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## The Role of Asset-Liability Management on Financial Stability in Malaysia

Mohamad Zaim Ismail<sup>a1</sup>, Husnizam Hosin<sup>b2</sup>, Fatin Farazh Ya'acob<sup>c3</sup>, Mohd Fauzi Abu-Hussin<sup>d3</sup>, Mohd Firdaus Abdul Hamid<sup>e3</sup>, Siti Nur Attiya Shamsul Azhar<sup>f3</sup>, Aminudin Hehsan<sup>g4</sup>, Juhazren Junaidi<sup>h4</sup>, Aemy Aziz<sup>i5</sup>, Siti Nur Anisah Yaakob<sup>j</sup>, Munawar Rizki Jailani<sup>k</sup>

<sup>a1</sup>Corresponding Author, Academy of Contemporary, Universiti Teknologi MARA Cawangan Johor Kampus Segamat, Malaysia, <sup>2</sup>Faculty of Business and Management, Universiti Teknologi MARA Cawangan Johor Kampus Segamat, Malaysia, <sup>3</sup>Academy of Islamic of Civilization, Faculty of Social Sciences and Humanities, Universiti Teknologi Malaysia, Malaysia, <sup>4</sup>Centre of Research for Fiqh Science & Technology (CFIRST), Universiti Teknologi Malaysia, Malaysia, <sup>5</sup>Academy of Contemporary Islamic Studies, Universiti Teknologi MARA Cawangan Johor Kampus Segamat, Malaysia, <sup>j</sup>Transaction Monitoring & Investigation (TMI), Group Compliance, Malayan Bank Berhad, <sup>k</sup>Fakultas Ekonomi & Bisnis Islam, Institut Agama Islam Negeri (IAIN) Lhokseumawe, Indonesia  
Corresponding Author's Email: mohamadzaim@uitm.edu.my

### Abstract

Financial stability in the Malaysian Islamic banking sector is a popular issue that should be given attention by all financial service practitioners, including bank management, regulators, and policymakers. In this regard, Islamic banking institutions are stable not only in terms of their ability to be resilient, but also in their financial stability when it concerns their smooth functioning as effective intermediaries. However, to achieve the goals for stability, the Islamic banking sector often faces a mismatch between assets and liabilities, which may contribute to financial instability. Based on the above-mentioned issues and problems, the objective of this study is to describe the asset and liability management practices in Malaysian Islamic banking institutions. To achieve these objectives, the study used methods of estimation on a panel data set (a combination of time series and cross-section) which contains 211 observations from 16 Islamic banks (full-fledged Islamic banks) in Malaysia from 1997 to 2016. The model estimation results showed that the profitability of Islamic banking is influenced by various factors such as asset quality, liquidity, financing, credit risk, deposit ratio, zakat, other liabilities, and capital adequacy. The study found that the asset quality ratio variable has a positive relationship with the profitability of Islamic banking, while the total asset ratio variable has a negative relationship. The liquidity ratio variable, on the other hand, has a positive relationship with the profitability of Islamic banking. The article concludes that these findings have implications for the management of assets and liabilities in Islamic banking,

particularly in terms of maintaining high asset quality and liquidity while managing credit risk and capital adequacy.

**Keywords:** Asset-Liability Management, Islamic Banking, Financial Stability

## **Introduction**

Asset and liability management is a management system used to ensure that a banking institution is at its best and orderly. This technique was introduced to guarantee the liquidity of a bank because when liquidity is managed well, it can avoid the bank from facing the problem of low-demand deposits. In addition, the management of these assets and liabilities also aim to ensure that there are sufficient funds to meet the demand for loans. Besides that, this asset and liability management technique also aims to maintain the net interest margin and profitability of a bank. In assessing this issue in the Malaysian financial institution, this study is conducted. The discussion begins with the introduction section, followed by the research methodology section, basic models in asset-liability management, asset and liability management structure with each one discussing and displaying the results of data analysis of asset and liability management in Islamic banking institutions and financial stability in Islamic banks in Malaysia.

## **Literature Review**

### **Introduction**

Asset-liability management (ALM) is an essential aspect of global financial stability for financial institutions. Effective ALM practices allow financial institutions to manage risks related to their assets and liabilities and maintain a solid balance sheet. In recent years, there has been an increasing interest in the role of ALM in financial stability, especially in the aftermath of the 2008-2009 global financial crisis. A financial institution's stability and ongoing profitability depend on effective asset liability management, whereas deteriorating asset liability management is the most common reason for subpar financial performance and condition (Mukasinayobye & Mulyungi, 2018). As a result, banks employ ALM techniques to enhance benefits by protecting themselves from risks and minimising transaction-related losses.

A thorough understanding of a bank's assets and liabilities, customers, economic environment, and competitive environment is required for an accurate ALM evaluation. (Bidabad & Allahyarifard, 2019). Recent years have seen a proliferation of research devoted to the investigation of the internal factors that have an impact on the profitability and stability of banks (Xu et al., 2019; Alharthi, 2017; Samail et al., 2018; Rahman & Akhter, 2015).

### **Profitability**

Most studies measure a bank's ability to make money by looking at its return on assets, since the more money a bank makes, the more investors it may attract. This is in line with Kusuma (2021) that state ROA net income provides a more accurate forecast of the returns on future investments. Therefore, banks can use this method to analyse the profitability of the division as well as the efficiency of the company's financial performance. Return on assets is a useful metric for determining whether or not a financial institution is successful at converting assets into net earnings or net profit.

### **Size**

According to the findings of a study on the factors that determine the profitability of commercial banks in India that was conducted by Almaqtari (2019), bank size is a part of the determination to have a substantial positive influence on ROE. On the other hand, according to the findings of the research conducted by Rahman et al., (2020), bank size has no impact on the return on assets generated by Pakistan's banking industry. For Islamic banks, the empirical findings done by Javaid & Alalawi (2018) suggest size has a major role in determining the profitability of Islamic banks.

### **Zakat**

Disclosure of zakat is a duty for Islamic banks, according to the findings of several studies, which makes a significant contribution to the profitability of Islamic banks (Ali et al, 2023; Rusydiana & Riani, 2022; Nomran & Haron, 2022; Al-Homaidi et al., 2021; Haron, 2021). According to Oktaviani et al., (2020), zakat has a major beneficial influence on the profitability of Islamic banks in Indonesia, which indicates that the bigger the amount of zakat that has been channelled to the community, the better the profitability of Islamic banks will be. This corroborates the findings of Sulaeman et al. (2020), who discovered that the effectiveness of zakat is the key factor that determines the profitability of Islamic banks in Indonesia. It has been demonstrated here that zakat makes a major contribution to enhancing the profitability of Islamic banks.

### **Liquidity**

One of the factors that has been identified as having a significant favorable impact on ROE is the liquidity ratio (Almaqtari, 2019). This is consistent with Islamic banks as the findings of an empirical study carried out by Javaid and Alalawi (2018) reveal that liquidity is one of the primary determinants of the profitability of Islamic banks. However, according to the findings of the research carried out by Rahman et al (2020), the liquidity ratio does not have an effect on the return on assets of the banking industry in Pakistan.

### **Credit Risk**

According to the findings of the study, credit risk management has an effect on the overall performance of commercial banks. According to Serwadda (2018), the performance of banks in Uganda was shown to be negatively affected by non-performing loans, which may put the banks at risk of experiencing significant levels of illiquidity and a financial crisis. As a consequence, financial institutions ought to place a greater emphasis on credit risk management, particularly the management and oversight of non-performing loans, due to the fact that there is a negative connection between the two (Ekinici & Poyraz, 2019).

### **Deposit**

According to the findings of the research carried out by Al-Homaidi et al (2018), the ratio of deposits has a detrimental effect on the profitability of banks in India. Whereas in Germany, according to the findings, deposits have a considerable impact, both positively and significantly, on profitability (Farkasdi et al., 2021). This is in line with an Islamic bank in MENA countries, where deposits has a positive effect on bank profitability (Alzoubi, 2018).

### Asset Quality

According to Elsa et al (2018), the results demonstrated that there were disparities in the asset quality between conventional banking and Islamic banking. Conventional banking was shown to be more efficient, to have higher asset quality, and to have greater stability than sharia banking. In the case of an Indian commercial bank, it was discovered that the assets quality ratio had a large and favourable influence on the profitability of the bank (Almaqtari, 2019)

### Methodology

This study used panel data (a combination of cross-sectional data and time series) for the period of 1997–2016 for the purpose of analysing the relationship between bank specifications (asset and liability management) and the financial stability of Islamic banking in Malaysia. The analysis process is divided into the following: descriptive analysis of variables, correlation analysis of independent variable matrix, model estimation analysis, best model selection process and subsequently diagnostic testing on the study model. The analysis process in this section was carried out using the software package Econometric Views (Eviews) 7 and StataMP 13 to analyze the secondary data.

### Basic Models in Asset-Liability Management

The financial stability model of Islamic banking which incorporates these asset and liability management factors is the result of modifications made to the basic model of asset and liability management. Researchers such as (Hester and Zoellner, 1965) in their study proposed a model that suggested bank assets are always positively related to profit, while bank liabilities are negatively related to profit.

It is argued that bank institution will earn its income through various sources such as service fees and commissions from assets as well as earning income through its use on liabilities. At the same time, each asset and liability also have bank operating costs to be borne. The bank's operating expenses also include interest expenses on deposits, other liabilities as well as administrative expenses. Thus, when these operating costs are deducted from operating revenue, net income for the bank will be obtained. The changes in the operating turnover of these banking institutions have been described in the model developed by Donald D. Hester dan John F. Zoellner for a bank ( $i$ ) in a specific time ( $t$ ) that will be used in this study, the proposed model is as follows:

$$\pi_{it} = \alpha_1 + \Sigma\alpha_2A_{it} + \Sigma\alpha_3L_{it} + \varepsilon_{it} \quad (1)$$

Where,  $\pi_{it}$  is used to measure the profit ratio (Return on Assets, ROA),  $i$  refers to Islamic commercial banks in Malaysia and  $t$  refers to time. While  $\alpha_0$  represents the intercept, followed by the symbols  $\alpha_1$  and  $\alpha_2$  which refer to changes in the rate of return on assets as well as changes in costs on liabilities. Next, for  $A_{it}$  and  $L_{it}$ , it refers to the assets and liabilities of a bank. While the symbol  $\varepsilon_{it}$  is known as the error term.

At the same time, commercial banks also gradually need to increase the total profits of their business. Therefore, it is necessary to divide all the variables in equation (1) with the average amount of bank assets as in equation (2). This situation is done to avoid inefficiencies in management as well as the need to underestimate the value of the coefficients associated with heteroscedasticity.

$$\frac{\pi_{it}}{ATA_{it}} = \frac{\alpha_1}{ATA_{it}} + \frac{\Sigma\alpha_2 A_{it}}{ATA_{it}} + \frac{\Sigma\alpha_3 L_{it}}{ATA_{it}} + \varepsilon_{it} \quad (2)$$

Thus, from equation (2) it is developed and estimated as equation (3) below. The following is a modified equation model to estimate the proposed variables:

$$ROA_{it} = \alpha_1 + \alpha_2 AQ_{it} - \alpha_3 SIZE_{it} + \alpha_4 LIQ_{it} + \alpha_5 FINANCING_{it} - \alpha_6 CRISK_{it} - \beta_1 DEPOSIT_{it} + \beta_2 ZAKAT_{it} - \beta_3 OTHERLIABILITIES_{it} + \delta_1 CAR_{it} + \mu_{it} \quad (3)$$

$i = 1, 2, \dots, N$  (no. of banks)

$t = 1, 2, \dots, T$  (time)

Table 1

Variable Formula (Asset and Liability Management)

Variable	Formula
<b>ROA<sub>it</sub></b>	Return on Asset bank <i>i</i> and time <i>t</i> *. This profit ratio is obtained by dividing the total assets by the profit before tax.
<b>Assets</b>	
<b>AQ<sub>it</sub></b>	Asset Quality: This asset quality ratio is obtained by dividing gross financing by the profit equalization reserve.
<b>SIZE<sub>it</sub></b>	Bank Assets: This indicator refers to the total logged assets of the bank.
<b>LIQ<sub>it</sub></b>	Liquidity: This profit ratio is obtained by dividing the total assets by the profit before tax.
<b>FINANCING<sub>it</sub></b>	Financing: This indicator refers to the total logged financing amount of the bank.
<b>CRISK<sub>it</sub></b>	Credit Risk: This ratio is obtained by dividing the current year's non-performing financing by the total financing.
<b>Liability</b>	
<b>DEPOSIT<sub>it</sub></b>	Deposit: This indicator refers to the deposit amount divided by the amount of assets.
<b>ZAKAT<sub>it</sub></b>	Zakat: This indicator refers to the amount of zakat that needs to be paid and then logged.
<b>OTHERLIABILITIES<sub>it</sub></b>	Other liabilities. Refers to the amount of other liabilities that are logged.
<b>CAR<sub>it</sub></b>	Capital Adequacy: This ratio is obtained by dividing total assets by total capital.

#### Variable Description

Variable Name	Description
<b>ROA<sub>it</sub></b>	Profit or Return on Assets (ROA) is one of the degrees of profit. Typically, the degree of profitability is often studied in the analysis of financial reports. This is because it depicts the success of the enterprise that generates profit. ROA is able to assess the capabilities of enterprises by using past profits as a guide and measure in the future.

<b><i>AQ<sub>it</sub></i></b>	Asset quality is related to the asset portion of a bank balance sheet. In this situation, the bank management needs to pay attention to the quality of their financing as it generates income for the bank. The higher the asset quality ratio, the lower the quality of the financing.
<b><i>SIZE<sub>it</sub></i></b>	Assets can be divided into fixed assets and current assets. Fixed assets are assets that are used for the company's production purposes but are not bought or sold as merchandise. These assets are not very liquid that is, they cannot be cashed easily. Current assets are assets that can be liquidated in a short period of time such as cash, marketable securities, accounts receivable and inventory.
<b><i>LIQ<sub>it</sub></i></b>	Liquidity is the ability to convert an asset into cash easily and quickly. In fact, according to a study by the Standard of Sounds Business Practices has clarified that liquidity is the funds or a guarantee of which funds can be acquired over time.
<b><i>FINANCING<sub>it</sub></i></b>	In Islamic banking, loans can also be called as financing. Through the total assets of the bank, part of it has been contributed through financing which covers half or more of the total assets as well as two-thirds of the total income. In addition, this financing is the highest risk category of bank assets as the liquidity of these assets is the lowest of other assets.
<b><i>CRISK<sub>it</sub></i></b>	Every credit risk is a risk for loss by the bank following the failure of repayment by the debtor or other party to the bank upon the maturity.
<b><i>DEPOSIT<sub>it</sub></i></b>	Deposit is a sum of money kept (deposited) in a savings account in a financial institution and obtain profits for banks that adopt the Islamic banking system. It also refers to a sum of money as the initial payment of a trade in the commodity market or futures contract.
<b><i>ZAKAT<sub>it</sub></i></b>	Through this indicator, zakat is obligatory once it meets its specific conditions. In Islamic banking, any money deposited in savings, fixed deposit accounts, current savings, and other forms of savings in a bank or financial institution will be subjected to zakat.
<b><i>OTHERLIABILITIES<sub>it</sub></i></b>	This indicator refers to other liabilities that include other than customer deposits as well as deposits and balances of financial institutions and agents. In fact, other liabilities also include funds deposited by foreign banks, foreign bank loans to commercial banks and loans from Bank Negara Malaysia.
<b><i>CAR<sub>it</sub></i></b>	Capital is money used by a company to purchase assets for the purpose of conducting operations that are derived from the sale of securities, loans, or own savings.

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## Results and Discussion (Empirical Results of the Study)

### Data and Descriptive Analysis

In this section, the researcher did a descriptive analysis on the variable data used in this study. Several indicators are used in this descriptive analysis such as mean, median, standard deviation, skewness, peak (kurtosis), and Jarque-Bera to see if the study data sample is normally distributed or not. To determine whether the data are normally distributed or not, the skewness value is usually equal to zero, the kurtosis value is close to the value of three, the mean value equals or approaches the median value, and the Jarque-Bera value should be insignificant. If all the characteristics of these indicators are met, the estimation obtained in this study will be good, consistent and unbiased.

Table 2

*Variable Descriptive Statistics*

	Mean	Median	Std. Dev.	Skewness	Kurtosis	Jarque-Bera
<b>ROA<sub>it</sub></b>	0.0086	0.0097	0.0101	-4.9150	39.1607	7021.140*
<b>AQ<sub>it</sub></b>	-0.6848	-0.4110	2.8402	-5.0472	33.5789	5184.849*
<b>SIZE<sub>it</sub></b>	7.0336	7.1324	0.5684	-0.6200	3.0786	7.720734*
<b>LIQ<sub>it</sub></b>	0.1242	0.0982	0.1044	1.9198	7.6615	182.3663*
<b>FINANCING<sub>it</sub></b>	6.7364	6.8665	0.7447	-1.1826	4.6380	41.38803*
<b>CRISK<sub>it</sub></b>	0.0277	0.0171	0.0316	2.5261	11.6582	502.4540*
<b>DEPOSIT<sub>it</sub></b>	1.4245	1.2867	0.4570	3.2996	17.8377	1318.549*
<b>ZAKAT<sub>it</sub></b>	3.5940	3.8172	1.0353	-0.8320	2.9166	13.88146*
<b>OTHERLIABILITIES<sub>it</sub></b>	5.1154	5.0869	0.5558	-0.6026	3.3399	7.8414*
<b>CAR<sub>it</sub></b>	0.2031	0.1231	0.4652	8.9603	88.3562	38034.18*

**Notes:** Significant at the 1%\*, 5%\*\* , 10%\*\*\* level

ROA = Return on Assets (Profit), AQ = Asset Quality, SIZE = Total Bank Assets, LIQ = Liquidity, FINANCING = Financing, CRISK = Credit Risk, DEPOSIT = Deposit, ZAKAT = Zakat, OTHERLIABILITIES = Other Liabilities, CAR = Capital Adequacy Ratio.

Based on table 2, the value of **SIZE<sub>it</sub>** shows the average value of the highest distribution, that is 7.0336, followed by the financing variable **FINANCING<sub>it</sub>** with a value of 6.7364. The asset quality variable **AQ<sub>it</sub>** recorded the lowest average value of -0.6848. Meanwhile, the profit ratio variable **ROA<sub>it</sub>** recorded the second lowest average value with a value of 0.0086.

As for the median indicator, the total asset variable **SIZE<sub>it</sub>** recorded the highest median value of 7.1324. The second highest variable is the **FINANCING<sub>it</sub>** variable with a median value of 6.8665. Moreover, the lowest variable for the median indicator is the **AQ<sub>it</sub>** asset quality variable with a value of -0.4110. The second lowest variable is the **ROA<sub>it</sub>** profit ratio variable with a median value of 0.0097.

The next indicator is the standard deviation that is used to identify the variation in the data. The **AQ<sub>it</sub>** asset quality variable shows the highest standard deviation value at 2.8402. The second highest variable is zakat **ZAKAT<sub>it</sub>** with a standard deviation value of 1.0353. The

variable that recorded the lowest amount for the standard deviation indicator, is the  $ROA_{it}$  profit ratio variable with a value of 0.0101. The credit risk ratio variable  $CRISK_{it}$  recorded the second lowest amount for the standard deviation indicator with a value of 0.0316.

The next descriptive analysis is to identify skewness. With reference to table 2, all variables of  $LIQ_{it}$  liquidity ratio,  $CRISK_{it}$  credit risk ratio,  $DEPOSIT_{it}$  deposit ratio,  $CAR_{it}$  capital adequacy ratio recorded a total positive value, that is skewed to the right with values of 1.9198, 2.5261, 3.2996, 8.9603. While for the variables of  $ROA_{it}$  profit ratio,  $AQ_{it}$  asset quality ratio, total asset  $SIZE_{it}$ ,  $FINANCING_{it}$  financing ratio,  $ZAKAT_{it}$  zakat ratio and other liabilities  $OTHERLIABILITIES_{it}$  recorded a negative value which is skewed to the left.

For the kurtosis, the variables of total assets  $SIZE_{it}$ , zakat ratio  $ZAKAT_{it}$ , other liabilities  $OTHERLIABILITIES_{it}$  and  $FINANCING_{it}$  financing ratio show a horizontal distribution relative to the normal distribution as its value approaches three. The variables of  $ROA_{it}$  profit ratio,  $AQ_{it}$  asset quality,  $LIQ_{it}$  liquidity ratio,  $CRISK_{it}$  credit risk,  $DEPOSIT_{it}$  deposit ratio and  $CAR_{it}$  capital adequacy have a distribution far from the value of three, so the data are not normally distributed.

For Jarque-Bera values, the data for the entire variable showed significant values at one percent significance level. From the result, it is concluded that, the hypothesis that says the data samples used are normally distributed is rejected. Therefore, this study will use the generalized least squares estimation method to assure accurate, consistent and unbiased estimation. In analysing the proposed model, there is an option to use ordinary least squares estimation method. However, using the method could lead into poor results, bias, and inconsistencies, thus generalized least squares estimation method is more suitable for this research.

### Summary of Matrix Correlation Statistics

Correlation analysis is a simple method to detect the existence of multiple collinearity relationships in data based on a variable correlation matrix. High correlation values between the two independent variables indicate the possible existence of multiple collinearities. The purpose of correlation measurement is to identify the relationship between two variables whether it has a strong or weak positive relationship and a strong or weak negative relationship.

Referring to table 3, the results show that all bank specification variables, namely  $AQ_{it}$  asset quality ratio,  $FINANCING_{it}$  financing ratio,  $ZAKAT_{it}$  zakat ratio, and also  $CAR_{it}$  capital adequacy ratio show positive correlation value to  $ROA_{it}$  profit ratio variable. While the variables of total assets  $SIZE_{it}$ ,  $LIQ_{it}$  liquidity ratio,  $CRISK_{it}$  credit risk ratio,  $DEPOSIT_{it}$  deposits and other liabilities  $OTHERLIABILITIES_{it}$  show a negative correlation value to the  $ROA_{it}$  profit ratio variables. For the  $AQ_{it}$  asset quality ratio variable, it has a positive value with the dependent variable i.e.,  $ROA_{it}$  profit ratio with a strong positive value of 0.2506. As for the  $CRISK_{it}$  credit risk variable, it recorded a negative correlation value with the dependent variable with a strong negative value of -0.5743. For the  $AQ_{it}$  asset quality ratio variable, it has a positive value with the dependent variable, that is  $ROA_{it}$  profit ratio with a strong positive value of 0.2506. As for the  $CRISK_{it}$  credit risk variable, it recorded a negative correlation value with the dependent variable with a strong negative value of -0.5743.



Table 3  
Correlation of Dependent and Independent Variables

	$ROA_{it}$	$AQ_{it}$	$SIZE_{it}$	$LIQ_{it}$	$FINANCING_{it}$	$CRISK_{it}$	$DEPOSIT_{it}$	$ZAKAT_{it}$	$OTHERLIABILITIES_{it}$	$CAR_{it}$
$ROA_{it}$	1.0000									
$AQ_{it}$	0.2506*	1.0000								
$SIZE_{it}$	-0.0071	-0.0940	1.0000							
$LIQ_{it}$	-0.0149	-0.0104	-0.2783*	1.0000						
$FINANCING_{it}$	0.0040	-0.1047	0.9667*	-0.3341*	1.0000					
$CRISK_{it}$	-0.5743*	-0.0574	0.0312	0.2334*	-0.0376	1.0000				
$DEPOSIT_{it}$	0.2141*	-0.1358	-0.1773**	0.0209	-0.2353*	0.1325	1.0000			
$ZAKAT_{it}$	0.1766*	0.1543**	0.4816*	-0.1078	0.4473*	-0.0777	0.0260	1.0000		
$OTHERLIABILITIES_{it}$	0.1082	-0.2164*	0.6760*	-0.2680*	0.7081*	0.0607	0.0380	0.3181*	1.0000	
$CAR_{it}$	0.0125	0.0292	-0.3303*	0.1362	-0.4951*	0.2736*	0.5868*	-0.0446	-0.2750*	1.0000

Notes: Significant at the 1%\*, 5%\*\* , 10%\*\*\* level

ROA = Return on Assets (Profit), AQ = Asset Quality, SIZE = Total Bank Assets, LIQ = Liquidity, FINANCING = Financing, CRISK = Credit Risk, DEPOSIT = Deposit, ZAKAT = Zakat, OTHERLIABILITIES = Other Liabilities, CAR = Capital Adequacy Ratio.

The  $FINANCING_{it}$  financing variable and the  $CAR_{it}$  capital adequacy ratio show a weak positive correlation value to the  $ROA_{it}$  profit ratio variable.

### Model Estimation Results

The table below represents the estimation results on the financial stability model through profitability structure in Malaysian Islamic banking for the period of 1997 to 2016. The estimation results showed is focused on the management of assets and liabilities themselves.

Table 4  
 Model Estimation Results

Variable Specifications	Estimation Parameter
	Fixed Effect Model
<b>Constant</b>	0.0376 (1.61)
<b>AQ<sub>it</sub></b>	0.0005 (1.12)
<b>SIZE<sub>it</sub></b>	-0.0253 (-2.69)***
<b>LIQ<sub>it</sub></b>	0.0290 (3.19)***
<b>FINANCING<sub>it</sub></b>	0.0236 (3.49)***
<b>CRISK<sub>it</sub></b>	-0.2164 (-2.90)***
<b>DEPOSIT<sub>it</sub></b>	-0.0013 (-0.61)
<b>ZAKAT<sub>it</sub></b>	0.0005 (0.73)
<b>OTHERLIABILITIES<sub>it</sub></b>	-0.0019 (-1.01)
<b>CAR<sub>it</sub></b>	0.0142 (4.43)***
R <sup>2</sup>	0.4379
F-Test	19.80***

**Notes:** Significant at the 1%\*, 5%\*\* , 10%\*\*\* level  
 Values in parentheses are T-Statistic values

Based on table 4, the results show the value of R<sup>2</sup> is 0.4379. This explains that all the variables, namely **AQ<sub>it</sub>** asset quality variable, **SIZE<sub>it</sub>** total asset ratio, **LIQ<sub>it</sub>** liquidity, **FINANCING<sub>it</sub>** financing, **CRISK<sub>it</sub>** credit risk ratio, **DEPOSIT<sub>it</sub>** deposit ratio, **ZAKAT<sub>it</sub>** zakat, other liabilities **OTHERLIABILITIES<sub>it</sub>** and **CAR<sub>it</sub>** capital adequacy explain 43.79% of the **ROA<sub>it</sub>** profit ratio. Based on table 4 as well, the statistical F value is 19.80 (0.0000), thus rejecting the null hypothesis. These results indicate the existence of a significant relationship between the dependent variable and the independent variable. This also means that the variables of **AQ<sub>it</sub>** asset quality ratio, **SIZE<sub>it</sub>** total asset ratio, **LIQ<sub>it</sub>** liquidity, **FINANCING<sub>it</sub>** financing, **CRISK<sub>it</sub>** credit risk ratio, **DEPOSIT<sub>it</sub>** deposit ratio, **ZAKAT<sub>it</sub>** zakat, other liabilities **OTHERLIABILITIES<sub>it</sub>** and **CAR<sub>it</sub>** capital adequacy are the factors influencing the **ROA<sub>it</sub>** profit ratio. The results of the model estimation are as follows:

$$ROA_{it} = 0.0376 + 0.0005AQ_{it} - 0.0253SIZE_{it} + 0.0290LIQ_{it} + 0.0236FINANCING_{it} - 0.2164CRISK_{it} - 0.0013DEPOSIT_{it} + 0.0005 ZAKAT_{it} - 0.0019OTHERLIABILITIES_{it} + 0.0142CAR_{it} + \mu_{it}$$

i= 1,2,...N (no. of banks)

t= 1,2,...T (time)

### i. Assets

Based on the equation, one percent increase on the  $AQ_{it}$  asset quality ratio variable would result in an increase in the  $ROA_{it}$  profit ratio with a coefficient value of 0.0005 percent. This result is in line with the findings (Shaista and Hanimas, 2010) where a slight increase in the asset quality ratio does not mean that a portfolio financing is not of quality, which also affects the profits of a bank. In fact, by offering other high-return assets such as real estate financing, consumer financing, and commercial financing (Ahmed et al., 2011), it is able to provide high returns to Islamic banks. This situation also implies that each financing offer is a financing that does not provide problems and losses. However, researchers are of the opposite opinion where the improvement in the quality of assets  $AQ_{it}$  is able to increase the bank's risk rate and can contribute to default. This is due to high non-performing loans. This situation is also supported by other researchers such as (Jaffar and Manarvi, 2011).

For the next variable is  $SIZE_{it}$ . This variable indicates the existence of a negative relationship between this variable with the profitability of Islamic banking with a coefficient value of -0.0253 percent. In this regard, Islamic banking profits are seen to decline even though total assets show a significant increase. This finding is in line with the findings of the study (San and Heng, 2013) in which these researchers explained that each increase in the number of assets does not reflect as a whole on the part of the assets. In fact, a decline in profits can occur for a bank due to instability in the asset division with low liquid assets as well as high amounts of financing and advances which also contributes to the increase in bad debts. However, the researcher also thinks otherwise where the increase in  $SIZE_{it}$  is able to contribute to the increase in bank profits. This can be illustrated when a large bank size is able to offer a variety of services at a lower cost. This situation is also able to attract people to apply for funding and so on (Pasiouras and Kosmidou, 2007).

The  $LIQ_{it}$  liquidity ratio variable has a coefficient value as high as 0.0290 percent, which indicates that there is a positive relationship between this variable and Islamic banking profits. These findings are in line with studies conducted by researchers such as (Molyneux and Thornton, 1992) where these researchers explained that in the long run for banking institutions, high liquidity can be developed by becoming additional capital and liabilities. In fact, this situation can be used to obtain assets and with this method, Islamic banking institutions are able to profit from these assets. However, it is the opposite for the researcher where excessive liquidity holdings by Islamic banking can provide low returns to the banking institution. This situation is in line with the findings by (Iqbal, 2012) that suggested the high non liquid assets can affect capital depreciation because large liquid assets not only provide no high returns to banks for the long term but also erode the capital.

The next variable which is  $FINANCING_{it}$  financing has a coefficient value as high as 0.0236 percent and this indicates a positive relationship between this variable and the  $ROA_{it}$  profit ratio. This situation also illustrates that an increase in the amount of financing can contribute to the profits of a bank. Typically, every operation carried out by a banking institution is profit-motivated and the same is true in Islamic banking institutions where every profit earned is partly contributed through financing activities. Thus, this is also in line with the findings conducted by (Zakaria and Ismail, 2008) where these researchers concluded that each financing offered to customers has a high return that can provide profit integrity to a bank. The researcher also agreed with the findings found by Roza Hazli Zakaria and Abdul Ghafar

Ismail, but as an improvement in this study, the researcher is of the opinion that each financing offered should be accompanied by information related to risk and also measures to overcome it by conducting regular analysis with effective management. This situation is also able to maintain high returns to Islamic banking institutions.

In addition, this  $CRISK_{it}$  ratio variable shows that there is a negative and significant relationship between this variable and Islamic banking profit with a coefficient value of -0.2164 percent. These findings are in line with a study conducted by (Naceur and Omran, 2011) where these researchers explained that any increase in this credit risk ratio is able to influence the profitability of Islamic banking through the diversity of financing and investments offered. In fact, as the results of the study conducted by this researcher, the increase in credit risk indicates more financing activities that are vulnerable to repayment insolvency from the customers. Thus, this situation is also able to provide a reduction to the total income of the bank. In addition, the researchers are also in line with previous findings stating that an increase in credit risk is able to reduce the level of bank turnover. In fact, the situation of increased credit risk is sometimes not due to the management of the banking institution itself to cause a decrease in revenue but the increase in risk is due to a series of global financial crises that occur. This situation is also in line with the findings (Banu and Amira, 2014) which stated that credit risk in banking institutions can soar when the financial crisis occurs to affect the level of turnover of banking institutions.

## ii. Liability

The next variable is  $DEPOSIT_{it}$ . This variable indicates the existence of a negative relationship between this variable with the profitability of Islamic banking with a coefficient value of -0.0013 percent. This result is in line with the results of the study done by (Muhammad et al., 2012) that found that cash earned and kept for a long period without using it can affect the declining in profits due to dumping of liquid assets in such banking institutions. However, researchers also argue the opposite where the increase in liquidity funds obtained from depositors can contribute to the increase in bank profits. This argument is in line with the findings by (Noraini et al., 2017). They argued that deposit proceeds will usually be used to make investments in the capital market such as buying sukuk and shares and offering more long-term financing compared to short-term financing to customers because these long-term financing is typically more profitable.

The next variable is zakat variable,  $ZAKAT_{it}$ . This variable shows a positive relationship between this variable with Islamic banking profits with a coefficient value of 0.0005 percent. For the researcher, this situation also illustrates that each high zakat payment has reflected that the profits earned by Islamic banking institutions are also high. In fact, with this practice of zakat implemented, it is also able to give blessings to the banking institution.

The next variable is the other liabilities variable,  $OTHERLIABILITIES_{it}$  where this variable is negatively related to the profit of  $ROA_{it}$  with a coefficient value of -0.0019 percent. In this situation, the researcher believes that any increase in the variables of other liabilities  $OTHERLIABILITIES_{it}$  is capable of lowering the profits of Islamic banking. This can be explained when Islamic banking institutions have to pay all other accrued payments to the detriment of the profitability of Islamic banking itself.

For the next variable, the capital adequacy variable,  $CAR_{it}$ , a one percent increase in  $CAR_{it}$  capital adequacy will result in an increase in the  $ROA_{it}$  profit ratio of 0.0142 percent. As suggested by (Yee Loon Mun and Hassanudin, 2017), the increase in Islamic banking capital occurs due to fund lending by banks through the conversion of their assets into capital to be able to provide high returns to Islamic banking institutions by doing investment activities and so on. According to them, although the increase in capital is seen to be able to protect depositors and creditors, capitalization in Islamic banking is also able to absorb unexpected losses. This circumstance could increase the profitability of a banking institution and maintain the financial stability of a banking institution for a long period of time. In addition, other researchers argue that higher capital tends to have lower liquidity risk as a research by (Doriana Cucinelli, 2013). She concluded that low liquidity risk is able to contribute to increased bank profits.

### Best Model Determination Decision

Table 5 is the results of specification and diagnostic tests for the purpose of selecting the best model from the three models presented in this study. Thus, the results obtained from the analysis performed are as follows

Table 5

#### *Specification and Diagnostic Tests*

Type Of Test	Statistics	Stat	P-value
Lagrange Multiplier Test (no effects model vs. random effects model)	$\chi^2$	0.33	0.2842
Chow Test (no effects model vs. fixed effects model)	F	2.19	0.0000
Hausman Test (random effects model vs. fixed effects model)	$\chi^2$	30.84	0.0036

### Lagrange Multiplier Breusch Pagan Test

The results for Lagrange Multiplier (LM) test show the value of LM Chi-Square is 0.33 and this value is found to be significant because it does not exceed the critical value. This significance mean that the no effects model is accepted whereas the random effects model is rejected. The results of the study also found that the statistical probability value of F (0.2842) was greater than alpha, leading to failure to reject Ho. This also illustrates that the no effects model is better than the random effects model.

### Chow Test

In addition, the Chow test was also conducted where the F ratio showed a value of 2.19 which is greater than the critical value (1.97) or the statistical probability value of F (0.0000) was smaller than alpha leading to rejection of the null hypothesis. Therefore, the test conclusion is that the fixed effects model is appropriate for this study, while the no effects model is not suitable for this study.

### Hausman Test

Furthermore, the results of the Hausman test show that the Wald statistical value obtained through  $\chi^2$  is 30.84 and this value also exceeds the critical value, or the statistical probability value of F (0.0036) is smaller than alpha leading to rejection of  $H_0$ . Thus, the null hypothesis that the random effects model estimation is better than the fixed effects is rejected.

### Diagnostic Tests on Models

To ensure that the model formed in this study does not have multicollinearity problems, the diagnostic test VIF (Variance Inflation Factor) is performed. The results of the test showed that the value of VIF (9.91) obtained is less than 10 leading to failure to reject the null hypothesis. Thus, it can be concluded here that the data between independent variables have no multicollinearity problem. As for the problem of heteroskedasticity and autocorrelation, this problem has been solved through the method used by (Daniel Hoechle, 2007) that is the Robust Standard Errors.

### Conclusion

Based on the above discussions and analysis, it is clear that the assets and liabilities management of a bank may have a positive or negative impact on the financial stability of Islamic banking, in fact, this circumstance also affects the Malaysian economic landscape. In this regard, regardless of whether the management of assets and liabilities is based on Islamic or conventional, these two are the core things in ensuring the smooth running of a banking institution. This research concludes that, banking institutions that practice efficient asset and liability management are not only able to manage risk well, but they are also able to maintain stability despite facing a series of financial crises.

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### Competing Interests

The authors declare that they have no competing interests.

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