

The Impact of Financial Risks on Islamic Banks' Profitability

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Abstract—This paper aims to empirically study the impact of financial risks on Islamic banks' profitability. The data for this study is obtained from the annual reports of Islamic banks' worldwide derived from the Bankscope database for the period between 2004 and 2011. The methodology employed is the Generalized Least Square (GLS) panel data analysis. The dataset used in this study involves 65 full-fledge Islamic banks across the globe. Results show that credit risk and interaction between credit risk and rate of interest risk have significant negative impact on the return on assets (ROA) which is the proxy for Islamic banks' profitability. However, the other financial risks, namely liquidity risk and rate of interest risk, are found to be insignificant in affecting the profitability of the banks.

Keywords—Financial risks, Islamic banks, Profitability, Financial crisis.

I. INTRODUCTION

THE effectiveness of risk management could be tested by measuring banks' profitability whereby any financial institution has set the profitability as its essential objective to be achieved and thus "Superior risk management practices are really good for the bottom line"[1]. Apart from that, the impact of financial risks namely interest rate risk, credit risk, and liquidity risk is a vital agenda for all financial institutions.

According Bank Negara Malaysia in its report regarding capital adequacy standard for Islamic banks stated that banks financial risks need to be studied because it would help regulators such as Basel Committee and central banks to improve the regulations of banks. Indeed, facts show that banks are also exposed to a wide array of risks whereby there are stand outs and normally related to each other. To quote [2], "An increase in interest rate would trigger credit risk as it leads to an increase in the number of loan defaults, the increase in interest rate could also lead to liquidity problems." Therefore, it is vital to empirically study the impact of financial risks on Islamic banks' profitability. Hence, the management of the banks could focus on the positive effects and mitigate the negative effects. So, the wealth of the bank owners and depositors can be maximized. In addition, information about key sources of major financial risks and the

impact that the risks may have on profitability of the Islamic banks could be analysed. Last but not least, this study would contribute information to the current literature, body of knowledge and regulators.

II. LITERATURE REVIEW

A. Previous Studies

The recognition of factors that affect the success of conventional financial institutions is one of the most important topics that stir the interest of researchers in the financial field where the researchers could recognize a set of internal and external factors that have statistically significant effect in the success of conventional financial institutions. The same goes to Islamic banks. Researchers also analyzed the effect of these factors on profitability of Islamic banks. In fact from the study, researchers are able to determine some theories regarding the determinants of Islamic banks' profit [3]. These studies include [4] which seeks to obtain the determinants of Islamic banks' profitability. In their research, her team focused only on internal factors that would affect the profitability of Islamic banks in Malaysia. These factors consist of capital adequacy, credit risk, liquidity risk, size of bank, and expenses of management. The study employed the Generalized Least Square (GLS) panel data analysis. They used quarterly data between periods 2007 to 2009 for nine Islamic banks that operate in Malaysia. The team found that only bank size is significant in determining the banks' profit and other factors such as capital adequacy, credit risk, liquidity risk, and expenses management are found to be not significant. This study also suggested that Islamic banks' size is the most important aspect in describing the difference of profitability for non interest based banks in Malaysia whereby the larger bank size will generally have better accessibility to capital markets, have cheaper borrowing cost, and be able to generate greater earnings.

Meanwhile, reference [3] investigated the bank-specific determinants of Jordanian Islamic banks' profitability. The study used profit margin and return on assets (ROA) to express the profitability of banks. Moreover, the researcher employed unbalanced panel data linear regression model to determine the effect of bank-specific determinants on profitability. The determinants consist of capital adequacy, credit risk, liquidity risk, management efficiency, bank size, management expenses, non-interest earning, market

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concentration, banking-industry size, inflation, and economic growth. The result from this study is credit risk has positive impact on Islamic banks' profitability. In other words, if Islamic banks increase its exposure to credit risk, the higher is its profit. In addition, the larger book value of equity to total asset ratio, capital adequacy, and investment to total deposits ratio, management efficiency will lead to greater profit for the Jordanian Islamic banks. These findings are consistent with previous researches. However, other factors such as bank size, non-interest earning, and efficiency of management expenses did not have a significant impact on return on assets (ROA) and profit margin of Jordanian Islamic banks.

Another study, conducted by [5], evaluated the independent variables that consist of bank size, networking capital, return on equity (ROE), capital adequacy, and return on assets (ROA) on liquidity risk management (dependent variable) in conventional and Islamic banks of Pakistan. The study found that two independent variables (bank size and networking capital) have positive but insignificant relation to net assets in both type of banks.

Reference [6] studied only the internal factors that affect the profitability (return on assets) of banks in Pakistan. These internal factors include banks' assets, banks' loans, and banks' deposits. The study used panel data for period from 2004 to 2008 gathered from top 10 banks in Pakistan which consists of both Islamic and conventional banks. They found that bank size have significant negative relationship with ROA. That means larger banks will have a lower profitability perhaps due to diseconomies of scale. In fact, banks that have too large of a network and are too large in size may suffer from managerial efficiencies and bottlenecks of bureaucratic. On other hand, total loan to total asset variable have positive but is insignificant in affecting ROA. This result is similar with a study conducted by [7]. Next, they also found that banks' deposit have positive and significant impact on banks in Pakistan. It indicates banks that are tend to be more dependable on customers' deposits for funds could achieve better ROA. Overall, the study concluded that all these internal determinants of banks' profitability in Pakistan are major determinants.

A study by [2] aimed to analyse the relationship between financial risks and profitability of conventional and Islamic banks in Malaysia. They used panel data from 1996 to 2005. Meanwhile, the proxies for bank profitability in the study are return on equity (ROE), return on assets (ROA), and net interest/income margin (NIM). Whereas the independent variables are liquidity risk, credit risk, interest rate risk, interaction between credit risk and interest rate risk, off balance sheet activities, bank size, bank capital, lagged of ROA or ROE, and GDP growth. The study concluded that credit risk has significantly effect on return on asset and return on equity of the banks. They believed the outcome might be due to the more that banks are exposed to high risk loan, the higher the non performing loan and this eventually results in the decrease of conventional banks' earnings. Meanwhile, interest rate risk affects the conventional bank return on equity but this effect is weakly significant and is insignificant for

Islamic bank. Moreover, liquidity risk is not significant in affecting the return on asset and return on equity for both conventional and Islamic banks.

Reference [8] studied how bank specific, industry specific, and macroeconomic determinants effect Ukraine banks' profitability. The bank specific determinants include bank capital, credit risk, bank size, management cost, liquidity, and deposit to total assets. Macroeconomic indicators are GDP growth, inflation, exchange rate, financial crisis, and foreign ownership for industry specific determinants. The study used unbalanced panel for the period from the first quarter of 2005 to the fourth quarter of 2009. Banks that have fewer than eight quarters of available data are excluded from the sample. He employed Generalized Least Square (GLS) regression and two-step robust option of the Arellano Bond GMM estimation procedure in this study. Surprisingly, his result shows that all the determinant variables are significantly affecting the bank's profitability whereby lagged of bank profitability, bank capital, GDP, inflation, and exchange rate have positive significant impact on ROA which represents bank's profitability. However, loan provisions, credit risk, management expenses, liquidity, bank size, and foreign ownership have strong negative effect.

Reference [7] investigated the determinants of bank profitability in the South Eastern Europe Region over the period 1998 to 2002. They used random effect model (REM) for generalized least squares (GLS) estimation model since Hausman test indicates insignificant p-value. The results of this study show liquidity risk has positive but insignificant impact on return on assets (ROA) of banks while credit risk has negative and significant effect on banks' ROA. Moreover, bank capital has positive and significant affect ROA. The relationship between bank size and profitability is negative but not significant for bank profitability. However, banks owned by foreigner have positively significant impact on the South Eastern Europe Region bank performance. The macroeconomic determinants inflation shows it has positive effect and is significant in affecting ROA. Nevertheless, GDP growth rate does not seem to present any significant impact on ROA.

A similar study on the determinants of Islamic bank profitability was conducted by [9]. He used panel data in order to create more observations and to offset the existence of multicollinearity among independent variables. The study found external factors such as interest rates, market share, and bank size play major roles in influencing the profitability of Islamic banks. Moreover, the effect of liquidity, bank expenditures, and fund invested in Islamic securities, and percentage of the profit-sharing ratio between bank and borrower of funds are highly related with Islamic bank profitability.

A study conducted by [10] examined the impact of internal variables and economic environment on the performance of Islamic banks in the Middle East. Data for 14 Islamic banks in eight countries over the period 1993 to 1998 is used in this study. The study controls macroeconomic environment, financial market structure, and taxation. Results for this study

indicate that high capital-to-asset and loan-to-asset ratios lead to higher bank profitability. The results also indicate foreign owned Islamic banks are likely to be profitable. Moreover, regression results show that implicit and explicit taxes have negative effect on bank performance and profitability. Meanwhile macroeconomic conditions which are GDP and inflation have positive impact.

III. METHODOLOGY

A. Data Sources

The data is obtained from banks' annual reports derived from Bankscope database. The duration of the study is 8 years (2004-2011). Panel data set consisting of 65 full-fledge Islamic banks worldwide is employed. With regard to the macroeconomic variables, the data of GDP growth rate and inflation rate are obtained from Euromonitor International portal.

B. Model Specifications

The basic model used for this study follows previous studies such as those conducted by [7],[11], [12].

PROFITABILITY=F (RISKS, BANK, MACROECONOMIC)

The RISKS represents by credit risk, rate of return risk, and liquidity risk. Meanwhile BANK and MACROECONOMIC are the control variables that represent bank size, GDP growth rate and inflation. The specific model used in this study is stated as follows:

$$ROA_{it} = \beta_0 + \beta_1 ROA_{i,t-1} + \beta_2 CR_{it} + \beta_3 ROR_{it} + \beta_4 (CR * ROR)_{it} + \beta_5 \ln LIQ_{it} + \beta_6 \ln BSIZE_{it} + \beta_7 GDP_{it} + \beta_8 INF_{it} + \mu_{it} \quad (1)$$

Where,

ROA_{it}	= Return on Assets of bank i for year t
CR_{it}	= Credit Risk of bank i for year t
ROR_{it}	= Rate of Return Risk of bank i for year t
$\ln LIQ_{it}$	= Log of Liquidity Risk of bank i for year t
$\ln BSIZE_{it}$	= Log of Total Assets of bank i for year t
GDP_{it}	= GDP growth rate for country i for year t
INF_{it}	= Inflation rate for country i for year t
β_{it}	= Coefficient of the variables
μ_{it}	= Error term

C. Profitability

Some studies suggest that the determinants of bank profitability are operating efficiency, financial risk, and bank size. The proxy for bank profitability could be return on assets (ROA), return on equity (ROE) of banks and other financial ratios. However, references [3], [4], [6], [13],[14] used only return on asset as the proxy of banks' profitability in their studies. In addition, reference [14] said the reason of choosing return of asset over return of equity is because financing was made by Islamic banks from its deposits rather than capital. Therefore, return on assets is a better choice over return on equity. ROA can be calculated by dividing the net profit of bank over its total assets [3].

D. Financial Risks

This study focuses on credit risk, rate of return risk, and liquidity risk since they are more prominent compared to other

financial risks. In fact, these risks are related to each other. For instance, increase in interest rate risk or commonly known as rate of return risk in Islamic banks would cause increase in loan provision and have adverse affect on liquidity of the bank.

Credit Risk: Since the main business of financial institution is providing loan to customers, thus this risk exists to all financial institutions and it is one of the prominent risks that affect banks' performance [15]. Reference [4] asserts bank profitability has negative relationship with its credit risk. Or simply put, the more exposure banks are exposed to credit risk, the lesser is its profitability.

Rate of Return Risk: Reference [16] opined that rate of return risk is also known as interest rate risk since Islamic banks are not directly involved in interest. However, Islamic banks are still exposed to fluctuation in interest rates for instances the London Interbank Offering Rate (LIBOR) and the Kuala Lumpur Interbank Offering Rate (KLIBOR), even though they are prohibited to deal with interest rate. Reference [2] calculated interest rate risk by measuring the difference between rate sensitive assets minus rate sensitive liabilities over total capital of the bank. The sensitive assets and liabilities consists of floating rate loans (assets), variable rate deposits (liabilities), loans maturing within the year, marketable securities maturing within the year, money market deposits accounts. On the other hand, the non rate sensitive assets and liabilities include assets like cash, liquidity reserves, and physical assets. Meanwhile, liabilities include share holders' equity and long term loan by [17]. The results found by [2] shows that interest rate risk has significant impact on banks' profit whereby increased exposure to interest rate risk is normally associated with increased profitability of banks.

Gap = Rate sensitive assets – Rate Sensitive Liabilities

Thus, Rate of return Risk = Gap/Total Capital

Liquidity Risk: Reference [5] asserts that liquidity arises if the maturities of the two sides of balance sheet are different. This difference could be due to excessive cash or lack of cash that is needed to be financed. Moreover, reference [3] used the proxy for bank liquidity ratio as the total amount of liquid assets owned by the bank. Regarding the relationship between liquidity risk and bank profitability, [18] found in his study the proxy for bank profitability, namely Average Return on Assets, is significantly affected by liquidity risk. In fact, other study by [19] on determinants of European Banks' profitability found that liquidity risk has significantly negative effect on profitability of banks but [3] opined liquidity risk has positive relationship with bank profitability.

E. Controlled Variables

In reality, there are many significant variables such as bank size, bank capital, gross domestic product (GDP) growth, and inflation that affect banks' profitability. Since this study is focusing on financial risks only, therefore the impacts from these variables need to be controlled. So that, the effect of aforementioned risk factors could be isolated. Reference [4] used year end natural log of total bank's total assets and they

found both the variables bank size and bank profitability is positively associated. Thus, these results is supported by argument that increased in bank size could lead to small saving in its cost perhaps due to economic of scale.

Other controlled variables are GDP growth rates since the growth of banking sector have relationship with economic growth by [12]. Meanwhile, inflation also is expected to have positive impact on profitability of banks by [20]. A summary of the variables' definition, notation and the expected effect of independent variables to bank's profitability used in this study is tabulated in Table I.

TABLE I
VARIABLE DEFINITION, NOTATION AND THE EXPECTED EFFECT OF THE INDEPENDENT VARIABLES TO BANK PROFITABILITY

VARIABLE	MEASURE	NOTATION
PROFITABILITY	NET PROFIT / TOTAL ASSETS	ROA
LAGGED ROA	PREVIOUS YEAR ROA	ROA (-1)
CREDIT RISK	LOANS LOSS PROVISION/LOANS (RATE SENSITIVE ASSETS - RATE SENSITIVE LIABILITIES) / TOTAL CAPITAL	CR
RATE OF RETURN RISK	LOAN / TOTAL DEPOSIT	ROR
LIQUIDITY RISK	INTERACTION BETWEEN CREDIT RISK AND RATE OF RETURN RISK	LNLIQ
CREDIT RISK*RATE OF RETURN RISK	TOTAL ASSETS	CR*ROR
BANK SIZE	GDP GROWTH RATE	LNBSIZE
GDP GROWTH	CONSUMER PRICES INDEX	GDP
INFLATION		INF

IV. RESULT & DISCUSSION

A. Descriptive Statistics

Table II shows the descriptive statistics which summarizes the mean, variance, and standard deviation of the Return on Assets (ROA), financial risks and controlled variables namely Credit Risk (CR), Rate of Return Risk (ROR), Liquidity Risk (LIQ), Interaction between Credit Risk and Rate of Return Risk (CR*ROR), Bank Size (BSIZE), GDP Growth Rate (GDP), Inflation (INF), and Lagged Of Return on Assets (ROA (-1)). Ordinary Least Square (OLS) requires data which is normally distributed. Since the value of Jarque- Bera is

significant, this implies that the data is not normally distributed. Therefore, instead of using the OLS, the Generalized Least Squares (GLS) method is used because GLS allows not normally distributed data.

TABLE II
DESCRIPTIVE STATISTICS

Variables	Mean	Std
ROA	1.5043	6.8464
Credit Risk	16.9824	147.1068
Rate of Return Risk	2.1866	3.6797
Liquidity Risk	4.3895	2.0775
Bank Size	7.7761	1.5732
GDP	5.0637	3.5847
Inflation	7.7259	6.1196
Jarque-Bera Probability	23181.65	0.000000

Note: Std = Standard deviation

B. Correlation Matrix

Table III presents the correlation matrix for Return on Assets (ROA) and financial risks used in the study whereby Credit Risk has negative relationship with ROA. On the other hand, Rate of Return Risk and Liquidity Risk have positive correlation with ROA. The simplest and most obvious way to detect multicollinearity is to check the correlation matrix for independent variable and correlation of 0.7 and above is considered as highly correlated. Since the correlation values are less than 0.7, this implies that the multicollinearity among the variables is not high.

C. Panel Unit Root Test

To evaluate the stationarity of the variables in the model, the unit root test is applicable for unbalanced panels. Stationary means the mean, variance and autocorrelation of a variable do not change with time [8]. This study employs Fisher-type test, specifically the ADF unit root test. Indeed, probabilities for Fisher tests are computed using an asymptotic Chi-square distribution and all other tests assume asymptotic normality. Table IV shows the result for ADF Panel Unit Roots Tests which indicates that all variables are stationary except Inflation. Nevertheless, the variable becomes stationary after the first differencing is conducted.

TABLE III
CORRELATION MATRIX FOR ALL ISLAMIC BANKS

Variables	ROA	Credit Risk	Rate of Return Risk	Liquidity Risk	Bank Size	GDP	Inflation
ROA	1.0000	-0.5392	0.5902	0.1498	0.0915	0.2120	0.1374
Credit Risk		1.0000	-0.0700	-0.1419	-0.0423	-0.0294	-0.0948
Rate of Return Risk			1.0000	0.0660	0.0729	0.1059	0.0506
Liquidity Risk				1.0000	0.1782	0.0504	0.2776
Bank Size					1.0000	-0.0395	0.03551
GDP						1.0000	0.0318
Inflation							1.0000

TABLE IV
ADF PANEL UNIT ROOTS TESTS

VARIABLES	ADF-FISHER (X^2) AT LEVEL	FIRST DIFFERENT
ROA	148.920***	
CREDIT RISK	115.786***	
RATE OF RETURN RISK	87.8751**	
LIQUIDITY RISK	139.195***	
BANK SIZE	152.564***	
GDP	99.5717**	
INFLATION	70.0685	149.045***

To perform the Hausman test, it is necessary to estimate a model with random effects specification first. Table V indicates that the p-value of chi-square is less than 0.05. This means that the model is significant and thus the null hypothesis is rejected. Therefore, the fixed effect model (FEM) is used in this study.

TABLE V
HAUSMAN SPECIFICATION TEST

Chi-Square Value	Degree of Freedom	Probability	Justification
61.045093	8	0.0000***	FEM

Note, *** indicates significance at 1% levels and FEM = Fixed effect model

D. Multivariate Result

Table VI shows the value of Durbin –Watson Statistic for OLS or Non Effect Model is 1.4391. Since the value is less than 2, there is positive autocorrelation of the error terms. Therefore, the consequences of applying OLS to a model that has autocorrelation of error terms are inefficient estimation and invalid inference procedures which is same as in the presence of heteroscedasticity.

Based on Table VI, the value for adjusted R-square is 0.7623. As such, 76.23% of the total variation in the level of ROA for Islamic banks is due to the variation in Lagged ROA, Credit Risk, Rate of Return Risk, Interaction between Credit Risk and Rate of Return Risk, Liquidity Risk, Bank Size, GDP, and Inflation, while the remaining 23.77% might be caused by randomness and other variables not included in the study. Since F-statistic value is 13.2565 and is significant in supporting the validity and stability of the model, thus the fixed effect model is relevant to be employed in this study.

Out of eight independent variables, only three are significant. The result shows Lagged ROA is significant at 5% significance level and has positive effect with the dependent variable. It means that a 1% increase in Lagged ROA will cause the level of bank profitability to increase by 7.27%. However, Credit Risk and Interaction of Credit Risk and Rate of Return Risk are highly significant at 1% significance level and both have negative impact on Return on Assets (ROA).

In addition, the coefficient value for Credit Risk stood at -0.0167. It could be interpreted as a percent increase in Credit Risk will perhaps lead to a 1.67% decrease in Return on Assets (ROA) of Islamic banks. This finding is in line with previous study conducted by [4]. The reason for this result may be due to that the more Islamic banks are exposed to high

risk of financing, the more financing loss provision will be recorded. Consequently, it will cause depletion in Islamic banks' profit.

TABLE VI
MULTIVARIATE RESULT FOR ALL MODELS

VARIABLES	SPECIFICATIONS		
	NON EFFECT MODEL	FIXED EFFECT MODEL	RANDOM EFFECT MODEL
CONSTANT	-3.1530**	-4.4056	-3.4397**
ROA (-1)	0.1265***	0.0727**	0.1144***
CREDIT RISK	-0.0026	-0.0167***	-0.0047
RATE OF RETURN RISK	0.4130***	0.2279	0.3980***
LIQUIDITY RISK	0.0655	0.1523	0.0594
CREDIT RISK* RATE OF RETURN RISK	-0.2489***	-0.1512***	-0.2341
BANK SIZE	0.4272**	0.6229	0.4722
GDP	0.0531	-0.0051	0.0428
INFLATION	0.0027	0.0287	0.0078
ADJUSTED R ²	0.6587	0.7623	0.6369
F-STATISTICS	42.4950***	13.2565***	38.7094***
DW-STATISTICS	1.4391	2.141047	1.5226

Note, *** and ** indicate significance at 1% and 5% levels, respectively.

The coefficient value for interaction of credit risk and rate of return risk is -0.1523. It indicates that one percent increase in this variable will result in 15.23% decrease in profitability of Islamic banks. Thus, the effect of interaction of credit risk and rate of return risk on profitability of Islamic banks is significantly negative. This result is perhaps due to increase in rate of interest and increase in credit risk that make borrowers could not afford to repay their financing at high level rate of interest imposed by Islamic banks that later cause decrease in profitability of the banks. Next, the effect of rate of return risk is positive but insignificant. The finding concurs with [2].

Another financial risk namely liquidity risk has positive but insignificant impact on profitability of Islamic banks. Nevertheless, it is suggested that this variable cannot be regarded as absolute determinants of full-fledge Islamic banks' profitability. However, [9] found that interest rates and banks' liquidity have significant positive impact on Islamic banks' profitability. In fact, the current practice of Islamic banks which use mark-up principles in financing activities will benefit banks since increase in interest rate could lead to more income received by the banks.

For the control variables, the results suggest that the coefficient for bank size have positive but insignificant relationship with ROA. This result concurs with [4]. The effect of inflation on ROA is positive but insignificant. This finding is in line with [9]. In addition, coefficient for GDP growth also shows insignificant impact on ROA. This finding agrees with [3] which found that real GDP growth rate have negative but insignificant effect on profitability of Islamic bank in Jordanian Market.

V. CONCLUSION

The study is a modest attempt to establish the empirical evidence on the impact of financial risks on Islamic banks

profitability. Based on the results of empirical analysis, inflation rates and bank size have insignificant positive impact on the profits of Islamic banks. Moreover, the negative relationship between GDP growth rates and profitability do not seem to have significant impact. Nevertheless, for financial risks, the result of this study suggests that credit risk have highly negative significant effect on profitability. This finding serves as an indicator that the greater the exposure of banks to high risk financing, the more financing loss will be recorded. Consequently, it will cause depletion of Islamic banks' profit. This study also provides information on the impact of the interaction of credit risk and rate of return risk on banks' profitability which is significantly negative. This outcome is perhaps due to the increase in rate of interest and increase in credit risk that may result in borrowers could not afford to pay back their financing at high level rate of interest imposed by Islamic banks that later cause decrease in profitability of the banks. However, liquidity risk and rate of interest risk have positive but insignificant effect to the profitability of Islamic bank. Therefore, in general, this study concludes that financial risks do not seem to have significant impact on Islamic banks 'profitability, which is represented by ROA.

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