR | Do Not Reject |
| DA | Do Not Reject |
| CR | Reject |
| CAR | Do Not Reject |
| ROE | Reject |
| BS | Do Not Reject |

Table 5 shows the differences between the conventional banks’ measures and their Islamic counterparty are statistically equally for most the variables (LR, DA, CAR, BS) except for cash ratio (CR) and return on equity (ROE). This gives an indication of possible differences in risk management between the two groups of banks.

#### Correlation Tables

The pairwise correlation among the conventional banks’ variables are illustrated in Table 6.

**Table 6: Correlation Matrix – Conventional Banks**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  Variables |  (1) |  (2) |  (3) |  (4) |  (5) |  (6) |
|  (1) LR | 1.000 |
|  (2) DA | 0.272 | 1.000 |
|  (3) CR | -0.269 | -0.412 | 1.000 |
|  (4) ROE | -0.223 | -0.228 | 0.786 | 1.000 |
|  (5) BS | 0.305 | 0.627 | -0.401 | -0.086 | 1.000 |
|  (6) CAR | -0.311 | -0.688 | 0.743 | 0.450 | -0.707 | 1.000 |
|  |

It is evident that the correlation between most independent variables is high with the maximum correlation is between ROE and cash ratio (78%). This raises the issue of multicollinearity in the statistical analysis that needs to be checked for and corrected for.

The correlation matrix of the Islamic Banks variables is illustrated in Table 7.

**Table 7: Correlation Matrix – Islamic Banks**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  Variables |  (1) |  (2) |  (3) |  (4) |  (5) |  (6) |
|  (1) LR | 1.000 |
|  (2) DA | 0.750 | 1.000 |
|  (3) CR | 0.123 | 0.455 | 1.000 |
|  (4) ROE | 0.586 | 0.621 | 0.076 | 1.000 |
|  (5) BS | 0.803 | 0.823 | 0.115 | 0.816 | 1.000 |
|  (6) CAR | -0.793 | -0.983 | -0.333 | -0.622 | -0.841 | 1.000 |
|  |

The correlation coefficient between the study variables show high correlation coefficients for the almost all the variables related to Islamic Banks, especially the correlation between deposits to assets and Capital adequacy ratio (-98%).

#### Quantitative Model Estimation

The estimation of the two models has been accomplished using panel data regression. The results of the random effect and fixed effect models are summarized in the tables below. The details of Stata printout are included in appendix 2.

### Fixed Effect and Random Effect Models

The results of estimating the fixed effect and random effect model of the Islamic and conventional banks are presented in Table 8.

**Table 8: Fixed Effect and Random Effect Estimation – Conventional Banks and Islamic Banks**

|  |  |  |  |
| --- | --- | --- | --- |
|   | **Conventional Banks** |  | **Islamic Banks** |
| **Variables** | **Fixed Effect** | **Random Effect** |  | **Fixed Effect** | **Random Effect** |
| DA | -4.663 | -5.407 |  | .463 | .501 |
| CR | -1.528 | .733 |  | 1.123 | .196 |
| ROE | -8.286\* | -1.17 |  | .43 | -.834 |
| BS | .899\*\* | .67\* |  | .64\*\* | .27\* |
| CAR | -3.558 | -4.003 |  | .26 | -.027 |
| Constant | -10.492 | -6.129 |  | -12.098\*\* | -4.236 |

|  |
| --- |
| *\*\*\* p<.01, \*\* p<.05, \* p<.1* |

Table 8 shows that the different results and implications obtained under the two methods for each group of banks. Hausman test was used as the last step to select the most accurate estimator.

### Hausman test

Hausman test are performed to aid in selecting the appropriate model that reflects the most accurate estimator. The results of Hausman test are presented in the Table 9. The null hypothesis under Hausman test is that the random effect model is the appropriate model, whereas the alternative hypothesis calls for the fixed effect model.

**Table 9: Hausman Test- Conventional and Islamic Banks**

|  |  |  |  |
| --- | --- | --- | --- |
|   | **Conventional Banks** |  | **Islamic Banks** |
| **Variables** | **Fixed Effect** | **Random Effect** |  | **Fixed Effect** | **Random Effect** |
| DA | -4.663 | -5.407 |  | -4.663092 | -5.406506 |
| CR | -1.528 | .733 |  | -1.527626 | 0.7331058 |
| ROE | -8.286 | -1.17 |  | -8.285582 | -1.170462 |
| BS | .899 | .67 |  | 0.8994423 | 0.6697512 |
| CAR | -3.558 | -4.003 |  | -3.558342 | -4.00349 |
|  |  |  |  |  |  |
| Chi square | 5.021 |  |  | 4.3 |
| Probability Value | .413 |  |  | .507 |
| **Chosen Model** | **Random Effect** |  |  | **Random Effect** |

As a result of Hausman test, H0 hypothesis was not rejected in both conventional and Islamic banks and it was concluded that the random effects model is efficient.

### Diagnostic Tests

To gauge the quality of the estimates in the continuation of the analysis, various tests were conducted to check the presence of heteroscedasticity, autocorrelation, and inter-unit correlation

With respect to autocorrelation test, using the Durbin-Watson and Baltaqi-Wu LBI test we rejected the null hypothesis of no autocorrelation. Therefore, the autocorrelation was found in the models of conventional banks and Islamic banks.

As well, the heteroscedasticity of the models is tested using Modified Wald test results. We did not reject the null of no heteroscedasticity. Therefore, the cross-sectional units show no unit’s heteroscedasticity.

In order to determine the factors affecting liquidity risk in conventional banks and Islamic Banks, panel data regression analysis has been performed with Driscoll-Kraay standard errors resistant estimator as a result of the presence of autocorrelation in the models. The results of these values for conventional and Islamic banks are given in Table 10 & 11.

**Table 10: Driscoll-Kraay standard errors- Conventional Banks**

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable** | **fixed** | **dris\_kraay** | **random** |
| DA | 0.4635 | 0.5013 \*\*\* | 0.5013 |
|   | 0.8853 | 0.1476 | 0.8480 |
|   | 0.5200 | 3.4000 | 0.5900 |
| CR | 1.1228 | 0.1965 | 0.1965 |
|   | 1.8433 | 0.3600 | 1.2221 |
|   | 0.6100 | 0.5500 | 0.1600 |
| ROE | 0.4295 | (0.8342)\*\*\* | (0.8342) |
|   | 1.4104 | 0.2551 | 0.7970 |
|   | 0.3000 | (3.2700) | (1.0500) |
| BS | 0.6403 | 0.2698 \*\*\* | 0.2698 |
|   | 0.2490 | 0.0989 | 0.1466 |
|   | 2.5700 | 2.7300 | 1.8400 |
| CAR | 0.2598 | (0.0266) | (0.0266) |
|   | 0.6792 | 0.1481 | 0.4917 |
|   | 0.3800 | (0.1800) | (0.0500) |
| \_cons | (12.0983) | (4.2364)\*\* | (4.2364) |
|   | 4.9822 | 2.0973 | 2.9285 |
|   | 2.4300 | (2.0200) | (1.4500) |

Table 10 illustrates that the dris kraay standard errors make a significant improvement of parameters significance as it corrects the standard errors for the effect of heteroscedastic and auto correlation. It can be seen that the DA, ROE and BS are statistically significant at 5% level of significance.

For Islamic banks, the estimation procedures for Islamic Banks follows that of conventional banks. Table 11 outlines the results of estimating the fixed effect, the random effect as well as the dris kraay corrected standard errors. The dris kraay model corrects the standard errors for the effect of heteroscedastic and auto correlation.

**Table 11: Driscoll-Kraay standard errors- Islamic Banks**

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable** | **Fixed** | **dris\_kraay** | **random** |
| DA | -4.66309 | -5.4065064\*\*\* | -5.40651 |
|   | 4.485169 | 2.0237606 | 4.772729 |
|   | -1.04 | -2.67 | -1.13 |
| CR | -1.52763 | 0.73310578 | 0.733106 |
|   | 1.670975 | 1.8874206 | 1.380356 |
|   | -0.91 | 0.39 | 0.53 |
| ROE | -8.28558 | -1.1704618\*\*\* | -1.17046 |
|   | 4.220485 | 0.1666011 | 2.824794 |
|   | -1.96 | -7.03 | -0.41 |
| BS | 0.899442 | 0.66975125\*\*\* | 0.669751 |
|   | 0.36736 | 0.19956445 | 0.378361 |
|   | 2.45 | 3.36 | 1.77 |
| CAR | -3.55834 | -4.0034901\*\*\* | -4.00349 |
|   | 2.466055 | 1.8038341 | 2.623091 |
|   | -1.44 | -2.22 | -1.53 |
| \_cons | -10.4925 | -6.1285052 | -6.12851 |
|   | 7.845698 | 7.8125223 | 8.158453 |
|   | -1.34 | -0.78 | -0.75 |

### Discussion

#### Conventional Banks

Results outlined in Table 10 show that the relationship between liquidity risk and the deposit to assets (DA) is positive and significant at a significance level of 5%. This means that the increased proportion of deposits to assets results in higher liquidity risk which reflects the maturity structure of the deposits of conventional Banks. This result is consistent with (S. Milošević-Avdalović, 2018), which reflects that short-term maturity structure of the deposits.

However, the relationship between the relationship between the cash ratio and liquidity risk is positive but insignificant. This match with the result obtained from (Iqbal, 2012). It indicates that the conventional banks do not depends on their cash balances to meet their short-term needs for funds. This result reflects excess cash available at banks, which averaged 20% of total assets of the consolidated balance sheet during the analysis period.

Capital adequacy ratio proves to have a negative relationship with the liquidity risk albeit not significant at 5% level of significance. This result is consistent with the results obtained by (Tarawneh, 2006), but inconsistent with that obtained (Ojo, 2010). We contribute this result to the fact that the Palestinian conventional banks are not exposed severely to international financial markets that would affect the liquidation value of the financial assets. During the asset period, the average proportion of portfolio assets to total assets is 6.5%.

The analysis indicates that the liquidity risk is positively and significantly related to the liquidity risk. This result is inconsistent with . (Mohamad et al., 2013), (Khan et al., 2008) who find a positive but insignificant relationship between liquidity risk and profitability. The result reflects that basic law of finance of the higher the risk the higher the return.

#### Islamic Banks

Results outlined in Table 11 show that the relationship between liquidity risk and the deposit to assets (DA) is negative and significant at a significance level of 5%. This means that the increased proportion of deposits to assets results in lower liquidity risk. This result contradicts that obtained for conventional banks. This result can be settled based on the fact that the deposits obtained by Islamic banks are of an investment type nature (restricted and unrestricted). Therefore, these deposits are funds of stable nature.

The cash ratio of Islamic banks has a positive but insignificant relationship with the liquidity risk. In addition, the relation between the return on equity (ROE) and liquidity risk is a significantly negative at 5% level of significance. This result contradicts that obtained by (Mohamad et al., 2013), (Khan et al., 2008), who find positive and significant relationship between the ROE and liquidity risk. This result can be explained by the fact that the increased profitability of Islamic banks is translated into higher liquidity and lower liquidity risk.

The capital adequacy ratio has a negative relationship with the liquidity risk and significant at 5% level of significance. This result is inconsistent with (Tarawneh, 2006) and (Ojo, 2010). This reflects that increasing capital and reserves has the effect of decreasing liquidity risk.

## Conclusion

The above results are summarized in Table 12. It is clear the wide discrepancy in the results obtained. The cash ratio and ROE share the same sign between the two groups of Banks. However, their significance is different. ROE have consistent sign with different significance between the two groups of banks. The other two variables have different sign and significance. This reflects that in spite the two groups of banks share the same macroeconomic and sociocultural environments, their liquidity risk management are different. This result emphasizes the two groups of banks are fundamentally different therefore their risk management practices are different. Therefore, we find that Shari’ah compliance has effects of the risk management practices of Islamic banks.

**Table 12: Summary of Statistical Analysis**

|  |  |  |  |
| --- | --- | --- | --- |
|   | **Conventional Banks** |  | **Islamic Banks** |
| **Variable** | **Sign** | **Significant @5%** |  | **Sign** | **Significant @5%** |
| DA | + | Yes |   | - | Yes |
| CR | + | Yes |   | + | No |
| CAR | - | No |   | - | Yes |
| ROE | - | No |   | - | Yes |

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# Appendix -1

|  |  |  |
| --- | --- | --- |
| **Bank** | **Founded** | **Type** |
| Arab Bank | 1930 | Conventional |
| Bank of Palestine | 1960 | Conventional |
| The National Bank | 2006 | Conventional |
| Quds Bank | 1995 | Conventional |
| Cairo Amman Bank | 1960 | Conventional |
| Housing Bank for Trade & Finance | 1973 | Conventional |
| Bank of Jordan | 1960 | Conventional |
| Palestine Investment Bank | 1994 | Conventional |
| Jordan Ahli Bank | 1955 | Conventional |
| Jordan Commercial Bank\* | 1977 | Conventional |
| Egyptian Arab Land Bank | 1994 | Conventional |
| Palestine Islamic Bank | 1995 | Islamic |
| Arab Islamic Bank | 1995 | Islamic |
| Al-Safa Bank | 2017 | Islamic |

\* Jordan Commercial Bank has been acquired by the National Bank on July 2020.

# Appendix -2

* **Conventional Banks**

***Fixed effect Regression results***

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| LR | Coef. | St.Err. | t-value | p-value | [95% Conf | Interval] | Sig |
| DA | -4.663 | 4.485 | -1.04 | .315 | -14.223 | 4.897 |  |
| CR | -1.528 | 1.671 | -0.91 | .375 | -5.089 | 2.034 |  |
| ROE | -8.286 | 4.22 | -1.96 | .068 | -17.281 | .71 | \* |
| BS | .899 | .367 | 2.45 | .027 | .116 | 1.682 | \*\* |
| CAR | -3.558 | 2.466 | -1.44 | .17 | -8.815 | 1.698 |  |
| Constant | -10.492 | 7.846 | -1.34 | .201 | -27.215 | 6.23 |  |
|  |
| Mean dependent var | 1.893 | SD dependent var | 0.746 |
| R-squared | 0.595 | Number of obs | 23.000 |
| F-test | 4.407 | Prob > F | 0.008 |
| Akaike crit. (AIC) | 26.973 | Bayesian crit. (BIC) | 33.786 |
| *\*\*\* p<.01, \*\* p<.05, \* p<.1* |

***Random effect Regression results***

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| LR | Coef. | St.Err. | t-value | p-value | [95% Conf | Interval] | Sig |
| DA | -4.663 | 4.485 | -1.04 | .315 | -14.223 | 4.897 |  |
| CR | -1.528 | 1.671 | -0.91 | .375 | -5.089 | 2.034 |  |
| ROE | -8.286 | 4.22 | -1.96 | .068 | -17.281 | .71 | \* |
| BS | .899 | .367 | 2.45 | .027 | .116 | 1.682 | \*\* |
| CAR | -3.558 | 2.466 | -1.44 | .17 | -8.815 | 1.698 |  |
| Constant | -10.492 | 7.846 | -1.34 | .201 | -27.215 | 6.23 |  |
|  |
| Mean dependent var | 1.893 | SD dependent var | 0.746 |
| R-squared | 0.595 | Number of obs | 23.000 |
| F-test | 4.407 | Prob > F | 0.008 |
| Akaike crit. (AIC) | 26.973 | Bayesian crit. (BIC) | 33.786 |
| *\*\*\* p<.01, \*\* p<.05, \* p<.1* |

* **Islamic Banks**

***Fixed effect Regression results***

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| LR | Coef. | St.Err. | t-value | p-value | [95% Conf | Interval] | Sig |
| DA | .463 | .885 | 0.52 | .602 | -1.292 | 2.219 |  |
| CR | 1.123 | 1.843 | 0.61 | .544 | -2.533 | 4.779 |  |
| ROE | .43 | 1.41 | 0.30 | .761 | -2.368 | 3.227 |  |
| BS | .64 | .249 | 2.57 | .012 | .146 | 1.134 | \*\* |
| CAR | .26 | .679 | 0.38 | .703 | -1.087 | 1.607 |  |
| Constant | -12.098 | 4.982 | -2.43 | .017 | -21.981 | -2.216 | \*\* |
|  |
| Mean dependent var | 1.469 | SD dependent var | 0.920 |
| R-squared | 0.077 | Number of obs | 119.000 |
| F-test | 1.709 | Prob > F | 0.056 |
| Akaike crit. (AIC) | 291.098 | Bayesian crit. (BIC) | 307.773 |
| *\*\*\* p<.01, \*\* p<.05, \* p<.1* |
|  |

***Random effect Regression results***

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| LR | Coef. | St.Err. | t-value | p-value | [95% Conf | Interval] | Sig |
| DA | .501 | .848 | 0.59 | .554 | -1.161 | 2.163 |  |
| CR | .196 | 1.222 | 0.16 | .872 | -2.199 | 2.592 |  |
| ROE | -.834 | .797 | -1.05 | .295 | -2.396 | .728 |  |
| BS | .27 | .147 | 1.84 | .066 | -.018 | .557 | \* |
| CAR | -.027 | .492 | -0.05 | .957 | -.99 | .937 |  |
| Constant | -4.236 | 2.928 | -1.45 | .148 | -9.976 | 1.503 |  |
|  |
| Mean dependent var | 1.469 | SD dependent var | 0.920 |
| Overall r-squared | 0.132 | Number of obs | 119.000 |
| Chi-square | 11.232 | Prob > chi2 | 0.047 |
| R-squared within | 0.056 | R-squared between | 0.482 |
| *\*\*\* p<.01, \*\* p<.05, \* p<.1* |