

The impact of financial stress on the relation “Liquidity risk-performance and credit risk”

Oussama Gafrej*, Mouna Boujelbene Abbes**

* Ph.D. student, management science-finance, Faculty of Economics and Management of Sfax, University of Sfax, Sfax, Tunisia.

** Assistant professor of finance, Faculty of Economics and Management of Sfax, University of Sfax, Sfax, Tunisia.

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Abstract- This paper seeks to test the impact of a number of factors on performance, liquidity risk as well as credit risk in each type of banks. The variables selected are specific to the banking sector, macroeconomic variables and factors specific to each type of contracts used by Islamic banks that are included in the financing assets activities. A panel threshold regression is used to examine the dependence of financial stress indices with our dependent variables. The empirical application is comprised of 66 banks (including 31 Islamic banks) located in the GCC region. The study gives remarkable and significant results, especially by introducing the financial stress indices as threshold variables.

Index Terms- Credit risk, Financial stress, Liquidity risk, Profitability.

I. INTRODUCTION

The global financial crisis demonstrated that understanding the importance of the dependence of financial stress with the stability of the banking system is essential to ensure its survival. This implies that examining the interaction between financial risks and performance from different financial stress levels is considered as an important step to ensuring the proper functioning of the banking system. In addition, it seems clear that profitability, credit risk and liquidity risk constitute a major interest for scholars due to their great consequences on the competitiveness of the whole economic system. Several studies have included with greater precision the impact of specific banks' factors and macroeconomic factors on profitability, liquidity risk or credit risk in Islamic banks, Bashir (2000), Husain et al. (2015), Ramlan and Adnan (2016), Trad et al. (2017) are some examples. To our knowledge, none of the recent studies have investigated and analyzed the impact of each type of Islamic banking contracts on these matters. This peculiarity will be included in our work to confirm or to reject the hypotheses of some theoretical studies, addressing the impact of commercial and partnership contracts on liquidity risk, profitability and credit risk. In addition, the relation “risk-performance” will be examined in a context of financial stress in order to study the role of financial stress indices to explain this relation. Therefore, the main objective of this paper is to analyze the impact of specific banks and macroeconomic factors on the financial risks and the performance of Islamic and conventional banks (using financial stress indices as threshold variables). It also aims at investigating each type of contract entered under financial assets activities side of the Islamic banks' balance sheet. This paper is structured as follows. In the second section, we will shed the light on the literature review. The data, variables and methodology, including the panel threshold models will be presented in section 3. Section 4 presents the research findings. Finally, section 5 concludes with a summary of principal results and findings implication.

II. LITERATURE REVIEW

In a study conducted by Masruki et al. (2011) on the performance and the liquidity of Malaysian Islamic banks versus conventional banks, they found that Islamic banks have more liquidity, but generate less profitability during the period from 2004 to 2008. They explained the higher performance of conventional banks by the higher profit margin rate applied in Malaysian Islamic banks. In addition, Khan et al. (2014) studied the profitability determinants of Islamic banking in Pakistan for the period 2007-2014. They used three measures which are: return on assets, return on equity and earnings per share. The study found that deposit ratio, non-performing loans and consumer price index are significant in determining the profitability of Islamic banks.

The empirical study of Bashir (2003) investigated the performance determinants in eight Middle Eastern countries covering the period from 1993 to 1998. The result indicated that net loans to total assets and capitalization ratios have a positive and significant impact on profitability. Moreover, a study conducted by Ramlan and Adnen (2015) showed that the profitability and the net loans to total assets ratio of Malaysian' Islamic banks are higher than conventional banks. Using GMM system, Trad et al. (2017) examined the factors that influence the ROA and ROE which serve as profitability proxies. They found that Size, capital to total assets ratio and inflation

rate increased the performance of Islamic banks. Credit risk determinants in Islamic banks have been studied by a range of researchers thanks to its importance in terms of its ability to minimize financial risks and maximize the bank’s profitability. Among them, the work conducted by Uda et al. (2018) which examines the factors that may have considerable influence on the credit risk of Malaysian banks. They found that management efficiency, size, loan to deposit and risk weighted asset have significant importance Malaysian Islamic and conventional banks. Using the non-performing loans as a proxy of credit risk, Hayati and Ahmad (2014) found that the credit risk in Malaysian Islamic banks is influenced by three factors which are the size of the bank, the risk weighted assets and the management efficiency. Some threshold literatures were consulted, we can take the example of the study conducted by Chen and Quang (2014), the authors of this paper have chosen to analyze the relationship between international financial integration and economic growth by using threshold variables of some of country characteristics. In addition, Hameed et al. (2017) have investigated the impact of the inflation rate of GDP growth with low, medium and high levels, the results obtained from this study are significant and different from one level to another. The study conducted by Xie et al. (2018) examined the impact of the new energy consumption on the GDP growth using multiple threshold effects.

III. DATA, VARIABLES AND MODELS SPECIFICATION

A. DATA

The data included in this study cover Islamic and conventional banks in the GCC region, we retain three types of variables: bank specific, macroeconomic and Islamic bank specific factors covering the period from 2006 to 2018. As regards the bank specific factors and Islamic bank specific ones were taken from the banks’ annual reports. The macroeconomics variables were obtained from the World Bank website. Our sample contains 66 banks in which 31 are Islamic banks and 35 are conventional banks.

| <i>Country</i> | <i>Islamic banks</i> | <i>Conventional banks</i> |
|---------------------|----------------------|---------------------------|
| <i>Bahrain</i> | 7 | 5 |
| <i>Kuwait</i> | 5 | 5 |
| <i>Oman</i> | 2 | 5 |
| <i>Qatar</i> | 4 | 6 |
| <i>Saudi Arabia</i> | 5 | 6 |
| <i>UAE</i> | 8 | 8 |
| <i>Total</i> | 31 | 35 |

Table 1. Number of Islamic and Conventional banks by country

B. VARIABLES

Dependent variables:

The liquidity measure included in our study was the net loans to total assets ratio (LTA). This ratio gives a picture of the liquidity risk position, measures the ability of banks to manage the liquidity problems and measures the less liquid asset the bank has. The higher LTA ratio indicates that bank holds more illiquid assets in their balance sheet which lead to increase the level of liquidity risk and vice versa. It also may be implied that banks may not have enough liquidity to pay its shorter maturity obligations. Return on assets (ROA) is considered as the most often used measure of profitability. It articulates the ability of banks to use their assets in order to generate more profits. The ROA ratio is calculated by dividing the net income after tax by the total assets. Concerning the measurement of credit risk, we have used the loan loss provision ratio (LLP). The LLP ratio measure the amount holds by the bank in order to cover potential default risk of gross loans. This ratio is used by banks to measure credit risk and the quality of bank’s asset. LLP ratio indicates that banks may confront more future losses. These proxies previously were used in some studies Vodava (2011), Ben Moussa and Chedia (2016), Ramlan and Adnen (2015), Trad et al. (2017).

Independent variables:

Bank specific factors:

We mention four bank specific variables as possible factors that could have an impact on liquidity risk, profitability and credit risk.

Capital to total assets ratio:

It captures the potentiality of bank to cover the loss of assets arising from inadequate financial transactions. Higher CAP ratio involves that a bank's equity represents a large portion in their balance sheet. Nouaili et al. (2015) found that in Tunisian banks, CAP ratio has a positive influence on performance. Farhan et al. (2011) and Iqbal (2012) found that CAP ratio has a positive and significant impact on the liquidity risk in conventional banks and for commercial banks in Pakistan respectively. Gila- Gourgouna and Nikolaidou (2017) analyzed the determinants of credit risk in the Spanish banking, they found that there is a positive link between credit risk and capitalization ratio.

The size of the bank:

The link between the size of the bank performance and risks has been the object of some studies. In our study, we will use the logarithm of total assets as a measure for each Islamic and Conventional bank. Chen (2018) found that bank performance has a positive and significant relationship with the size of banks of 12 advanced countries. Oehler and Almin (2010) showed that size has a positive and significant influence on liquidity risk in Islamic banks. Also, in a paper conducted by Terraza (2015), the results presented indicate that bank performance and liquidity risk depend on the size of the European banking sector. Ruslan (2019) found that bank size is proven to influence significantly the credit risk with a positive sign.

Interbank ratio:

It is a ratio that links two important items of banks' balance sheet which are loans due from banks and deposits due to banks by dividing the first by the second. When that ratio exceeds the 100 points of percentage, indicates that the bank is a "net placer" in the banking sector as a whole. By contrast, a bank is considered as a "net borrower", if the interbank ratio is less than 100 percent. Cerrato et al. (2012) have shown that the world average of interbank ratio was equal to 74.6 percent for the time period from 2000 to 2010. Dinger and Hager (2007) have found that the interbank ratio affects negatively the bank risk and this means that a higher interbank ratio implies a higher bank risk level. In a study conducted by Paloni (2015), using a sample of 83 UK banks found that the profitability depends on whether banks are net placer or net borrower.

Islamic Banking specific factors:

In this study, we have used Islamic specific factors and we have focused exclusively on assets sides, which are the types of financial activity contracts, which include partnership contracts and commercial contracts.

Macroeconomics factors:

Concerning the macroeconomic factors, we have used the two most widely recognized and utilized which are the growth rate of gross domestic product, the inflation rate.

The rate of the growth of gross domestic product:

It measures the rate at which the economy of a country is growing. It has been calculated by subtracting from the GDP of the final year, the GDP of the initial year and dividing this gap by the latter. Yuksel et al. (2018) found that there is a positive relationship between banks' profitability and economic growth in post soviet countries. Tan and Floros (2016) found an opposite outcome where GDP growth rate negatively influences the profitability of the banking sector in China. Castro (2012) studied the link between GDP growth and credit risk in a group of countries which have experienced unfavorable economic conditions. The results of this study showed that GDP growth rate negatively affects credit risk. On the other hand, Tesfaye (2012) found that GDP growth rate has a positive influence on banks' liquidity.

The inflation rate:

It is a purely economic concept referring to rising over time at a general level of goods and services on the basis of the Consumer Price Index (CPI) which is calculated by dividing a price of a basket of goods for a particular year by the price of a basket of goods in a base year. Mkandawire (2016) found that inflation is a significant variable that has a positive impact on profitability of commercial banks in Azerbaijan and Malawi respectively. Gafrej and Boujelbene (2017) found that inflation is negatively and significantly related to the liquidity of conventional banks. Ghenimi and Omri (2015) found that inflation rate has a positive and significant impact on the level of liquidity of conventional and Islamic banks in the GCC region. On the other hand, Blessing and Canicio (2015) found that credit risk is positively and significantly influenced by inflation rate in Zimbabwe.

C. MODELS SPECIFICATION

In this study, we shed light on the issue of liquidity risk management and profitability in Islamic banking and make comparison with conventional banks.

The basic equation for the models is as follows:

For Islamic banks:

$$Y_{it} = \alpha_0 + \beta_j \text{BANK} + \beta_k \text{ISLBANK} + \beta_l \text{MACRO} + \varepsilon_{i,t} \quad (1)$$

For Conventional banks:

$$Y_{it} = \alpha_0 + \beta_j \text{BANK} + \beta_l \text{MACRO} + \varepsilon_{i,t} \quad (2)$$

where Y_{it} represents the liquidity risk expressed as net loans to total assets ratio (LTA) and the bank profitability and credit risk measured by the return on assets (ROA) and the loan loss provision ratio (LLP) respectively; BANK represents a vector of specific-bank variables (CAP, SIZE and IBR), ISLBANK represents a vector of specific-Islamic bank variables (CC and PC) and MACRO represents macroeconomics variables (GDP and INF). α_0 is the constant coefficient; and β is the coefficient of all explanatory variables. All variables included in each vector are mentioned in the tables above.

Panel Threshold Regression (PTR):

We use the panel threshold model was introduced by Hansen (1999). The methodology is based on the assumption that the relation between risks and performance will be affected by a third factor in a non linear way (the financial stress index). In other words, the equation will be divided into two regimes, based on the threshold parameter. The model will take the following form:

$$Y_{it} = \mu_i + \beta_1 \text{zit} I(q_{it} \leq \gamma) + \beta_2 \text{zit} I(q_{it} > \gamma) + \varepsilon_{it} \quad (3)$$

Where i represents the individual and t represents the time period. Y is the dependent variable γ is the threshold parameter, β_1 and β_2 are the coefficients of the two regimes. zit and q_{it} are a vector of endogenous variables and the threshold variable respectively. The ε_{it} is the error term and μ_i is the bank individual effect.

The alternative way to write the PTR model is as follows:

$$Y_{it} \begin{cases} \mu_i + \beta_1 \text{xit} + \varepsilon_{it} & q_{it} \leq \gamma \\ \mu_i + \beta_2 \text{xit} + \varepsilon_{it} & q_{it} > \gamma \end{cases} \quad (4)$$

Where: the model parameters β_1 and β_2 vary at the same time over the period across individual points in a threshold condition which is the financial stress in our case.

The methodology applied by Hansen (1999) is based on a sequential manner to estimate the threshold parameter. For the first step of this process, the individual effects shall be estimated with a different way from linear models. Following this step, the last squares estimators will be used to estimate γ . Then γ estimator will be selected by the value which minimizes the sum of squared residuals (RSS). After the identification of γ estimator, OLS estimation is made to estimate the coefficient of β_1 (γ) and β_2 (γ) on the basis of two separate regimes. In order to test the null hypothesis (H_0), Hansen (1999) use an asymptotic distribution of the likelihood ratio. In our study, we consider a single-threshold regression model with two regimes:

$$Y_{it} = \mu_i + X_{it} \theta + \beta_1 \text{zit} I(\text{IMFSI}_{it} \leq \gamma) + \beta_2 \text{zit} I(\text{IMFSI}_{it} > \gamma) + \varepsilon_{it} \quad (5)$$

$$Y_{it} = \mu_i + X_{it} \theta + \beta_1 \text{zit} I(\text{FSI}_{it} \leq \gamma) + \beta_2 \text{zit} I(\text{FSI}_{it} > \gamma) + \varepsilon_{it} \quad (6)$$

Where Y_{it} is the dependent variable, X_{it} is a set of explanatory variables, FSI and IMFSI are the threshold variables (the construction of both indices was presented in our previous study (Gafrej and Boujelbene 2020)), γ is the threshold parameter. β_1 and β_2 are the coefficients of the two regimes. θ is the coefficient of independent variables. μ_i and ε_{it} are the individual effects and the error term respectively.

IV. EMPIRICAL RESULTS

A. DESCRIPTIVE STATISTICS

Table 2 provides a summary of descriptive statistics (mean, standard deviation, minimum and maximum values) for the dependent variables and the independent variables for the period from 2006-2018 with a number of observations (for each variable) equal to 455 for conventional banks and 403 for Islamic banks.

| <i>Variables</i> | <i>Observations</i> | <i>Mean</i> | <i>Standard Deviation</i> | <i>Minimum</i> | <i>Maximum</i> |
|------------------|---------------------|-------------|---------------------------|----------------|----------------|
|------------------|---------------------|-------------|---------------------------|----------------|----------------|

| <i>Panel A: Islamic Banks</i> | | | | | | |
|-------------------------------------|-----|---------|---------|---------|---------|--|
| LTA | 403 | 0.5512 | 0.1543 | 0.01595 | 0.9471 | |
| ROA | 403 | 0.01404 | 0.01834 | -0.0627 | 0.1169 | |
| LLP | 403 | 0.0390 | 0.03957 | 0 | 0.3451 | |
| CAP | 403 | 0.2025 | 0.1317 | 0.01175 | 1.9054 | |
| IBR | 403 | 5.7066 | 11.3954 | 0.0008 | 77.2785 | |
| SIZE | 403 | 9.8643 | 2.6739 | 4.5643 | 17.7418 | |
| PC | 403 | 0.0676 | 0.0993 | 0 | 0.9637 | |
| CC | 403 | 0.9259 | 0.1103 | 0.0362 | 1 | |
| GDP | 403 | 4.2042 | 4.7399 | -7.076 | 26.17 | |
| INF | 403 | 3.2641 | 3.1107 | -4.863 | 15.05 | |
| <i>Panel B : Conventional Banks</i> | | | | | | |
| LTA | 455 | 0.5989 | 0.1184 | 0.0825 | 0.9628 | |
| ROA | 455 | 0.0173 | 0.0091 | -0.0725 | 0.0514 | |
| LLP | 455 | 0.0427 | 0.0375 | 0.0019 | 0.3647 | |
| CAP | 455 | 0.1547 | 0.1155 | 0.0076 | 132.1 | |
| SIZE | 455 | 9.7950 | 1.7182 | 5.3844 | 26.17 | |
| IBR | 455 | 2.7955 | 8.3240 | 0.0438 | 15.05 | |
| GDP | 455 | 0.1570 | 0.1328 | 0.0076 | 0.9663 | |
| INF | 455 | 3.2607 | 3.2998 | -4.863 | 15.05 | |

Table 2 Descriptive analysis of banking specific and macroeconomics factors

Table 2 illustrates the descriptive analysis of the specific banks, Islamic specific banks and macroeconomic factors for Islamic banks and specific banks and macroeconomic variables for conventional banks. In addition, the table shows that the average of the LTA ratio for Islamic banks is 0.5512 and for Conventional banks is 0.5989. Next, we see that the average of profitability over the study period of Conventional banks, which is measured by ROA, is higher than that of Islamic banks, which means that Conventional banks generate profit more than Islamic banks. The reverse observation applies to the mean of capitalization ratio (CAP) calculated by dividing the total equity of a bank by the total assets. This table also shows the descriptive statistics of LLP ratio, we observe that the arithmetical average is 0.039 for Islamic banks, while is 0.0427 for Conventional Banks. Concerning, the variable used to measure the evolution of the interbank ratio (IBR), the table indicates that the mean of IBR for Conventional banks is 2.7955 and for Islamic banks is 5.7066. In addition, the arithmetic average of the size of the bank is higher in conventional banks. Finally, the average of CC and PC are 0.9259 and 0.0676 respectively.

B. STUDYING THE RELATION “LIQUIDITY RISK-PERFORMANCE AND CREDIT RISK”: COMPARING ISLAMIC AND CONVENTIONAL BANKS

This section presents the estimations of (1) and (2) equations concerning the study of the impact of banking specific factors and macroeconomic variables on the banking profitability and credit risk and liquidity risk in Islamic and Conventional banks. Also, it presents the impact of the partnership and commercial contracts of Islamic banks.

| <i>LTA</i> | <i>ROA</i> | <i>LPP</i> |
|-----------------------------------|------------|------------|
| <i>Specific Banking variables</i> | | |

| | | | |
|--|-----------------------|-----------------------|-----------------------|
| LTA | - | -0.0100 (0.151) | -0.0642 (0.000***) |
| ROA | -0.5712 (0.090*) | - | -0.4647 (0.000***) |
| LLP | -0.7009 (0.000***) | -0.1048 (0.000***) | - |
| CAP | -0.2904 (0.000***) | -0.0092 (0.213) | -0.0426 (0.006***) |
| IBR | -0.0013 (0.006***) | 0.0001 (0.015**) | -0.0003 (0.016**) |
| SIZE | 0.0170 (0.000***) | -0.0011 (0.017**) | -0.0017 (0.130) |
| <i>Macroeconomics variables</i> | | | |
| GDP | -0.0031 (0.018***) | 0.0007 (0.000***) | 0.0007 (0.073*) |
| INF | -0.0019 (0.296) | 0.0009 (0.000***) | -0.0007 (0.270) |
| <i>Islamic specific banking variables</i> | | | |
| PC | -0.1102 (0.609) | 0.0009 (0.977) | -0.0855 (0.194) |
| CC | -0.0019 (0.296) | 0.0061 (0.824) | -0.0877 (0.116) |
| *** Significant at 1 % level. ** Significant at 5 % level * Significant at 10 % level. | | | |

Table 3 The estimation results of model 1, 2 and 3 for Islamic Banks.

The results displayed in table 3 shows models estimations of Islamic banks using the net loans to total assets ratio (LTA) as a measure of liquidity risk, return on assets (ROA) and loss loans provisions (LLP) as a measure of profitability and credit risk respectively. We first observe that LTA ratio has a negative and insignificant effect on profitability. Second, we find a negative and significant relationship between our measure of liquidity risk and our capitalization ratio (CAP) and the loan loss provisions (LLP). In addition, SIZE has a significant positive influence on LTA ratio. Furthermore, it is obvious from our results that there is no significant influence of macroeconomics factors and Islamic specific variables on LTA ratio. However, the results displayed in this table show the model 2 estimations of the return on assets ratio (ROA). We observe that Size and our credit risk measure have a negative and significant effect on Islamic banks' performance. Whereas, we find that interbank ratio (IBR) and macroeconomics variables have a significant positive effect on ROA. We also find an insignificant relationship between ROA and Islamic specific contracts (PC and CC). Table 4.13 shows also the model 3 estimations of the credit risk of Islamic banks measured by LLP ratio, we find that profitability and commercial contracts exert a positive and significant influence on LLP ratio, while LTA, IBR and macroeconomics variables have a negative and significant impact on LLP ratio.

| LTA | ROA | LLP |
|-----------------------------------|-----|-----|
| <i>Specific Banking variables</i> | | |

| | | | |
|--|-----------------------|-----------------------|-----------------------|
| LTA | - | -0.0013 (0.976) | -0.0539 (0.000***) |
| ROA | -0.0524 (0.909) | - | -0.6363 (0.000***) |
| LLP | -0.3862 (0.005***) | -0.0572 (0.000***) | - |
| CAP | -0.1859 (0.000***) | 0.0110 (0.018**) | 0.1549 (0.000***) |
| SIZE | 0.0048 (0.220) | 0.0002 (0.557) | -0.0034 (0.005***) |
| IBR | 0.0005 (0.224) | 0.00005 (0.217) | -2.72e-06 (0.985) |
| <i>Macroeconomics variables</i> | | | |
| INF | -0.0012 (0.218) | -0.0002 (0.065*) | -0.0003 (0.328) |
| GDP | -0.0025 (0.001***) | 0.0005 (0.000***) | -0.0005 (0.062*) |
| *** Significant at 1 % level. ** Significant at 5 % level * Significant at 10 % level. | | | |

Table 4 The estimation results of model 1, 2 and 3 for Conventional Banks

The following table presents the regression analysis of models related to conventional banks. It presents the linear regression results using the net loans to total assets ratio (LTA), the return on assets (ROA) and the loan loss provisions (LLP) as dependent variables. According to the results, the LLP ratio and CAP contribute significantly towards liquidity risk with a negative sign. The interbank ratio (IBR) has a positive and significant impact on liquidity risk. On the macroeconomics variables side, only the gross domestic product growth rate has a significant impact on liquidity risk with a negative sign.

Table 4 presents also the determinants of profitability expressed by Return on Assets in conventional banks. The results indicate that the CAP, SIZE and the interbank ratio significantly influence the banks' performance with a positive sign. According to the table, the financial performance has a negative and significant relationship with the inflation rate (INF) and the credit risk (LLP). Moreover, GDP has a positive and significant repercussion on the performance of conventional banks. Concerning, the regression outcome of LLP ratio shows a significant and negative relationship with LTA, ROA and SIZE. On the contrary, it has a positive impact on CAP ratio. In addition, our study shows a negative and significant impact of the inflation rate (INF) and the gross domestic product (GDP) on return on the credit risk of conventional banks. In the following table, we present the summarized results derived from the GLS regressions for both types of banks, including the acceptance and rejection of each hypothesis based on the expected and the observed impact.

C. STUDYING THE IMPACT OF FINANCIAL STRESS ON THE RELATION “LIQUIDITY RISK-PERFORMANCE AND CREDIT RISK: COMPARING ISLAMIC AND CONVENTIONAL BANKS

The purpose of panel threshold regressions is to examine the relation “liquidity risk, profitability and credit risk” in a context of financial stress on the basis of levels of financial stress “low stress” and “high stress”.

| LTA | Islamic Banks | Conventional banks |
|-----|---------------|--------------------|
|-----|---------------|--------------------|

| | | | | |
|-----------------------|----------------------|----------------------|----------------------|----------------------|
| ROA | - | -0.585 (0.084*) | - | -0.143 (0.752) |
| LLP | -0.738 (0.000***) | - | -0.2211 (0.110) | - |
| CAP | -0.288 (0.000***) | -0.302 (0.000***) | -0.198 (0.000***) | -0.188 (0.000***) |
| PC | -0.132 (0.860) | -0.020 (0.079*) | - | - |
| CC | 0.022 (0.052*) | 0.020 (0.079*) | - | - |
| SIZE | 0.017 (0.000***) | 0.016 (0.000***) | 0.003 (0.422) | 0.008 (0.065*) |
| IBR | -0.008 (0.103) | -0.001 (0.012**) | 0.004 (0.242) | 0.004 (0.272) |
| INF | -0.001 (0.405) | -0.008 (0.650) | -0.002 (0.001***) | -0.001 (0.225) |
| GDP | -0.003 (0.005***) | -0.003 (0.007***) | -0.002 (0.001***) | -0.001 (0.225) |
| ROA/LLP Low stress | -0.407 (0.235) | -0.645 (0.000***) | -0.689 (0.174) | -0.240 (0.081*) |
| High stress | -3.024 (0.000***) | -1.487 (0.000***) | 0.271 (0.568) | 2.370 (0.011***) |
| Threshold estimate | 1.2556 | 0.581 | 0.198 | 1.827 |
| Numbers of banks | 31 | 31 | 35 | 35 |
| Observations | 403 | 403 | 455 | 455 |

Table 5 Threshold regression using LTA as dependent variable

The above table provides the results of panel threshold models using FSI and IMFSI as threshold variables for conventional and Islamic banks respectively. Table 10 shows that the impacts of ROA and LLP ratios on liquidity risk are not the same for the different financial stress levels. Studying the influence of ROA on LTA ratio for both types of banks, when the level of stress is high, the profitability of Islamic banks has a negative and significant impact on liquidity risk, but not vice versa. On the contrary, the impact of conventional banks' performance on liquidity risk is insignificant for high or low financial stress levels. However, studying the impact of credit risk measured by the LLP ratio on liquidity risk, we show that at any level of stress (high or low), the LLP ratio has a significant negative impact on liquidity risk except when the FSI is high for conventional banks, the impact is positive and significant. Comparing the observed outcome from the above table to the result of GLS regression, where the impact of ROA on LTA is insignificant and negative for Islamic banks and positive for conventional banks. This relation remains insignificant for both types of banks in a low financial stress, but for a high level of financial stress, the relation is significant and negative for both types of banks. The results imply that the financial stress indices provide a significant explanation of such relation. Comparing the impact of LTA on ROA in GLS regression to the impact observed in threshold regression, we show that ROA has a negative and significant impact in the all estimated models for Islamic and Conventional banks, except in a high financial stress for conventional banks, it becomes positive and significant.

| ROA | Islamic Banks | | Conventional banks | |
|-----|---------------|--------|--------------------|--------|
| LTA | - | -0.014 | - | 0.0014 |

| | | | | |
|---------------------------|----------------------|-----------------------|----------------------|-----------------------|
| | | (0.064*) | | (0.777) |
| <i>LLP</i> | -0.116 (0.000***) | - | -0.057 (0.000***) | - |
| <i>CAP</i> | -0.012 (0.124) | -0.017 (0.029**) | 0.012 (0.016**) | 0.0098 (0.051*) |
| <i>PC</i> | -0.010 (0.355) | -0.009 (0.430) | - | - |
| <i>CC</i> | 0.002 (0.211) | 0.0019 (0.276) | - | - |
| <i>SIZE</i> | -0.002 (0.001***) | -0.002 (0.000***) | 0.0001 (0.768) | -0.0005 (0.235) |
| <i>IBR</i> | -0.000 (0.290) | - 0.0001 (0.030**) | 0.0000 (0.439) | 0.0004 (0.348) |
| <i>INF</i> | -0.0006 (0.020**) | -0.000 (0.001***) | -0.0001 (0.076*) | -0.0001 (0.296) |
| <i>GDP</i> | -0.000 (0.002***) | -0.000 (0.001***) | 0.0005 (0.000***) | -0.0005 (0.000***) |
| <i>LTA/LLP</i> | -0.0143 (0.067*) | -0.348 (0.000***) | -0.001 (0.778) | -0.0539 (0.000***) |
| <i>Low stress</i> | | | | |
| <i>High stress</i> | 0.005 (0.554) | -0.116 (0.000***) | 0.010 (0.141) | -0.319 (0.000***) |
| <i>Threshold estimate</i> | 0.4673 | -0.7003 | 1.882 | 1.646 |
| <i>Numbers of banks</i> | 31 | 31 | 35 | 35 |
| <i>Observations</i> | 403 | 403 | 455 | 455 |

Table 6 Threshold regression using ROA as dependent variable

In table 6, we use panel threshold regressions to test the impact of ROA on financial risks (liquidity and credit risks). We show that in the low regime, where the financial stress is below the threshold value, LTA ratio has a negative and significant effect on Islamic banks' performance, but it has a negative and insignificant impact on the profitability of conventional banks. In the high regime, its influence becomes positive and insignificant in both types of banks. Table 4.17 shows also the results of credit risk influence on banks' performance using the financial stress indices as threshold variables. These results indicate that below the threshold value, the LLP ratio has a negative and significant impact on ROA for Islamic banks. Once the financial stress exceeds the threshold estimated value, the impact becomes positive and insignificant for conventional banks, and we show that in both regimes, the impact of an LLP and ROA is significantly negative. The only observed change from the estimation models concerning the impact of LTA on ROA is that the influence of liquidity risk on profitability becomes significant and negative for Islamic and conventional banks in a low financial stress level. While, it is insignificant for the results obtained from other estimation models. As regards the impact of the LLP on ROA, the results show a significant impact with a negative sign for each type of banks in GLS and PTR regressions. This means that credit risk has a negative and significant impact on profitability, regardless of the type of banks and the level of financial stress.

| LLP | Islamic Banks | | Conventional banks | |
|------------|----------------------|----------------------|---------------------------|-------------------|
| LTA | - | -0.067 (0.000***) | - | -0.028 (0.100) |
| ROA | -0.464 | - | -0.6485 | - |

| | | | | |
|--------------------|----------------------|----------------------|----------------------|----------------------|
| | (0.000***) | | (0.000***) | |
| CAP | -0.045 (0.004***) | -0.043 (0.006***) | 0.1729 (0.000***) | 0.172 (0.000***) |
| PC | 0.032 (0.162) | 0.024 (0.306) | - | - |
| CC | 0.014 (0.000***) | 0.014 (0.000***) | - | - |
| SIZE | -0.002 (0.104) | -0.002 (0.116) | -0.002 (0.168) | -0.002 (0.179) |
| IBR | -0.0003 (0.019**) | -0.000 (0.008***) | -0.0001 (0.915) | -0.0001 (0.924) |
| INF | -0.0006 (0.252) | -0.0006 (0.254) | -0.0001 (0.767) | -0.0001 (0.578) |
| GDP | -0.0006 (0.098*) | -0.0007 (0.064*) | -0.0001 (0.767) | -0.0002 (0.459) |
| LTA/ROA | -0.066 (0.000***) | -0.595 (0.000***) | -0.025 (0.149) | -0.480 (0.007***) |
| Low stress | | | | |
| High stress | -0.072 (0.000***) | -0.410 (0.000***) | -0.034 (0.050**) | -0.726 (0.000***) |
| Threshold estimate | -0.1531 | -0.2908 | 0.225 | 0.198 |
| Numbers of banks | 31 | 31 | 35 | 35 |
| Observations | 403 | 403 | 455 | 455 |

Table 7 Threshold regression using LLP as dependent variable

In table 7, the results of threshold regression models (LLP ratio as dependent variable) are displayed with low and high financial stress of the impact of LTA and ROA ratios on credit risk for Islamic and conventional banks. The results for low financial stress level suggest that there is negative and significant impact of ROA on LLP ratio for both Islamic and conventional banks. And in a high stress level, the same result is observed. Concerning, the results of the impact of the LTA ratio on banks' credit risk we show that there is a negative and significant impact with low and high levels, except with low stress in conventional banks where the effect is negative and insignificant. It is important to recall that the results observed from GLS regression concerning the impact of liquidity risk and profitability on credit risk is negative and significant exactly as the outcomes observed from the above table. The only exception is that in a low financial stress level, the liquidity risk of conventional banks has no significant impact on credit risk.

V. CONCLUSION

In this paper, we investigate the impact of banking specific and macroeconomic factors on profitability and financial risks (liquidity and credit risk) for both Islamic and conventional banks. And, we focus on a partnership and commercial contracts that appeared in the asset side of the Islamic banks' balance sheets. First, our findings suggest that liquidity risk measured by net loans to total assets ratio is high in conventional banks for the 7 years of the study. Then, it was higher in Islamic banks in the last few years. As regards the profitability, our results are similar to the literature; conventional banks are more profitable compared to Islamic counterparts. Concerning the credit risk, our findings suggest that conventional banks are more risky than Islamic banks. Then, we use GLS regressions, for Islamic banks, we observed that liquidity risk has a significant relationship with return on assets and capitalization ratio. This is compatible with Ghnimi and Omri (2015). In addition, the interbank ratio has significant impact on profitability and risks. Our findings support the paper of Palomi (2015), profitability was impacted significantly by capital to total assets and size with a positive sign. In line with Bashir (2003), Muda et al. (2013) and Trabalsi and Goux (2017), credit risk has a significant relationship with liquidity risk, profitability, interbank ratio and commercial contracts. For conventional banks, the study finds that interbank ratio has a significant influence on performance and liquidity risk. Furthermore, capitalization ratio has a positive and significant relationship with conventional banks' profitability and a negative and significant relationship with liquidity risk. The influence of size on credit risk is negative and significant, while, it is positive and significant on profitability. Concerning the macroeconomic variables, it is obvious that Islamic banks were less sensitive than conventional ones. These findings were found by several previous papers. Using threshold panel regressions, we estimate the relationship between banks' profitability, liquidity risk and credit risk and we provide new evidence that the financial stress indices as threshold variables could affect these relations. And effectively, we found that the relation between banks' performance and risks in some cases is varied on reversed from threshold levels. But in most cases, it maintains the same relationship. The implication of our findings is that some of specific banking factors have led to enhance or reduce

profitability and the level risks. In addition, it supports previous studies concerning the impact of macroeconomic variables on both Islamic and conventional banks. However, it serves to identify which types of contracts, used by Islamic banks have an influence on profitability and risks. In addition, it examines the relation performance risks in Islamic and conventional banks using the financial stress indices as threshold variables are considered as a key contributor of our study.

VI. REFERENCES

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AUTHORS

*Oussama Gafrej, Ph.D. student, management science-finance, Faculty of Economics and Management of Sfax, University of Sfax, Sfax, Tunisia.

**Mouna Boujelbene Abbes, assistant professor of finance, Faculty of Economics and Management of Sfax, University of Sfax, Sfax, Tunisia.

***Corresponding author: Oussama Gafrej, oussama.gafrej01@gmail.com