CHAPTER FIVE

RESULTS AND DISCUSSION

5.1 Introduction

This chapter provides some details about the results in reference to the research objectives. It includes the analysis of the strength of the relationship between tests determinants of the Malaysian Islamic banks' profitability. This chapter also analyses the strength of the relationship between tests determinants and banks' efficiency for banks under consideration.

This chapter is divided into four main sections according to the objectives of the research:

Section 5.2 presents the estimated results of the determinants of banks' profitability using the ROA as the dependent variable for all samples of study. The tests are undertaken across the banks under consideration using both pooled and panel models. Three estimation methods are used to find which estimation method is more appropriate in terms of the compliance with the theory and the results of the statistical tests.

Section 5.3 presents the estimated results of the determinants of banks' profitability using the ROE as the dependent variable for all samples of the study. Also, three estimation methods (Pooled Ordinary Least Squares, Fixed Effects Model and Random Effects Model) are used.

Section 5.4 presents the results of the determinants of bank profitability according to the types of banks (domestic Islamic banks, foreign Islamic banks) using a panel model. This section aims to identify the source of differences in the determinants of profitability between domestic Islamic banks and foreign Islamic banks in Malaysia.

Section 5.5 presents the results of the determinants of banks' efficiency for all Islamic banks in this study using both the panel data and Tobit regression model. The purpose

of this section is to investigate whether or not banks' efficiency in the Islamic banking industry in Malaysia is determined by a set of profitability variables.

Before running the panel data regression, this chapter starts with the descriptive statistics of the variables.

5.1.1 Descriptive statistics

Descriptive statistics have been widely used in academic studies. Descriptive statistics can be defined as a set of brief descriptive coefficients that summarizes a given data set, such as, mean, median, standard deviation, skewness, kurtosis, which can either be a representation of the entire population. The descriptive statistics can be used to describe the sample data on a single variable in an organized form. In this study, the internal and external factors on bank profitability are analysed by the use of the descriptive statistics. Table (5.1) provides the abbreviation of the variables used in the regression analyses.

Table 5.1: The abbreviation of the dependent and independent variables (as determinants of banks' profitability)

		Variables	Abbreviation
Dependent Variables		Return on Asset	ROA
		Return on Equity	ROE
Independent Variables	Internal Variables (Bank-specific)	Capital and Reserves to Total Assets	CRTA
		Overhead to Total Assets	OHTA
		Loans (Financing) to Total Assets	LOTA
		Deposits to Total Assets	DTA
		Liquidity to Total Assets	LATA
		Technical Efficiency	TE
	Macroeconomic Variables	Annual Inflation rate	INF
		Gross Domestic Product Growth Rate	GDPGR
		Gross Domestic Product Per Capita	GDPPC

	Structural Variables	Bank Size	LOGTA
		Concentration Ratio	CONC
		Bank Age	LOGAGE
	Dummy Variables	The Effect of Global Financial Crisis	GFC
		The Differences between Domestic and Foreign Islamic Banks	DDF

Table (5.2) reports the descriptive statistics of the variables used in the regression analyses. Key figures, including mean, median, standard deviation, skewness and kurtosis value are reported.

Table 5. 2: The mean, median, standard deviation, Skewness and Kurtosis for Islamic banks in Malaysia from q_1 2007 to q_4 2010

Variables	Mean	Median	Std. Dev.	Skewness	Kurtosis	Obs
ROA	0.001707	0.001876	0.001999	-1.573363	4.039071	236
ROE	0.024517	0.023824	0.022373	-0.306947	3.375856	236
CRTA	0.087952	0.079075	0.035694	0.937556	3.215483	236
OHTA	0.003785	0.003750	0.001497	0.292807	2.679337	236
LOTA	0.540883	0.562352	0.164480	-0.507790	2.614710	236
DTA	0.860544	0.867494	0.048727	-0.656494	2.821825	236
LATA	0.306671	0.279228	0.144072	0.887413	3.348544	236
TE	0.812399	0.838336	0.167472	-0.827787	3.023207	236
INF	0.023525	0.018000	0.026489	0.673474	3.373873	236
GDPGR	0.038517	0.053000	0.046917	-0.824365	2.581568	236
GDPPC	0.025157	0.040000	0.046216	-0.830581	2.585306	236
LOGTA	9.048827	8.996098	0.817759	-0.373902	3.518467	236
CONC	0.188424	0.179504	0.023957	0.168179	4.186970	236
AGE	4.873941	3.000000	5.987154	2.828595	10.12174	236
LOGAGE	1.176847	1.098612	0.828419	0.622980	3.867530	236

Table (5. 2) offers to establish several conclusions. First of all, all variables comprise 236 observations. Second of all, with respect to dependent variables, on average, the Malaysian Islamic banks have an ROA of 0.17% over the entire period from $q_1$2007 to $q_4$2010. The difference between mean and median is found. This may mean that there is a difference in the profitability among the banks. For the second profitability measure, or the ROE, this amounts to 2.45% on average. Also, the small difference

between the mean and median for the ROE is found. This may indicates that there are differences in the profitability among the banks in our sample.

One of the main purposes of performing a descriptive analysis is to ensure the normal distribution of all the variables used in the analysis. When this assumption is violated, the interpretation and inference may not be reliable or valid. There are many measures that can be applied to check if the variable follows a normal distribution or not. This study employs skewness and kurtosis to test whether or not the independent variables and the dependent variable follow a normal distribution. Table (5.2) shows that the value of skewness and kurtosis is calculated for all variables. The variable bank age (AGE) is not normally distributed. Transforming non-normal distribution data into a normal distribution is performed in a number of different ways, but a common technique is to take the log of the data (Adam and Mark, 2013). It is possible to log transformation for the variables which are not a normal distribution in order to overcome the violations of the assumptions of the regression model (Berenson *et al*., 2012). Thus, the study has resorted to log transformation for the bank age variable. As shown in the table above, the values of skewness for the variables included in the Table are from -1.57 to 0.93, whereas the values of kurtosis for the variables included in the table are from 1.71 to 4.18. It can be concluded that the data are normally distributed, or are closer to a significantly normal distribution. Thus, the possibility of drawing on the results of the regression model is allowed.

In order to check that the regression assumptions are met to ensure the research data are sufficient to run the regression, the stationary test is used.

5.1.2 Testing for stationary

Recent econometrics literature has proposed a number of methods to test the existence of a unit root under panel data setting (Dhamija, 2010). To evaluate the stationarity of the variables in this study, the Im, Pesaran & Shin test has been chosen to perform the panel data unit root test due to the fact that the majority of the unit root tests assume that you have a balanced panel data, but this test allows for unbalanced panels (Im, Pesaran & Shin, 2003). The test is implemented on level differences (with intercept and intercept & trend).

Table 5.3: The panel unit-root test

Variables	Im, Pesaran & Shin test for panel unit-root test (Results of test on the level)	
	Intercept	**Intercept & trend**
ROA	-10.0*	-6.0*
ROE	-10.6*	-6.2*
CRTA	-9.4*	-11.0*
OHTA	-9.1*	-5.6*
LOTA	-13.5*	-10.0*
DTA	-14.5*	-12.4*
LATA	-12.3*	-8.9*
TE	-11.9*	-9.2*
INF	-17.0*	-11.3*
GDPGR	-34.3*	-26.8*
GDPPC	-5.5*	-3.9*
LOGTA	-10.0*	-22.4*
CONC	-12.8*	-44.5*
LOGAGE	-9.8*	-40.9*

* Denotes the rejection of the hypothesis whereby a panel of variables have a unit root at 1% level of significance (all panel variables are integrated at 1% level of significance).

Table (5.3) shows the results of the panel unit-root test. The findings show that all panel variables are integrated at 1% level of significance. Therefore, it can be concluded in the null hypothesis that panel variables have a unit root that is rejected and all the variables are stationary at 1% level of significance. When panel variables do not have a unit root, they are stationary and therefore, are integrated. Integration means a rejection of the null hypothesis that panel variables have a unit root. The results prove that all the variables are efficient and appropriate in measuring Islamic banks' profitability in Malaysia over the study period.

5.2 Findings of the Determinants of Islamic Bank's Profitability Using the ROA as the Dependent Variable

In order to test the determinants of bank's profitability, there are several ratios that are used to measure the profitability of banks. The two most often used are the rates of return on assets (ROA) and the rates of return on equity (ROE) (Iqbal and Molyneux, 2005). Two measures are used as dependent variables to analyze the profitability of Islamic banks in this study. A set of independent variables are used here as determinants of bank's profitability: 1) Internal variables of the bank: Capital ratio and reserves (CRTA), overhead ratio (OHTA), loans ratio (LOTA), deposits ratio (DTA), liquidity ratio (LATA) and technical efficiency (TE) of the bank. 2) Macroeconomic variables: The annual inflation rate (INF), gross domestic product growth rate (GDPGR), gross domestic product per capita (GDPPC). 3) Structural variables: The bank size (LOGTA), bank age (LOGAGE) and concentration ratio (CONC). 4) The dummy variables: two dummy variables are included to account, (DDF) for the type of differences between the banks (domestic and foreign) that may affect the determinants of Islamic banks' profitability, and the variable (GFC) to determine the effect of the global financial crisis on the profitability of Islamic banks in Malaysia.

According to the methodology of this study, the determinants of Islamic banks' profitability are tested by using two models are as in the following:

Model (1):

$$ROA_{it} = \alpha_{0+} \beta_1 OHTA + \beta_2 LOTA + \beta_3 DTA + \beta_4 GDPGR + \beta_5 GDPPC + \beta_6 CONC + \beta_7 DDF + \varepsilon_{it}$$

Model (2):

$$ROA_{it} = \alpha_{0+} \beta_1 CRTA + \beta_2 LATA + \beta_3 TE + \beta_4 INF + \beta_5 LOGTA + \beta_6 LOGAGE + B_7 GFC + \varepsilon_{it}$$

5.2.1 Testing by model (1)

This part of study tests the determinants of bank's profitability for all Islamic banks in Malaysia using return on assets (ROA) as the dependent variable. The hypotheses of this study are tested using multiple regressions in the panel data analyses for

seventeen Islamic banks during the period of q_1 2007- q_4 2010 (quarterly data). The number of observations is 236. The model of banks' profitability determinants is as follows:

Model (1):

$$ROA_{it} = \alpha_{0} + \beta_1 OHTA + \beta_2 LOTA + \beta_3 DTA + \beta_4 GDPGR + \beta_5 GDPPC + \beta_6 CONC + \beta_7 DDF + \varepsilon_{it}$$

5.2.1.1 Testing for linearity

One of the important assumptions of the regression model postulates that the relationship between the dependent and independent variables should be linear. Gretl econometric software is used to evaluate linearity. The linearity plots for residuals and independent variable are shown in the Appendix (G). From these figures, it can be concluded that the linear model is appropriate for the data of the model (1).

5. 2.1.2 Testing for multicollinearity problem

To investigate whether there is a multicollinearity problem in the model, this study uses the variance inflation factor (VIF) for all independent variables based on the panel OLS regression. The VIF measures the impact of collinearity among the variables in a regression model (Gujarati, 2003). Table (5.4) presents the variance inflation factor (VIF) between the independent variables in the model (1) to test the multi-collinearity problem.

Table 5.4: The variance inflation factor (VIF), model (1)

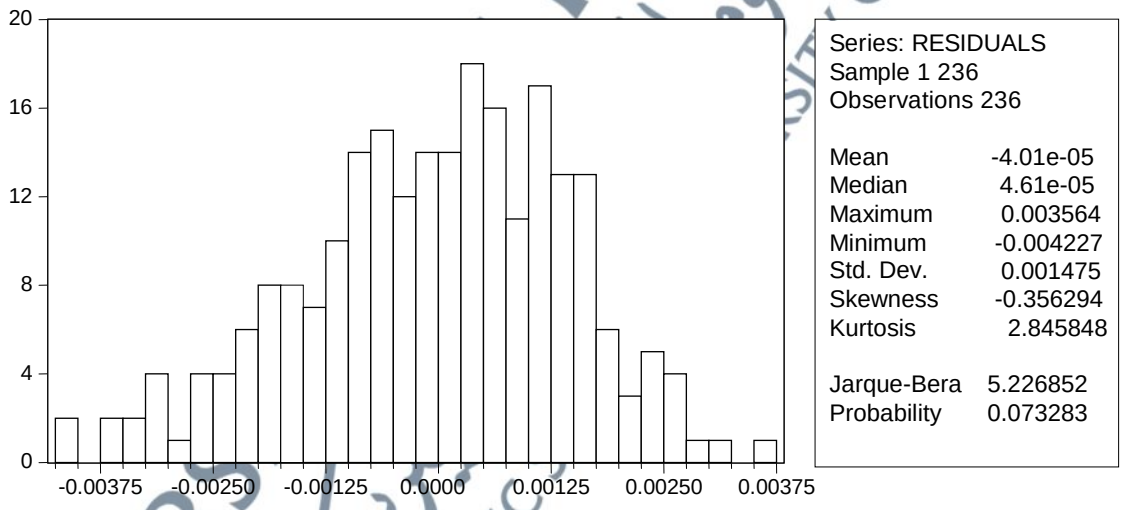
Variables	Centered VIF
OHTA	1.306748
LOTA	1.181971
DTA	1.563521
GDPGR	1.833233
GDPPC	2.113169
CONC	1.702562
DDF	1.808516

The result above the variance inflation factors (VIF) for the variables included in the model is between (1.18 and 2.11). This indicates that no multicollinearity problems in the model, because all VIF values are less than 10 (Gujarati, 2003). Thus, it can be concluded that there is no multicollinearity problem between the independent variables.

5.2.1.3 Testing for normality of residual

One of the regression assumptions is that the residuals are normally distributed. The violation of this assumption leads to the inferential statistics of a regression model (T-statistics, F-statistics, etc.) not being valid (Asteriou and Hall, 2007). In order to ensure that the assumption of normality is fully satisfied, Jarque–Bera (JB) test of normality is used to test the residuals normally.

Figure 5.1: The probability distribution of the residuals and the results of the Jarque–Bera test using model (1) with the ROA



As the Figure (5.1) shows, the residuals seem to be symmetrically distributed. The application of the Jarque–Bera test shows that the JB statistics is about 5.22 and the probability of obtaining such a statistics under the normality assumption is about 0.073. Therefore, the hypothesis is not rejected, that the error terms are normally distributed.

According to the results of the stationary test, multicollinearity, linearity test and normality of residual, it can be concluded that the multiple regression analysis can be used to interpret the dependent variable in the model (1).

5.2.1.4 Testing for appropriate model

Pooled Ordinary Least Squares (POLS), Fixed Effects Models (FEM), and Random Effects Models (REM) are types of panel analytic models. To identify the right estimator for the model, various tests have been performed using E-Views software and Gretl econometric software. Table (5.5) below displays three estimation methods in the panel data statistics: the pooled ordinary least squares, the fixed effects, and the random effects method.

Table 5.5: Results of Pooled Ordinary Least Squares, Fixed Effects Model and Random Effects Model using model (1) and the ROA as the dependent variable

Independent Variables	***POLS***	***FEM***	***REM***
C	-0.011987***	-0.011778***	-0.012863***
	(0.0041)	(0.0052)	(0.0010)
OHTA	0.240730***	0.402381***	0.317098***
	(0.0027)	(0.0001)	(0.0003)
LOTA	0.004052***	0.002690**	0.003658***
	(0.0000)	(0.0126)	(0.0000)
DTA	0.008492***	0.009446***	0.009641***
	(0.0016)	(0.0098)	(0.0016)
GDPGR	-0.001313	-0.001073	-0.001082
	(0.6616)	(0.6806)	(0.6774)
GDPPC	0.000341	0.000538	0.000423
	(0.6685)	(0.4397)	(0.5407)
CONC	0.003256	0.001223	0.000215
	(0.4083)	(0.7300)	(0.9510)
DDF	0.001818***	0.001766***	0.001737***
	(0.0000)	(0.0000)	(0.0001)
R^2	0.385071	0.570625	0.254123
F	20.39638***	12.86680***	11.09723***
	(0.0000)	(0.0000)	(0.0000)
DW	1.552864	2.151026	1.931185
N	236	236	236

Numbers in brackets below the coefficient are the probability levels of significance. *, ** and *** indicate significance levels of 10, 5, 1 percent respectively.

To identify which model is appropriate, the pooled model or the panel random effect model, The Breusch-Pagan Lagrange multiplier test is used. It is difficult to choose between the pooled model and the panel random effect model depending on the relationships between the coefficient signs of the variables and their expected signs only. Therefore, The Breusch-Pagan Lagrange multiplier test is used. The Breusch-Pagan Lagrange multiplier test is designed to test random effects depending on the value of the chi-squared. If the null hypothesis is not rejected, the pooled regression model is appropriate.

Table 5.6: The result of Breusch Pagan Lagrangian multiplier test using model (1) and the ROA as the dependent variable

Chi- chi-square (1)	Prob>chi2
69.304	0.0000

With the high chi-squared statistics, we rejected the null hypothesis in favour of the panel random effect model. Therefore, the Lagrange multiplier test results favour the panel over the pooled OLS estimation model (the panel random effect regression model is appropriate).

To choose between the pooled ordinary least squares and the panel fixed effect model, the joint significance test is used. A low probability counts against the null hypothesis that the pooled OLS model is adequate, in favour of the fixed effects alternative. If the null hypothesis is rejected, the fixed effect regression model is appropriate.

Table 5.7: The result of the joint significance test using model (1) and the ROA as the dependent variable

F-statistic	d.f.	Prob.
5.75297	(16, 213)	0.0000

Depending on the results of the joint significance test using sums-of-squares (F-test), we rejected the null hypothesis in favour of the fixed effect model. Therefore, joint significance results favour the fixed effect model over the pooled OLS model (the fixed effect regression model is appropriate).

To determine the use of the fixed effect model or the random effect model, the Hausman test is used by calculating the p-value (Prob>chi2). The null hypothesis is that individual effects are not correlated with the other regressors in the model. If the value of the Hausman Chi-square statistics is high (that mean, low probability) we favour the fixed effects model and if the value of the Hausman Chi-square statistics is low (that mean, high probability) we favour the random effects model. In other words, the probability for the test is less than 5%, indicating that the random effects model is not appropriate and that the fixed effect specification is to be preferred.

The following results are observed, with the panel that reports the Hausman test results shown in the following Table:

Table 5.8: The result of the Hausman test using model (1) and the ROA as the dependent variable

Chi-Sq. Statistic	Prob>chi2
10.133659	0.1191

The result of the Hausman test statistics in the Table suggests that the random effects model is the appropriate panel data estimator for ROA model (1).

Based on the results of Breusch Pagan Lagrangian multiplier test shown in Table (5.6), the joint significance test shown in Table (5.7) and the Hausman test shown in Table (5.8), it can be concluded that the random effect model is expected, therefore, the random effect model is appropriate.

5.2.1.5 Testing for present of autocorrelation

The Durbin Watson (DW) test is widely used to detect the existence autocorrelation problem. The DW test is the most frequently used statistical test for the presence of the serial correlation, therefore, this test is to be conducted in this study to detect the presence of the autocorrelation problem in the regression model.

The estimation of the random effect model provides the DW test statistics in Table (5.10), therefore, it can be seen that the Durbin-Watson statistics 1.93 is located

between d_u and 4-d_u value (zone of no autocorrelation). This result indicates that there is no evidence of the presence of the first order serial correlation in the model.

5.2.1.6 Testing for the presence of heteroscedasticity problem

There are several heteroscedasticity diagnostic tests, with the White heteroskedasticity test being one of the most widely used. The white test is to be used in this study to detect the presence of heteroskedasticity.

Table 5.9: The results of White heteroskedasticity using model (1) and the ROA as the dependent variable

F-statistic	Prob. F-statistic	Chi-Sq- Statistic	Prob>chi2
5.498018	0.0000	113.7210	0.0000

Applying White's heteroscedasticity test, we find the evidence of heteroscedasticity. Based on the results of the heteroskedasticity White test, the F-statistic is 5.49801 (P-value: 0.0000) and Chi-square statistics is 113.7210 (P-value: 0.0000). Therefore, the null hypothesis of no heterogeneity is rejected for the model. The results find the evidence of heteroscedasticity in the model. The problem of heteroscedasticity is corrected using the White procedure automatically, offered in the E-Views software to solve this problem (Tahir, 1999). The White cross-section option which corrects for heteroscedasticity and the general correlation of observations within a cross-section is implemented to eliminate the problem of residuals' heteroscedasticity.

Table 5.10: Results of the random effect model using model (1) and the ROA as the dependent variable

Independent Variables	***REM***
C	-0.012863*** (0.0023)
OHTA	0.317098** (0.0118)
LOTA	0.003658*** (0.0003)
DTA	0.009641*** (0.0091)
GDPGR	-0.001082 (0.5797)
GDPPC	0.000423 (0.4061)
CONC	0.000215 (0.9321)
DDF	0.001737*** (0.0000)
R^2	0.254123
F	11.09723*** (0.0000)
DW	1.931185
N	236

The heteroskedasticity–corrected. Numbers in brackets below the coefficient are the probability levels of significance. *, ** and *** indicate significance levels of 10, 5, 1 percent respectively.

5.2.1.7 Explaining the results

Table (5.10) above includes the results of the determinants of Islamic bank profitability (after correcting the heteroscedasticity problem) using return on assets (ROA) as the dependent variable. The variables which have been tested as determinants of banks' profitability are overhead-to-total assets (OHTA), Loans to total assets (LOTA), Deposits to total assets (DTA), Gross domestic product growth rate (GDPGR), Gross domestic product per capita (GDPPC), Concentration ratio (CONC) and differences between domestic and Foreign Islamic banks (DDF).

The first bank characteristics variable, namely the overhead-to-total assets (OHTA) has a positive and statistically significant impact on return on assets. The result

suggests that high profits earned by Islamic banks may be appropriated in terms of higher overhead (wages and salaries) which is in line with the Expense-Preference behavior theory. The theory proposes that the main goal which managers pursue is to maximize not profit but their own utility or the utility of the bank, which is usually achieved via increasing salaries or other staff expenses. This result is also consistent with the findings of some other related studies, for example: Naceur (2003), Haron (2004), Al Manaseer (2007), Bennaceur and Goaied (2008).

Loans-to total-assets (LOTA) have the expected positive effect on banks' return on assets (ROA) and it is statistically highly significant too. This result is consistent with what is expected, that Islamic banks play the intermediation role between the lenders and borrowers, which emphasizes that more deposits are transformed into loans. Hence, higher lending generates higher income. The Islamic banks' loan portfolio is heavily biased towards short-term financing and is associated with low risks. Thus, the bank loan has an important role as the source of revenue, which implies that high loans lead to increased bank profits. This finding is supported by other studies, for example: Bashir (2003); Sanusi and Ismail (2005); Al Manaseer, (2007); Al-Jarrah *et al.,* (2010); Ramadan *et al.,* (2011); Sufian (2011).

Deposits-to-total-assets (DTA) leave a positive and statistically significant impact on return on assets. This result is in line with similar studies that have focused on banks' profitability such as Al-Jarrah *et al.,* (2010) and Javaid *et al.,* (2011). In summary the results of the LOTA and DTA have supported the view that, more deposits will enhance the lending capacity and once they have been transformed into loans will lead to higher profits. Confirming with this, the banks rely heavily on deposits in their investments whereby during the period of this study, the deposits of Malaysian Islamic banks account for 86% on average from total Liabilities.

For the macroeconomic variables, the result reveals that GDPGR has an insignificant impact on the ROA. Similar results for the insignificant impact for the GDPGR in banks' profitability can be found in the other studies for examples, Sanusi and Ismail (2005), Al Manaseer (2007), Li. Yuqi (2008) and Sufian (2011). GDPGR has a negative and statistically insignificant impact on return on assets, but when the sample is split into two categories, which are the domestic Islamic banks and foreign

Islamic banks, we have found that the GDPGR has a positive and statistically significant impact on return on assets of Malaysian domestic Islamic banks only, whereas the GDPGR has a negative and statistically insignificant impact on the return on assets of Malaysian foreign Islamic banks, see Table (5.38). This might indicate that domestic Islamic banks have only benefited from economic growth, whereas, the insignificant impact was due to foreign Islamic banks not benefiting from the economic growth.

The estimated result shows that the gross domestic product per capita (GDPPC) has a positive and statistically insignificant impact on the return on assets which is consistent with the result of Choong *et al*., (2012) which analyzes the profitability of Islamic commercial banks in Malaysia and which finds that GDP per capita do not influence the profitability of Islamic commercial banks during the period of 2006-2009. Al Manaseer (2007), Bennaceur and Goaied (2008) and Flamini *et al*., (2009) discover a similar result where the GDPPC has an insignificant impact on banks' profitability. This may suggest to the non-favorable macroeconomic environment, as the result of the global financial crisis which had given a blow to the Malaysian economic growth in 2008 and 2009.

For the impact of the structural variables, the results indicate that the concentration ratio (CONC) has a positive and insignificant impact on the return on assets. However, the relationship is not significant; hence it is not confirmed whether this finding can support the structure - conduct - performance theory. The result of the CONC variable indicates that the CONC variable is not significant in determining banks' profitability. Choong *et al*., (2012) have found that concentration does not influence the profitability of Malaysian Islamic commercial banks during the period of 2006-2009. Also, other studies such as Al Manaseer (2007); Bennaceur and Goaied (2008); Flamini *et al*., (2009) and Sufian (2010b) found similar findings.

A dummy variable (DDF) has a positive and highly statistically significant impact on the return on assets. This result suggests that domestic and foreign Islamic banks have different profitability, and the domestic Islamic banks are often associated with high profits. Based on this result and the results which are presented in Appendix (F), it can be concluded that domestic Islamic banks are more profitable than foreign Islamic

banks during the period of study. The mean value of the return on assets (ROA) for domestic Islamic banks is higher compared to the mean value of the return on assets (ROA) for foreign Islamic banks; see Appendix (F). This result is consistent with Awdeh (2005) who has analyzed the profitability of domestic and foreign banks operating in the Lebanese market between 1993 and 2003 and who has found that although these banks operate in the same market, profitability determinants are different, also the findings suggest that foreign banks are more profitable than domestic banks during the period of study. Generally, the source of differences in the determinants of profitability between domestic Islamic banks and foreign Islamic banks are shown in this chapter, Section 5.4.

5.2.2 Testing by model (2)

The section above has tested the determinants of bank profitability for all Islamic banks in Malaysia using return on assets (ROA) as the dependent variable through model (1), whereas, this section is devoted to test the determinants of banks' profitability using ROA as the dependent variable as expressed in the model (2). The model of banks' profitability determinants is as follows:

Model (2):

$$ROA_{it} = \alpha_{0} + \beta_1 CRTA + \beta_2 LATA + \beta_3 TE + \beta_4 INF + \beta_5 LOGTA + \beta_6 LOGAGE + B_7 GFC + \varepsilon_{it}$$

5.2.2.1 Testing for linearity

Using Gretl econometric software, the linearity plots for residuals and the independent variable are shown in the appendix (G). From these figures it can be concluded that the linear model is appropriate for the data of the model (2).

5.2.2.2 Testing for multicollinearity problem

This study uses the variance inflation factor (VIF) for all independent variables to investigate whether there is a multicollinearity problem in the model. The VIF measures the impact of collinearity among the variables in a regression model

(Gujarati, 2003). Table (5.11) presents the variance inflation factor (VIF) between the independent variables in the model (2) to test the multi-collinearity problem.

Table 5.11: The variance inflation factor (VIF), model (2)

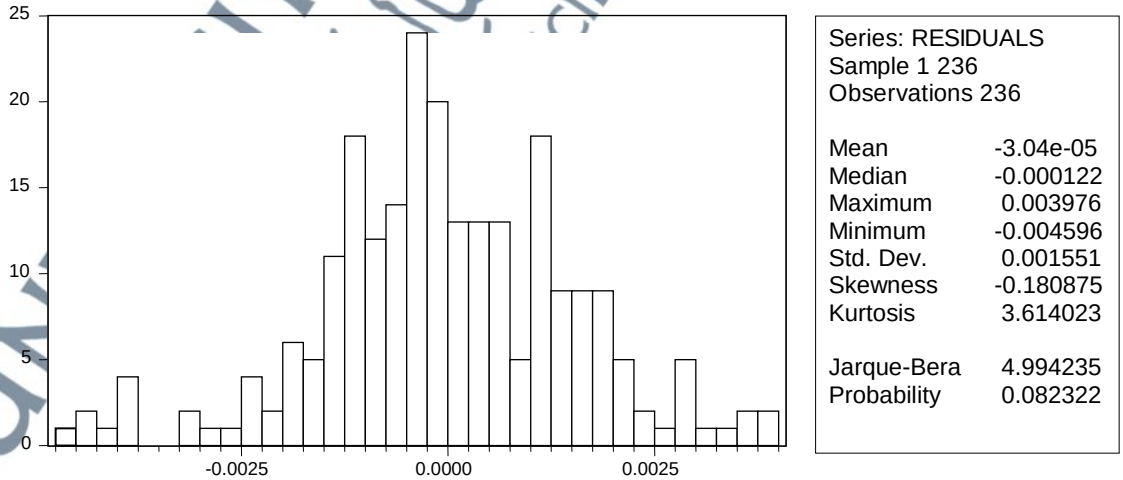
Variables	Centered VIF
CRTA	1.654788
LATA	1.955404
TE	2.649355
INF	1.145437
LOGTA	2.797357
LOGAGE	1.547260
GFC	1.121475

The result of the variance inflation factors (VIF) for the variables included in the model are between (1.12 and 2.79). This indicates that the models do not suffer from any multicollinearity problems, because all VIF values are less than 10 (Gujarati, 2003).

5.2.2.3 Testing for normality of residual

Jarque–Bera (JB) test of normally is used to test whether, the residuals are normally distributed or not.

Figure 5.2: The probability distribution of the residuals and the results of the Jarque–Bera test, model (2) with ROA



As the Figure (5.2) shows, the residuals seem to be symmetrically distributed. The application of the Jarque–Bera test shows that the JB statistics is about 4.99 and the probability of obtaining such a statistics under the normality assumption is about 0.082. Therefore, the hypothesis is not rejected, and that the error terms are normally distributed.

According to the results of the stationary test, multicollinearity, linearity test and normality of residual, it can be concluded that the multiple regression analysis can be used to interpret the dependent variable in the model (2).

5.2.2.4 Testing for appropriate model

Table (5.12) below displays three estimation methods in the panel data statistics, the Pooled Ordinary Least Squares, the Fixed Effects, and the Random Effects method.

Table 5.12: Results of Pooled Ordinary Least Squares, Fixed Effects Model, and Random Effects Model using model (2) and the ROA as the dependent variable

Independent Variables	***POLS***	***FEM***	***REM***
C	-0.004179**	-0.012181**	-0.007740**
	(0.0337)	(0.0112)	(0.0119)
CRTA	-0.014827***	0.003421	-0.006036
	(0.0001)	(0.6536)	(0.2790)
LATA	0.000199	0.002981*	0.001443
	(0.8449)	(0.0938)	(0.3080)
TE	0.004467***	0.004366***	0.004352***
	(0.0000)	(0.0071)	(0.0014)
INF	-0.008537**	-0.006433	-0.008084**
	(0.0448)	(0.1173)	(0.0390)
LOGTA	0.000437**	0.001050*	0.000724**
	(0.0424)	(0.0535)	(0.0312)
LOGAGE	-0.000166	-0.000121	-0.000200
	(0.2922)	(0.7462)	(0.4026)
GFC	-0.000206	-0.000284	-0.000271
	(0.3989)	(0.2011)	(0.2154)
R^2	0.374582	0.546712	0.192369
F	19.50803***	11.11710***	7.758178***
	(0.0000)	(0.0000)	(0.0000)
DW	1.686008	2.178023	2.049559
N	236	236	236

Numbers in brackets below the coefficient are the probability levels of significance. *, ** and *** indicate significance levels of 10, 5, 1 percent respectively.

To know which model is appropriate, the pooled ordinary least squares or the panel random effect model, The Breusch-Pagan Lagrange multiplier test is used. The null hypothesis of the one-way random effect model is that variances of groups are zero. If the null hypothesis is rejected, then the panel random effect model is appropriate.

Table 5.13: The result of the Breusch Pagan Lagrangian multiplier test using model (2) and the ROA as the dependent variable

Chi- chi-square (1)	Prob>chi2
46.1143	0.0000

With the high chi-squared statistics, the null hypothesis is rejected in favour of the panel random effect model. Therefore, the Lagrange multiplier test results favour the panel over the pooled OLS estimation model (the panel random effect regression model is appropriate).

To choose between the pooled OLS and the panel fixed effect model the joint significance test is used. A low p-value counts against the null hypothesis that the pooled OLS model is adequate, in favour of the fixed effects alternative. If the null hypothesis is rejected, the fixed effect regression model is then appropriate.

Table 5.14: The result of the joint significance test using model (2) and the ROA as the dependent variable

F-statistic	d.f.	Prob.
5.03149	(16, 212)	0.0000

The null hypothesis is rejected in favour of the fixed effect model depending on the results of the joint significance test. Therefore, joint significance results favour the fixed effect model over the pooled OLS model (the fixed effect regression model is appropriate).

To determine the use of the fixed effect model or the random effect model, the Hausman test is used. The following results are observed, with the panel that establishes the Hausman test results being reported here in the following Table:

Table 5.15: The result of the Hausman test using model (2) and the ROA as the dependent variable

Chi-Sq. Statistic	Chi-Sq. d.f.	Prob>chi2
9.123733	7	0.2439

The result of the Hausman test statistics in the Table suggests that the random effects model is the appropriate panel data estimator for (ROA) model (2).

Depending on the results of the Breusch Pagan Lagrangian multiplier test shown in Table (5.13), the joint significance test shown in Table (5.14) and the Hausman test shown in Table (5.15), it can be concluded that the random effect model is expected, therefore, the random effect model is appropriate and it should be implemented.

5.2.2.5 Testing for the presence of autocorrelation (random effect model)

The Durbin-Watson test statistics is used to test the null hypothesis that the residuals are not auto-correlated. The estimation of the random effect model provides the Durbin-Watson (DW) test statistics in Table (5.17), therefore, it can be seen that the Durbin-Watson statistics (2.04) is located between d_u and $4-d_u$ value (zone of no autocorrelation). This result indicates that there is no evidence of the presence of serial correlation in the model.

5.2.2.6 Testing for present of heteroscedasticity problem

The White heteroskedasticity test is one of the most widely used. The White test is to be used in this study to detect the presence of heteroskedasticity.

Table 5.16: The results of White heteroskedasticity using model (2) and the ROA as the dependent variable

F-statistic	Prob. F-statistic	Chi-Sq- statistic	Prob>chi2
3.929093	0.0000	94.22613	0.0000

The evidence of heteroscedasticity is found after applying the White's heteroscedasticity test. Based on the Results of the heteroskedasticity White test, the F-statistics is 3.929 (p-value: 0.0000) and Chi-square statistics is 94.226

(p-value: 0.0000). Therefore, the null hypothesis of no heterogeneity is rejected for the model. The problem of heteroscedasticity is corrected using the White's cross-section option.

Table 5.17: Results of the random effect model using model (2) and the ROA as the dependent variable

Independent Variables	***REM***
C	-0.007740* (0.0683)
CRTA	-0.006036 (0.2487)
LATA	0.001443 (0.4960)
TE	0.004352** (0.0480)
INF	-0.008084*** (0.0000)
LOGTA	0.000724* (0.0535)
LOGAGE	-0.000200 (0.1950)
GFC	-0.000271*** (0.0058)
R^2	0.192369
F	7.758178 (0.0000)
DW	2.049559
N	236

The heteroskedasticity–corrected. Numbers in brackets below the coefficient are the probability levels of significance. *, ** and *** indicate the significance levels of 10, 5, 1 percent respectively.

5.2.2.7 Explaining the results

Table (5.17) above includes the results of the determinants of bank profitability for all Islamic banks in Malaysia using return on assets (ROA) as the dependent variable. The variables tested as determinants of bank profitability are capital and reserves to total assets (CRTA), liquidity to total assets (LATA), efficiency-bank outputs to bank inputs (TE), annual inflation rate (INF), bank size- the natural logarithm of total assets

(LOGTA), Bank age (LOGAGE) and the effect of the global financial crisis on the profitability (GFC).

Capital and reserves to total assets (CRTA) has a negative and statistically insignificant impact on return on assets. This is against expectation. However, we should bear in mind that these results are obtained from pooling the data of both domestic and foreign Islamic banks together. Therefore, when applying these findings to either the domestic Islamic banks or the foreign Islamic banks, we have found that the CRTA affects domestic and foreign Islamic banks in different ways, that after splitting the data into two categories the CRTA has a positive and statistically significant impact on return on assets of the Malaysian domestic Islamic banks only, whereas the CRTA has a negative and insignificant impact on the return on assets of the Malaysian foreign Islamic banks; see Table (5.40). However, the result of the CRTA that has a negative and statistically insignificant impact on return on assets is consistent with other similar studies; for examples, Sanusi and Ismail (2005) and Guru, Staunton, and Shanmugam (1999) and Said and Tumin (2011). The study by Sanusi and Ismail (2005) has found that the ratio of total equity capital to total assets of Malaysian Islamic banks during the period of 1995-2004 has a negative and insignificant impact on return on assets. Guru *et al.*, (1999) and Said and Tumin (2011) also suggest that the capital to total assets is not significant in influencing the return on assets in Malaysian banks. Furthermore, the negative and insignificant relation between return on assets and capital to total assets is also found by Al Manaseer (2007) and Aburime (2008a).

Liquidity to total assets (LATA) has a positive and statistically insignificant impact on return on assets, which is not in accordance with what is expected, but it is consistent with the findings of some other related studies. Idris *et al.,* (2011) examine the determinants of profitability for nine Islamic Banks in Malaysia for the period of 2007-2009. The result has revealed that Liquidity to total assets is insignificant in determining profitability (ROA). Also, the study of Said and Tumin (2011) reveals that liquidity is not a significant factor that contributes towards the profitability of commercial banks in Malaysia for the period of 2001 to 2007. This result is also supported by Al-Jarrah, *et al.,* (2010) and Davydenko (2011).

For the impact of the technical efficiency variable (TE), the result indicates that the TE has an expected positive and significant impact on the return on assets. This gives support to the Efficient-structure theory. The result suggests that high profits of Islamic banks are consistent with higher efficiency. This result is in line with similar study results of Sufian (2007a) which examines the relative efficiency between the Islamic domestic and foreign banking operations in Malaysia and he has established that the ROA is significantly and positively correlated with efficiency. The result is also supported by other studies such as, Jiang *et al.*, (2003); Casu and Molyneux (2003) and Kosmidou *et al.*, (2006).

The macroeconomic variable inflation rate (INF) has a negative and statistically significant impact on return on assets. This may be due to the fact that, as Bashir (2003) has pointed out, in the case of Islamic banks, the inflation may have a negative effect on bank profitability if wages and other costs are growing faster than the rate of inflation. Accordingly, this may suggest that during the period of study, Islamic banks could not accurately predict the levels of inflation and the costs of banks have undergone a faster increase than the banks' revenues. However, this finding is supported by the results of Awdeh (2005), Fotios and Kyriaki (2007), Sufian and Chong (2008), Khrawish *et al.*, (2011) and Ali *et al.*, (2011). However, it can be postulated that the Islamic banks were not able to adjust its lending rate to the rising cost of the deposit. This is because Islamic banks used fixed rate of financing.

Bank size or the natural logarithm of total assets (LOGTA) has a positive and statistically significant impact on the ROA. This result is in line with the Economic of scale theory. This indicates that large size provides Islamic banks with the opportunity to have greater ability to diversify and utilize the economies of scale. Idris *et al.*, (2011) suggest that the bank size is an important factor in explaining the variation of profitability for Islamic banks in Malaysia and they explain that the larger bank size will fundamentally have better access to capital markets, lower cost of borrowing and are able to generate higher income. Many empirical studies find similar results, such as Athanasoglou *et al.*, (2006) and Al Manaseer (2007).

Bank age (LOGAGE) has a negative and statistically insignificant impact on the ROA. This is against what is expected. However, after splitting the data into two

categories, LOGAGE has a negative and statistically significant impact on return on assets of domestic banks, whereas it has a negative and insignificant impact on the return on assets of foreign banks. This result means that old banks are less profitable than the new banks as the latter uses the new technologies. This result is supported by Dietrich and Wanzenrie (2010) which analyzes the profitability of commercial banks in Switzerland, and the result rests in the fact that newer banks seem to be even a little bit more profitable than older banks. Also, Zeitun (2012) finds that, the bank's age has no effect on bank profitability of Islamic and conventional banks in the Gulf Cooperation Council countries, during the period of 2002-2009.

The global financial crisis (GFC) has a negative and statistically significant impact on return on assets, which is in accordance with the expectation. This result means that Islamic banks in Malaysia are affected by the global financial crisis in terms of profitability. This finding is supported by studies of Sufian and Habibullah (2010a) and Mehta (2012)

5.3 Findings of the Determinants of Islamic Bank's Profitability Using the ROE as the Dependent Variable

The determinants of Islamic banks' profitability in Malaysia are tested in this study using two models.

5.3.1 Testing by model (1)

The determinants of banks' profitability for all Islamic banks in Malaysia using return on assets (ROE) as the dependent variable are put to the test. The hypotheses of this study are tested using multiple regressions in the panel data analyses for 17 Islamic banks during the period of q_1 2007- q_4 2010 (quarterly data). The model of banks' profitability determinants is as follows:

Model (1):

$$ROE_{it} = \alpha_{0+} \beta_1 OHTA + \beta_2 LOTA + \beta_3 DTA + \beta_4 GDPGR + \beta_5 GDPPC + \beta_6 CONC + \beta_7 DDF + \varepsilon_{it}$$

It is worth mentioning, that it is not important to test whether or not the independent variables suffer from multicollinearity problem, see Table (5.4).

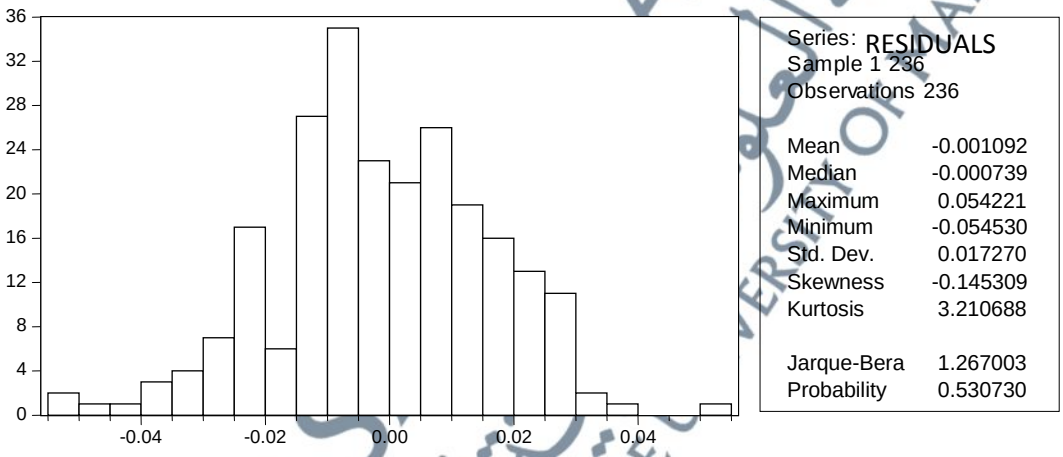
5.3.1.1 Testing for linearity

Using Gretl econometric software, the linearity plots for residuals and the independent variable are shown in the appendix (G). From these figures, it can be concluded that the linear model is appropriate for the data of the model (1).

5.3.1.2 Testing for normality

Jarque–Bera (JB) test of normality is used to test the residuals normally.

Figure 5.3: The probability distribution of the residuals and the results of the Jarque–Bera test, model (1) with ROE



As the Figure (5.3) shows, the residuals seem to be symmetrically distributed. The application of the Jarque–Bera test shows that the JB statistics is about 1.26 and the probability of obtaining such a statistics under the normality assumption is 0.53. Therefore, the error terms are normally distributed.

According to the results of the stationary test, multicollinearity, linearity test and normality of residual, it can be concluded that the multiple regression analysis can be used to interpret the dependent variable in the model (1).

5.3.1.3 Testing for appropriate model

The Pooled Ordinary Least Squares (POLS), Fixed Effects Models (FEM), and Random Effects Models (REM) are types of panel analytic models. To identify the right estimator for the model, various tests have been performed using E-Views software and Gretl econometric software.

Table 5.18: Results of Pooled Ordinary Least Squares, Fixed Effects Model, and Random Effects Model using model (1) and the ROE as the dependent variable

Independent Variables	***POLS***	***FEM***	***REM***
C	-0.083166*	-0.060096	-0.077069*
	(0.0673)	(0.1685)	(0.0628)
OHTA	-0.829635	0.079629	-0.324323
	(0.3398)	(0.9397)	(0.7353)
LOTA	0.031643***	0.026606**	0.030021***
	(0.0000)	(0.0178)	(0.0018)
DTA	0.112361***	0.101861***	0.110089***
	(0.0002)	(0.0075)	(0.0012)
GDPGR	0.034476	0.040835	0.040114
	(0.2940)	(0.1335)	(0.1400)
GDPPC	-0.000595	-0.000477	-0.000534
	(0.4954)	(0.5104)	(0.4595)
CONC	0.084449*	0.027250	0.035117
	(0.0507)	(0.4607)	(0.3379)
DDF	0.018773***	0.017052***	0.017849***
	(0.0000)	(0.0000)	(0.0021)
R^2	0.412373	0.627729	0.182636
F	22.85732***	16.32562***	7.277908***
	(0.0000)	(0.0000)	(0.0000)
DW	1.505819	2.329922	2.138322
N	236	236	236

Numbers in brackets below the coefficient are the probability levels of significance. *, ** and *** indicate significance levels of 10, 5, 1 percent respectively.

Table (5.18) displays three estimation methods in the panel data statistics, the pooled ordinary least squares, the fixed effects, and the random effects method.

To identify which model is appropriate- the pooled OLS or the panel random effect model, the Breusch-Pagan Lagrange multiplier test is used.

Table 5.19: The result of the Breusch Pagan Lagrangian multiplier test using model (1) and the ROE as the dependent variable

Chi- chi-square (1)	Prob>chi2
133.548	0.0000

Depending on the probability of chi^2 of the Breusch Pagan Lagrangian multiplier test in the above Table, it can be concluded that the panel random effect model is accepted. Therefore, the panel random effect model is found to be appropriate.

To choose between the pooled OLS and the panel fixed effect model, the joint significance test is used.

Table 5.20: The result of the joint significance test using model (1) and the ROE as the dependent variable

F-statistic	d.f.	Prob.
7.70117	(16, 213)	0.0000

The results in the Table (5.20) indicated that, the joint significance results favour the panel fixed effect model over the pooled OLS estimation model (the panel fixed effect model is appropriate).

To choose between the fixed effect model and random effect model, the Hausman test is used. The E-Views software is to be employed to achieve the aims of this part. The following results are observed, with the panel which establishes the Hausman test results reported here in the following Table:

Table 5.21: The result of the Hausman test using model (1) and the ROE as the dependent variable

Chi-Sq. Statistic	Chi-Sq. d.f.	Prob>chi2
11.118182	7	0.0848

According to the result of the Hausman test statistics in the Table (5.21) it can be concluded that the random effects estimation (REM) is more appropriate than the fixed effects estimation that due to the p-value for the test more than 5%, this indicates

that the fixed effects model is not appropriate and that the REM specification is to be preferred.

Based on the results of the Breusch Pagan Lagrangian multiplier test shown in Table (5.19), the joint significance test shown in Table (5.20) and the Hausman test shown in Table (5.21) it can be concluded that the random effect model is accepted, therefore, the random effect model is appropriate and it should be implemented.

5.3.1.4 Testing for the presence of autocorrelation (random effect model)

By reviewing the regression results displayed in Table (5.23), it can be seen that the Durbin-Watson statistics (2.13) is located between d_u and 4-d_u value (zone of no autocorrelation). This result indicates that there is no evidence of the presence of serial correlation in the model.

5.3.1.5 Testing for the presence of heteroscedasticity problem

The White test is to be used in this study to detect the presence of heteroskedasticity.

Table 5.22: The results of White heteroskedasticity using model (1) and the ROE as the dependent variable

F-statistic	Prob. F-statistic	Chi-Sq- statistic	Prob>chi2
2.220039	0.0004	64.42964	0.0012

Applying White's heteroscedasticity test, it can be found that there is evidence of heteroscedasticity. Depending on the results of the heteroskedasticity White test, the F-statistic is 2.220 (p-value: 0.0004) and Chi-square statistics is 64.429 (p-value: 0.0012). Therefore, the results find evidence of heteroscedasticity in the model and to overcome this, the White cross-section option is used to correct the heteroscedasticity.

Table 5.23: Results of the random effect model using model (1) and the ROE as the dependent variable

Independent Variables	***REM***
C	-0.077069**
	(0.0467)
OHTA	-0.324323
	(0.7831)
LOTA	0.030021***
	(0.0041)
DTA	0.110089**
	(0.0159)
GDPGR	0.040114**
	(0.0260)
GDPPC	-0.000534
	(0.1189)
CONC	0.035117
	(0.2354)
DDF	0.017849***
	(0.0039)
R^2	0.182636
F	7.277908***
	(0.0000)
DW	2.138322
N	236

The heteroskedasticity–corrected. Numbers in brackets below the coefficient are the probability levels of significance. *, ** and *** indicate significance levels of 10, 5, 1 percent respectively.

5.3.1.6 Explaining the results

Table (5.23) above includes the results of the determinants of banks' profitability for all Islamic banks in Malaysia using return on equity (ROE) as the dependent variable. The variables tested as determinants of banks' profitability are overhead-to-total assets (OHTA), loans-to-total assets (LOTA), deposits-to-total assets (DTA), gross domestic product growth rate (GDPGR), gross domestic product per capita (GDPPC), concentration ratio (CONC), The difference between domestic and Foreign Islamic banks (DDF).

The overhead-to-total assets (OHTA) have a negative and statistically insignificant impact on the return on equity. Dernergue-Kunt and Huizinga (1999) find

a statistically insignificant effect for overhead ratio on return on equity. Also later, Hassan and Bashir (2003), Al Manaseer (2007) and Ramadan *et al.,* (2011) find an insignificant impact for overhead ratio on return on equity.

Loans-to-total assets (LOTA) as another variable, has a positive and statistically significant impact on the return on equity. This result is consistent with what is expected, that Islamic banks play the intermediation role between the lenders and borrowers, which emphasizes that the more deposits are transformed into loans. This finding is supported by works done by Al Manaseer (2007), which finds a significant positive impact on return on equity of Islamic banks. Similarly, Zoubi (2011), Al-Jarrah *et al*., (2010) and Sufian (2011) find similar results in their studies that this variable LOTA has a positive impact on return on equity, as a proxy of banks' profitability.

Deposits-to-total assets (DTA), has the expected positive effect on bank return on equity (ROE) and it is also statistically significant. This result is consistent with what is expected, that more deposits lead to the transformation into loans and will lead to higher profits. This finding that the DTA is positively associated with ROE is supported by other studies, for example: Awdeh (2005) and Alkassim (2005).

The results show that the Gross domestic product growth rate (GDPGR) variable has a significant positive impact on return on equity (ROE) indicating that the GDPGR variable is significant in determining banks' profitability. This result is consistent with what is expected. The positive impact of the GDPGR in banks' profitability provides support to the argument of the association between economic growth and banking sector performance. The result is in line with similar studies that have focused on banks' profitability such as Hassan and Bashir (2003), Al Manaseer (2007), Sufian (2010b) and Sufian (2011).

The gross domestic product per capita (GDPPC) has a negative and statistically insignificant impact on the return on equity. This is against our expectation, but this finding remains consistent with other studies such as Hassan and Bashir (2003) and Al Manaseer (2007). The GDPPC has a negative and statistically insignificant impact on return on equity, but when the sample is split into two categories, domestic Islamic

banks and foreign Islamic banks, we have found that the GDPPC has a negative and significant impact on the return on equity of Malaysian foreign Islamic banks only, see Table (5.42).

The results of the structural variables in Table (5.23) indicate that the concentration ratio (CONC) has a positive and insignificant impact on the return on equity. This does not give support to the structure-conduct-performance theory. Choong *et al*., (2012) discover that concentration has a positive and insignificant impact on the ROE of Malaysian Islamic banks. Nevertheless, the positive and insignificant impact of the concentration ratio on (ROE) as a proxy of banks' profitability is supported by many empirical studies such as: Al Manaseer (2007), Al-Jarrah *et al*., (2010) and Sufian (2011).

A dummy variable (DDF) has a positive and statistically significant impact on the return on equity. This result means that domestic and foreign Islamic banks have a different level of profitability. On the other hand, the mean value of the return on equity for domestic Islamic banks is higher compared to the mean value of the return on equity for foreign Islamic banks; see Appendix (F). Based on these results, it can be concluded that domestic Islamic banks are more profitable than foreign Islamic banks during the period of study.

5.3.2 Testing by model (2)

This section is devoted to test the determinants of Islamic banks' profitability using return on equity as the dependent variable through model (2).

Model (2):

$$ROE_{it} = \alpha_{0} + \beta_1 CRTA + \beta_2 LATA + \beta_3 TE + \beta_4 INF + \beta_5 LOGTA + \beta_6 LOGAGE + B_7 GFC + \varepsilon_{it}$$

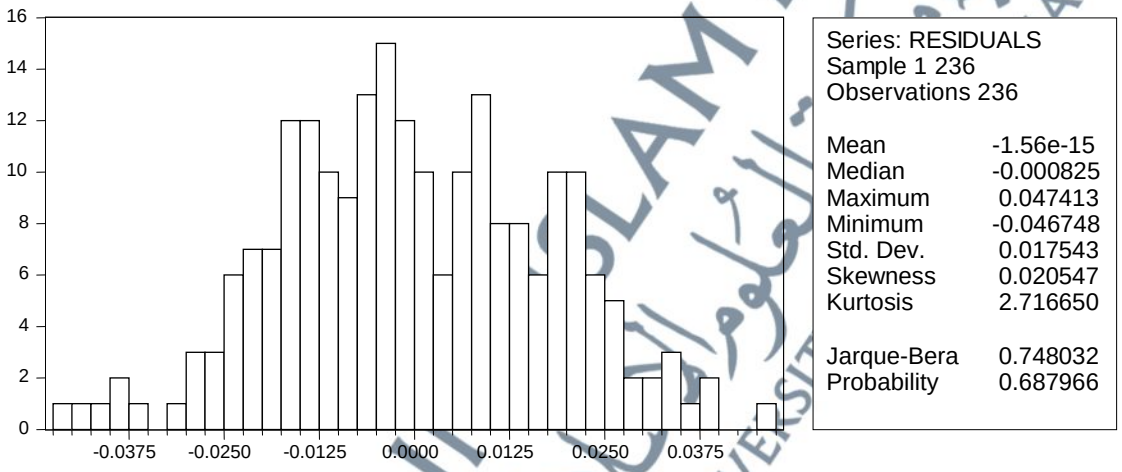
5.3.2.1 Testing for linearity

The linearity plots for residuals and independent variables are given in the appendix (G). From the figures, it can be concluded that the linear model is appropriate for the data of the model (2).

5.3.2.2 Testing for normality

As shown below, the Jarque–Bera (JB) test is used to test the residuals normally.

Figure 5.4: The probability distribution of the residuals and the results of the Jarque–Bera test, model (2) with ROE



As the Figure (5.4) shows, the residuals are symmetrically distributed. The application of the Jarque–Bera test shows that the JB statistics is 0.748 and the probability of obtaining such a statistics under the normality assumption is 0.687. Therefore, the error terms are normally distributed.

According to the results of the stationary test, multicollinearity, linearity test and normality of residual, it can be concluded that the multiple regression analysis can be used to interpret the dependent variable in the model (2).

5.3.2.3 Testing for appropriate model

Three estimation methods in the panel data statistics, namely, the Pooled Ordinary Least Squares, Fixed Effects Models, and Random Effects Models are used.

Table 5.24: Results of Pooled Ordinary Least Squares, Fixed Effects Model, and Random Effects Model using model (2) and the ROE as the dependent variable

Independent Variables	***POLS***	***FEM***	***REM***
C	-0.047919**	-0.101017**	-0.070549**
	(0.0154)	(0.0322)	(0.0162)
CRTA	-0.257739***	-0.083076	-0.178177***
	(0.0000)	(0.2684)	(0.0010)
LATA	0.013561	0.022786	0.015310
	(0.1849)	(0.1923)	(0.2623)
TE	0.032943***	0.019756	0.025606*
	(0.0014)	(0.2123)	(0.0507)
INF	-0.113846***	-0.091046**	-0.110096***
	(0.0079)	(0.0246)	(0.0043)
LOGTA	0.008138***	0.012924**	0.010497***
	(0.0002)	(0.0160)	(0.0011)
LOGAGE	-0.004453***	-0.002823	-0.004288*
	(0.0052)	(0.4430)	(0.0616)
GFC	-0.005329**	-0.005834***	-0.005852***
	(0.0308)	(0.0079)	(0.0068)
R^2	0.497153	0.649854	0.270351
F	32.20258***	17.10704***	12.06840***
	(0.0000)	(0.0000)	(0.0000)
DW	1.746207	2.322514	2.167688
N	236	236	236

Numbers in brackets below the coefficient are the probability levels of significance. *, ** and *** indicate significance levels of 10, 5, 1 percent respectively.

Three tests to be conducted for choosing the best model between the three models have been mentioned above, thus, to identify which model is appropriate the pooled OLS or the panel random effect model, The Breusch-Pagan Lagrange multiplier (LM) test is used.

Table 5.25: The result of the Breusch Pagan Lagrangian multiplier test using model (2) and the ROE as the dependent variable

Chi- chi-square (1)	Prob>chi2
64.3127	0.0000

The decision to choose between the pooled OLS and the panel random effect model is dependent on the probability of chi^2 of the LM test. The p-value for the LM test

is 0.000; it can be concluded that the panel random effect model is accepted. Therefore, the panel random effect model is appropriate.

To choose between the pooled OLS and the panel fixed effect model, the joint significance test is used.

Table 5.26: The result of the joint significance test using model (2) and the ROE as the dependent variable

F-statistic	d.f.	Prob.
5.77843	(16, 212)	0.0000

The results in Table (5.26) find that the joint significance results favour the panel fixed effect model over the pooled OLS estimation model.

To choose between the fixed effect model and random effect model, the Hausman test is used. The E-Views software is to be employed to achieve the aims intended for this part.

Table 5.27: The result of the Hausman test using model (2) and the ROE as the dependent variable

Chi-Sq. statistic	Chi-Sq. d.f.	Prob>chi2
14.111086	7	0.0492

According to the result of the Hausman test statistics in Table (5.27) it can be concluded that the fixed effect estimation is appropriate than the random effect estimation that due to the fact that the p-value for the test is less than 5%, this indicates that the random effects model is not appropriate and that the fixed effect specification is to be preferred.

Based on the results of the Breusch Pagan Lagrangian multiplier test shown in Table (5.25), the joint significance test shown in Table (5.26) and Hausman test shown in Table (5.27) it can be concluded that the fixed effects model is appropriate and it should be implemented.

5.3.2.4 Testing for the presence of autocorrelation

By reviewing the regression result displayed in Table (5.29), it can be seen that the Durbin-Watson statistics is 2.10. This result indicates that there is no evidence of the presence of serial correlation in the model.

5.3.2.5 Testing for the presence of heteroscedasticity problem

The White test is to be used in this study to detect the presence of heteroskedasticity.

Table 5.28: The results of White's heteroskedasticity test using model (2) and the ROE as the dependent variable

F-statistic	Prob. F-statistic	Chi-Sq- statistic	Prob>chi2
1.754882	0.0096	54.02000	0.0159

Depending on the results of the heteroskedasticity White test, the F-statistic is 1.754 (p-value: 0.0096) and Chi-square statistics is 54.020, (p-value: 0.0159). The results find evidence of heteroscedasticity in the model. White's cross-section option is used to correct the heteroscedasticity.

Table 5.29: Results of the fixed effect model using model (2) and the ROE as the dependent variable

Independent Variables	***FEM***
C	-0.093500***
	(0.0057)
CRTA	-0.104595**
	(0.0338)
LATA	0.011336
	(0.4200)
TE	0.008714
	(0.5272)
INF	-0.073360**
	(0.0184)
LOGTA	0.016429***
	(0.0007)
LOGAGE	-0.007144**
	(0.0315)
GFC	-0.003307**
	(0.0241)
R^2	0.731687
F	22.04316***
	(0.0000)
DW	2.106742
N	236

The heteroskedasticity– corrected. Numbers in brackets below the coefficient are the probability levels of significance. *, ** and *** indicate significance levels of 10, 5, 1 percent respectively.

5.3.2.6 Explaining the results

Table (5.29) above includes the results of the determinants of banks' profitability for all Islamic banks in Malaysia using return on equity as the dependent variable. The variables tested as determinants of banks' profitability are capital and reserves to total assets (CRTA), liquidity to total assets (LATA), efficiency bank outputs to bank inputs (TE), annual inflation rate (INF), bank size- the natural logarithm of total assets (LOGTA), bank age (LOGAGE) and the effect of the global financial crisis on profitability (GFC).

Capital and reserves to total assets (CRTA) has a negative and statistically significant impact on the return on equity which is contrary to expectation. Al Manaseer (2007) finds similar results and explains that the banks are benefiting from the increasing

leverage in terms of the return on equity. This result is supported by other previous studies, among them: Pratomo and Ismail (2006) who report that an increase in the capital of the Islamic Banks in Malaysia is not recommended, due to the fact that negative and significant CRTA with return on equity is found and it reflects that the higher the bank capital, the lower its performance. Wasiuzzaman and Tarmizi (2010) have found that Islamic banks in Malaysia should not focus on increasing the equity to increase their profitability due to the results showing the negative relationship with profitability during the period of 2005-2008. The capital and reserves to total liabilities of Islamic banks in Malaysia are very weak, which was apparent during the period concerned, with an average of 8.7% from total liabilities and shareholders' equity. Meanwhile, the average deposits of 86% was noted during the same period, which means that banks concentrate on deposits in their investments.

Bank characteristics variable liquidity ratio (LATA) has a positive and statistically insignificant impact on the return on equity, which is not in accordance with our expectation. This indicates that liquidity is not a significant factor that contributes towards the profitability of Islamic banks in Malaysia. This may be due to the conditions of uncertainty of the financial crisis, that the banks have resorted to increasing the rate of liquidity, the profits were growing, and the profits were growing isolation from the liquidity. This result is supported by other empirical studies such as Guru *et al*., (1999), Haron (2004), Alkassim (2005) and Choong *et al*., (2012).

The estimated result above shows that technical efficiency (TE) has a positive and statistically insignificant impact on return on equity. However, we should bear in mind that these results are obtained from pooling the data of both domestic and foreign Islamic banks. Therefore, when applying these findings to either the domestic banks or the foreign banks, we can find that TE affects domestic and foreign Islamic banks in different ways, that after splitting the data into two categories, the TE has a positive and significant impact on the return on equity of domestic banks, whereas TE has an insignificant impact on the return on equity of foreign banks. Furthermore, the insignificant relation between the return on equity and the efficiency is also found by the Case and Molyneux, (2003), Abbasoglu *et al*., (2007) and Zamil (2007).

The inflation rate (INF) has a negative and statistically significant impact on the return on equity. The same result has been found and explained with the return on assets. This result is consistent with that of similar studies; see for example: Khrawish *et al*., (2011), Zeitun (2012) and Azam and Siddiqui (2012).

Bank size or the natural logarithm of total assets (LOGTA) has a highly significant positive impact on the return on equity, which is in line with what is expected that large size will be associated with high profitability and it will provide evidence that the banks in the study benefit from the economies of scale. This result is supported by other empirical studies such as Al Manaseer, (2007) and Khrawish *et al*., (2011).

Bank age (LOGAGE) has a negative and statistically significant impact on the return on equity. This is against expectation. Mirzaei *et al*., (2011) establish that the effect of bank age is negative and significant on the return on equity of the banks in advanced economies over the period of 1999-2008. This result indicates that old banks are less profitable than the new banks probably due to the new banks' use of the new technologies.

The global financial crisis (GFC) has a negative and statistically significant impact on the return on equity. This is in line with what is expected. This result means that the profitability of Islamic banks in Malaysia is affected by the global financial crisis. This finding is consistent with the result derived from Mehta (2012).

5.4 Findings of the Differences and the Sources in the Determinants of Profitability between Domestic and Foreign Islamic Banks in Malaysia

According to Asteriou and Hall (2007), the Chow test can be conducted to determine whether the variables that investigate on the domestic Islamic banks' profitability are the same as the variables that determine the foreign Islamic banks' profitability in Malaysia.

The Chow test consists of breaking the sample into two structures, estimating the model for each of them, and then comparing the RSS (residual sum of squares) from the separate models with that of the whole sample. In order to apply Chow test the F statistics can be calculated using the E-Views software or the Gretl econometric software. As the next step, we had compared the F statistics with the critical F [k, $(n_1+n_2 - 2k)$] for the required significance level. If F statistical > F critical then we reject the hypothesis H_o that the parameters are stable for the entire data set, and conclude that there is evidence of structural instability. The Chow test might suggest that there is parameter instability; it does not give us any information regarding which parameters are affected, but it implies that further step is to be conducted.

Based on what is mentioned above, the Chow test is used to test whether the variables that determine the domestic Islamic banks' profitability are the same as the variables that determine the foreign Islamic banks' profitability.

5.4.1 Findings of the differences in the determinants of profitability between domestic and foreign Islamic banks in Malaysia

The Chow test is used here which offers the Gretl econometric software. The Chow test option which tests whether or not the parameters are stable is implemented. As pointed above, the determinants of banks' profitability are examined using two dependent variables, namely the return on assets (ROA) and return on equity (ROE). Because the determinants of bank profitability are tested using two models, this part of the study uses both models to test the differences in the determinants of profitability using the ROA and ROE as the dependent variables.

Model (1):

$$ROA_{it} = \alpha_{0+} \beta_1 OHTA + \beta_2 LOTA + \beta_3 DTA + \beta_4 GDPGR + \beta_5 GDPPC + \beta_6 CONC + \varepsilon_{it}$$

$$ROE_{it} = \alpha_{0+} \beta_1 OHTA + \beta_2 LOTA + \beta_3 DTA + \beta_4 GDPGR + \beta_5 GDPPC + \beta_6 CONC + \varepsilon_{it}$$

Model (2):

$$ROA_{it} = \alpha_{0+} \beta_1 CRTA + \beta_2 LATA + \beta_3 TE + \beta_4 INF + \beta_5 LOGTA + \beta_6 LOGAGE + B_7 GFC + \varepsilon_{it}$$

$$ROE_{it} = \alpha_{0+} \beta_1 CRTA + \beta_2 LATA + \beta_3 TE + \beta_4 INF + \beta_5 LOGTA + \beta_6 LOGAGE + B_7 GFC + \varepsilon_{it}$$

5.4.1.1 Findings of the differences in the determinants of profitability, ROA as dependent variable, Model (1)

Table 5.30: Result of the Chow test, ROA as the dependent variable, model (1)

F- statistic	d.f.
8.4323	(7, 222)

Table 5.31: The critical F value at 5%, ROA as the dependent variable, model (1)

F- tables	d.f.
2.0509	(7, 222)

As shown above, (F statistical = 8.4323 > F critical = 2.0509) (calculated F value exceeds the critical F value at 5%). Thus, it can be concluded that there is evidence of structural instability. This means that using a model (1) with the ROA the estimated coefficients of the determinants of domestic Islamic banks are different from that of the foreign Islamic banks.

5.4.1.2 Findings of the differences in the determinants of profitability, ROA as dependent variable, Model (2)

Table 5.32: Result of the Chow test, ROA as the dependent variable, model (2)

F- Statistic	d.f.
5.5235	(8, 220)

Table 5.33: The critical F value at 5%, ROA as the dependent variable, model (2)

F- tables	d.f.
1.9806	(8, 220)

As shown above, (F statistical = 5.5235 > F critical = 1.9806) (calculated F value exceeds the critical F value at 5%). Thus, it can be concluded that there is evidence of structural instability. This means that using a model (2) with the ROA the estimated coefficients of the determinants of domestic banks are different from that of the foreign Islamic banks.

5.4.1.3 Findings of the differences in the determinants of profitability, the (ROE) as the dependent variable, Model (1)

Table 5.34: Result of the Chow test, ROE as the dependent variable, model (1)

F- Statistic	d.f.
6.2836	(7, 222)

Table 5.35: The critical F value at 5%, ROE as the dependent variable, model (1)

F- Tables	d.f.
2.0509	(7, 222)

As shown above, (F statistical = 6.2836> F critical = 2.0509) (calculated F value exceeds the critical F value at 5%). Thus, it can be concluded that there is evidence of structural instability. This means that using a model (1) with the ROE; the estimated coefficients of the determinants of domestic Islamic banks are different from that of the foreign Islamic banks.

5.4.1.4 Findings of the differences in the determinants of profitability, the (ROE) as the dependent variable, Model (2)

Table 5.36: Result of Chow test, ROE as the dependent variable, model (2)

F- Statistic	d.f.
2.1693	(8, 220)

Table 5.37: The critical F value at 5%, ROE as the dependent variable, model (2)

F- Tables	d.f.
1.9806	(8, 220)

As shown above, (F statistical = 2.1693 > F critical = 1.9806) (calculated F value exceeds the critical F value at 5%). Thus, it can be concluded that there is evidence of structural instability. This means that using a model (2) with the ROE; the estimated coefficients of the determinants of domestic Islamic banks are different from that of the foreign Islamic.

5.4.2 Findings of the Source of differences in the determinants of profitability between domestic and foreign Islamic banks in Malaysia

In section 5.4.1 above, the Chow test is used to examine the structural stability of the regression model. The results of the Chow test show that domestic banks' and foreign banks' profitability determinants are different. However, we could not tell whether the difference in the two regressions is due to the differences in the intercept terms or the slope coefficients, or both. Following Awdeh (2005) and Azam *et al.*, (2012) the study split the sample into two categories, domestic Islamic banks and foreign Islamic banks and the multiple regression technique is applied to analyse the internal and external determinants.

5.4.2.1 Findings of the source of differences in the determinants of profitability ROA as the dependent variable, Model (1)

Table 5.38: Results of Domestic and Foreign Malaysian Islamic banks, Panel GLS, ROA as the Dependent Variable

Independent Variables	*Model (1)*			
	Domestic Islamic Banks		**Foreign Islamic Banks**	
	Coefficient	Prob.	Coefficient	Prob.
C	0.001899**	0.0286	-0.014954**	0.0432
OHTA	0.095202***	0.0000	0.129015	0.3268
LOTA	0.002284***	0.0000	0.005126***	0.0015
DTA	0.001644*	0.0890	0.019948***	0.0024
GDPGR	0.001572**	0.0303	-0.002234	0.6312
GDPPC	0.0000313	0.9852	-0.000952	0.4138
CONC	0.001642	0.1106	0.004669	0.8439
R^2	0.434604	-	0.329330	-
F	20.11360***	0.0000	5.319677***	0.0001
DW	1.950002	-	1.842807	-
N	164	-	72	-

*, ** and *** indicate significance levels of 10, 5, 1 percent respectively.

Table 5.39: Results of White heteroskedasticity test of domestic and foreign banks determinants using model (1) and the ROA as the dependent variable

	F-statistic	Prob. F-statistic
With estimation of domestic banks determinants	3.463953	0.0000
With estimation of Foreign banks determinants	3.323217	0.0002

Table (5.38) indicates that there is no evidence of the autocorrelation problem being present in both models, due to the value of the Durbin-Watson (DW) test statistics being located between d_u and 4-d_u value (zone of no autocorrelation). Results of White's heteroscedasticity test in Table (5.39) find evidence of heteroscedasticity. Therefore, the null hypothesis of no heterogeneity is rejected for the model. The problem of heteroscedasticity is corrected using the white cross-section procedure automatically.

Table (5.38) above includes the results of the determinants of profitability for domestic Islamic banks and foreign Islamic banks using the ROA as the dependent variable.

The overhead expenditure (OHTA) has a positive and statistically significant impact on the ROA of domestic banks and positive insignificant impact on the ROA of foreign banks. The result of domestic banks means that domestic bank managers sacrifice profits to maximize utility through the expense preference behavior, which is in line with the Expense-Preference behavior theory. Therefore, it can be concluded that the OHTA variable is significant in determining banks' profitability of domestic banks, whereas it is not significant in determining banks' profitability of foreign banks.

Loans ratio (LOAT) has a positive and statistically significant impact on the ROA of domestic and foreign banks. It analyzes that domestic and foreign banks play the intermediation role between the lenders and borrowers, which emphasizes that more deposits are transformed into loans. Therefore, the loans of domestic and foreign banks have an important role as the source of profits.

Deposits Ratio (DTA) as expected has a positive effect for both domestic and foreign banks and it shows that receiving more deposits improves domestic and foreign banks' ROA. Thus, the DTA as a variable is important in determining the profitability of domestic and foreign banks.

Gross domestic product growth rate (GDPGR) has a positive and statistically significant impact on the ROA of domestic banks and a negative insignificant impact on the ROA of Foreign banks. This might indicate that domestic banks only have benefited from the economic growth. Therefore, the GDPGR variable is important in determining banks' profitability of only the domestic banks.

The gross domestic product per capita (GDPPC) does not affect the ROA of domestic and foreign banks. The result of this GDPPC variable gives us the idea that this variable is not significant in determining banks' profitability of domestic and foreign banks.

Concentration ratio (CONC) has a positive and insignificant impact on the ROA for both domestic and foreign banks, which is not in line with the structure-conduct-performance theory. This result implies that the CONC variable is not significant in determining the profitability of domestic and foreign banks.

5.4.2.2 Findings of the source of differences in the determinants of profitability ROA as the dependent variable, Model (2)

Table 5.40: Results of Domestic and Foreign Malaysian Islamic banks, Panel GLS, ROA as the Dependent Variable

Independent Variables	*Model (2)*			
	Domestic Islamic Banks		**Foreign Islamic Banks**	
	Coefficient	Prob.	Coefficient	Prob.
C	-0.003172**	0.0216	-0.013757***	0.0015
CRTA	0.017338***	0.0000	-0.004840	0.3885
LATA	0.000195	0.7266	0.003815	0.2553
TE	0.000951***	0.0082	0.006589*	0.0655
INF	-0.000917	0.2565	-0.030160***	0.0001
LOGTA	0.000423***	0.0028	0.001236**	0.0205
LOGAGE	-0.000307***	0.0001	-0.000720	0.1170
GFC	-0.000262***	0.0000	-0.000870**	0.0413
R^2	0.536210	-	0.437006	-
F	25.76560***	0.0000	7.096851***	0.0000
DW	2.000532	-	1.843194	-
N	164	-	72	-

*, ** and *** indicate significance levels of 10, 5, 1 percent respectively.

Table 5.41: Results of the White's heteroskedasticity test of domestic and foreign banks determinants using model (2) and the ROA as the dependent variable

	F-statistic	Prob. F-statistic
With estimation of domestic banks determinants	2.380602	0.0003
With estimation of foreign banks determinants	1.358313	0.1814

Table (5.40) indicates that there is no evidence of the presence of the autocorrelation problem in both models. Results of White's heteroscedasticity test in Table (5.41) find evidence of heteroscedasticity with the estimation of domestic banks' determinants. The problem of heteroscedasticity is corrected using the white cross-section procedure

automatically which is provided in the E-Views software to solve this problem. In the meantime, no heteroscedasticity evidence is found with the estimation of foreign banks' determinants.

Table (5.40) above includes the results of the variables which are tested as determinants of banks' profitability for domestic Islamic banks and foreign Islamic banks using the return on assets (ROA) as the dependent variable.

Capital and reserves to total assets (CRTA) affects domestic and foreign Islamic banks in different ways, where the CRTA has a positive and statistically significant impact on the ROA of domestic banks, whereas the CRTA has a negative and insignificant impact on the ROA of foreign banks. Therefore, foreign banks in Malaysia should not focus on increasing the capital and reserves to increase their profitability. It can be concluded that capital and reserves variable is important in determining banks' profitability of domestic banks, but it is not significant in determining banks' profitability of foreign banks.

Liquidity ratio (LATA) has a positive and insignificant impact on the ROA for both domestic and foreign banks, which is not in accordance with what is expected. This indicates that liquidity is not a significant factor that contributes towards the profitability of Islamic banks in Malaysia. Thus, the liquidity variable is not significant in determining the profitability of domestic and foreign banks.

Technical Efficiency (TE) has a positive and statistically significant impact on the ROA of domestic and foreign banks, which is in line with the Efficient-structure theory. The result suggests that high profits of banks are consistent with higher efficiency. Therefore, the efficiency variable is important in determining the profitability of domestic and foreign banks.

Inflation rate (INF) has a negative and insignificant impact on the ROA of domestic banks. Nonetheless, a negative significant impact on the ROA of foreign banks is found. Therefore, high INF is associated with a low ROA of foreign banks. This may be due to the fact that, as Bashir (2003) has suggested, that in the case of Islamic banks, the inflation may have a negative effect on bank profitability if wages and other costs grow faster than the rate of inflation.

Bank size (LOGTA) has a positive and statistically significant impact on the ROA of domestic and foreign banks, which is in line with the Economics of Scale theory. This result indicates that domestic and foreign banks benefit from the economies of scale and large size is associated with high profitability, also the bank size is an important factor in explaining the variation of profitability for domestic and foreign banks.

Bank age (LOGAGE) has a negative and statistically significant impact on the ROA of domestic banks and a negative and insignificant impact on the ROA of foreign banks. This result means that old banks are less profitable than the new banks.

Global financial crisis (GFC) as expected has a negative and statistically significant impact on the ROA of domestic and foreign banks. This result means that Islamic banks in Malaysia are negatively affected by the global financial crisis in terms of profitability.

5.4.2.3 Findings of the source of differences in the determinants of profitability, ROE as the dependent variable, Model (1)

Table 5.42: Results of Domestic and Foreign Malaysian Islamic banks, Panel GLS, ROE as the Dependent Variable

Independent Variables	*Model (1)*			
	Domestic Islamic Banks		**Foreign Islamic Banks**	
	Coefficient	Prob.	Coefficient	Prob.
C	-0.058934**	0.0101	-0.072597*	0.0648
OHTA	-1.244043**	0.0151	-1.111583	0.3180
LOTA	0.034514***	0.0000	0.008855	0.3587
DTA	0.081683***	0.0000	0.133802***	0.0048
GDPGR	0.038208***	0.0031	0.021074	0.4727
GDPPC	0.0000459	0.9896	-0.000123*	0.0806
CONC	0.022378	0.2622	0.197642	0.1686
R^2	0.254695	-	0.313116	-
F	8.941990***	0.0000	4.938379***	0.0003
DW	1.905262	-	1.851692	-
N	164	-	72	-

*, ** and *** indicate significance levels of 10, 5, 1 percent respectively.

Table 5.43: Results of White heteroskedasticity test of domestic and foreign banks determinants using model (1) and the ROE as the dependent variable

	F-statistic	Prob. F-statistic
With estimation of domestic banks determinants	2.484815	0.0003
With estimation of foreign banks determinants	1.524891	0.1046

The results in Table (5.42) show that the value of the Durbin-Watson (DW) test statistics indicates that there is no evidence of the presence of the autocorrelation problem in both models. Results of White's heteroscedasticity test in Table (5.43) find evidence of heteroscedasticity with the estimation of domestic banks' determinants. Therefore, the null hypothesis of no heterogeneity is rejected for the model. The problem of heteroscedasticity is corrected using the white cross-section procedure automatically. Meanwhile, no heteroscedasticity evidence is found with the estimation of foreign banks' determinants.

Table (5.42) shows clearly that different factors influence domestic banks and foreign banks' ROE, and some factors that are important for domestic banks become unimportant for foreign banks, and vice versa.

Regression estimates in Table (5.42) indicate that the variable overhead-to-total assets (OHTA) has a negative and statistically significant impact on the ROE of domestic banks and negative insignificant impact on the ROE of foreign banks. The result of domestic banks means that the profitability of domestic banks will increase if the bank is better able to manage costs. On the other hand, the foreign banks are not able to control their expenses to realize lower profits. Therefore, it can be concluded that the OHTA variable has a significant effect in determining banks' profitability of domestic banks, whereas it is not significant in determining banks' profitability of foreign banks.

Loans ratio or financing (LOAT) has a positive and statistically significant impact on the ROE of domestic banks and a positive insignificant impact on the ROE of foreign banks. The loans of foreign banks have not a significant role as the source of revenue; it is probably that the profits of foreign banks are operating in isolation from the loans during the period. Therefore, loans do not improve the profitability of foreign banks

and also this shows that domestic banks that expand the lending will realize higher profits.

Deposits ratio (DTA) has a highly positive effect for both domestic and foreign banks and it shows that receiving more deposits improves domestic and foreign banks' ROE. Thus, the DTA variable is important in determining the profitability of domestic and foreign banks.

The results of the macroeconomic variables' impact reveal that the gross domestic product growth rate (GDPGR) has a positive and statistically significant impact on the ROE of domestic banks and a positive insignificant impact on the ROE of foreign banks. This might indicate that domestic banks only have benefited from the economic growth.

The macroeconomic variable, which is the gross domestic product per capita (GDPPC) does not leave any impact on the ROE of domestic banks but it has negatively affected the ROE of foreign banks. This implies that big GDPPC tends to be associated with less profitability in foreign banks. Therefore, high GDPPC is associated with low ROE of foreign banks. The result of the GDPPC variable implies that this variable is not significant in determining the profitability of domestic banks.

The structural variables' result indicates that the concentration ratio (CONC) has a positive and insignificant impact on the ROE for both domestic and foreign banks, which is not in line with the structure-conduct-performance theory. This result implies that the CONC variable is not significant in determining the profitability of domestic and foreign banks. This is supported by Choong *et al.* (2012) which found that concentration has a positive and insignificant impact on ROE of Malaysian Islamic banks.

5.4.2.4 Findings of the source of differences in the determinants of profitability, ROE as the dependent variable, Model (2)

Table 5.44: Results of Domestic and Foreign Malaysian Islamic banks, Panel GLS, ROE as the Dependent Variable

Independent Variables	*Model (2)*			
	Domestic Islamic Banks		**Foreign Islamic Banks**	
	Coefficient	Prob.	Coefficient	Prob.
C	-0.035456**	0.0242	-0.048222	0.4902
CRTA	-0.217888***	0.0000	-0.158178***	0.0040
LATA	0.002433	0.6579	0.039475	0.3184
TE	0.021603***	0.0000	0.059742	0.1200
INF	-0.021872**	0.0394	-0.272374**	0.0398
LOGTA	0.007877***	0.0000	0.003899	0.5619
LOGAGE	-0.005528***	0.0000	-0.008634**	0.0164
GFC	-0.004222***	0.0000	-0.005630	0.3153
R^2	0.577783	-	0.458992	-
F	30.49685***	0.0000	7.756809***	0.0000
DW	2.033659	-	2.123708	-
N	164	-	72	-

*, ** and *** indicate significance levels of 10, 5, 1 percent respectively.

Table 5.45: Results of White heteroskedasticity test of domestic and foreign banks determinants using model (2) and the ROE as the dependent variable

	F-statistic	Prob. F-statistic
With estimation of domestic banks determinants	3.551973	0.0000
With estimation of foreign banks determinants	0.756118	0.7935

The results in Table (5.44) show that the value of the Durbin-Watson test statistics indicates that there is no evidence of the autocorrelation problem present in both models. Results of White's heteroscedasticity test in Table (5.45) find evidence of heteroscedasticity with the estimation of domestic banks' determinants. The problem of heteroscedasticity is corrected using the white cross-section procedure automatically available in the E-Views software to solve this problem. By contrast, no heteroscedasticity evidence is found with the estimation of foreign banks determinants.

Regression estimates in Table (5.44) indicate that the variable capital and reserves to total assets (CRTA) has a negative and statistically significant impact on the ROE of both domestic and foreign banks. Therefore, Islamic banks in Malaysia should not place a focus on increasing the capital and reserves to increase their profitability. This result is supported by other previous studies, among them: Pratomo and Ismail (2006) and Wasiuzzaman and Tarmizi (2010) reported that an increase in capital of Islamic banks in Malaysia is not recommended, due to the negative and significant of CRTA with return on equity is found and it reflects that the higher of capital of bank, the lower of its performance.

Liquidity ratio (LATA) has a positive and statistically insignificant impact on the return on equity for both domestic and foreign banks, which is not in accordance with what is expected. This indicates that liquidity is not a significant factor that contributes towards the profitability of Islamic banks in Malaysia. Thus, LATA as the variable is not significant in determining the profitability of domestic and foreign banks. This may as mentioned before due to the conditions of uncertainty with financial crisis, that the banks resorted to increasing the rate of liquidity, while profits were growing, but with a lower rate of operational efficiency.

Technical Efficiency (TE) has a positive and statistically significant impact on the ROE of domestic banks and a positive insignificant impact on the ROE of Foreign banks. The result suggests that high profits of domestic banks are consistent with higher efficiency. Meanwhile, the efficiency does not improve the profitability of foreign banks. Therefore, the efficiency variable is significant in determining the profitability of only the domestic banks. The latter result is found also by Zamil (2007).

The macroeconomic variable inflation rate (INF) has a negative and a statistically significant impact on the ROE for both domestic and foreign banks. Therefore, high INF is associated with low ROE of banks. As Bashir (2003) has pointed out, this may be due to the case of Islamic banks, where the inflation may have a negative effect on bank profitability if wages and other costs are growing faster than the rate of inflation. Thus, this may suggest that during the period of study, Islamic banks could not accurately predict the levels of inflation and the costs of banks undergo faster increase

than their revenues. This result is consistent with similar other studies; see for example, Khrawish et al. (2011), Zeitun (2012) and Azam and Siddiqui (2012).

Bank size (LOGTA) has a positive and statistically significant impact on the ROE of domestic banks and a positive insignificant impact on the ROE of foreign banks. This result indicates that large size is associated with high profitability and the bank size is an important factor in explaining the variation of profitability for domestic banks and the domestic banks could enjoy the economies of scale and produce at lower average cost per unit. Meanwhile, bank size is not significant in determining the profitability of foreign banks.

Bank age (LOGAGE) has a negative and statistically significant impact on the ROE of both domestic and foreign banks. This result means that old banks are less profitable than the new banks. This is supported by Mirzaei *et al*., (2011) who have found that the effect of bank age is negative and significant on the ROE of the banks in advanced economies.

Global financial crisis (GFC) as expected has a negative and statistically significant impact on the ROE of domestic banks and an insignificant impact on the ROE of foreign banks. This result means that domestic Islamic banks in Malaysia are negatively affected by the global financial crisis in terms of profitability. Meanwhile, the profitability of foreign Islamic banks is not affected by the global financial crisis.

5.5 Findings of the Determinants of Islamic Banks' Efficiency in Malaysia

This section aims to investigate whether or not banks' efficiency in the Islamic banking industry in Malaysia is determined by a set of profitability variables. Therefore, technical efficiency is used as the dependent variable. Technical efficiency equals the total bank outputs divided by the total bank inputs. The Data Envelopment Analysis (DEA) approach is used to estimate the technical efficiency of the Malaysian Islamic banks during the period of q_1 2007-q_4 2010 for each bank.

As pointed out in chapter three, in cases with limited dependent variables (that the DEA index ranges between zero and one) Tobit regression model is known to generate consistent estimates of regression coefficients (Grigorian and Manole 2006). Tobit multiple regressions allow for the limited dependent variables. To estimate the relevant variables in the Tobit model, a method of maximum likelihood (ML) is used (Gujarati, 2003). Following prior studies like Worthington (2001), Sufian and Habibullah (2010b), these studies use Tobit regression model with unbalanced panel data to analyze the factors that influence the banks' efficiency, which is offered in E-Views software.

A set of independent variables are used here as determinants of banks' efficiency, where these variables are the same variables which are used as determinants of bank's profitability; Capital ratio and reserves (CRTA), Overhead ratio (OHTA), Ratio of total loans (LOTA), Deposits Ratio (DTA), Liquidity Ratio (LATA) , The annual inflation rate (INF), Gross domestic product growth rate (GDPG), The GDP per capita (GDPPC), The bank size (LOGTA), Bank age (LOGAGE), Concentration ratio (CONC), two dummy variables are included to account, (DDF) for the type differences between the banks (domestic and foreign) that may affect the determinants of Islamic banks' efficiency, and variable (GFC) to determine the effect of the global financial crisis on the efficiency of Islamic banks in Malaysia.

Model (1):

$$TE_{it} = \alpha_{0+} \beta_1 OHTA + \beta_2 LOTA + \beta_3 DTA + \beta_4 GDPGR + \beta_5 GDPPC + \beta_6 CONC + \beta_7 DDF + \varepsilon_{it}$$

Model (2):

$$TE_{it} = \alpha_{0} + \beta_1 CRTA + \beta_2 LATA + \beta_3 INF + \beta_4 LOGTA + \beta_5 LOGAGE + B_6 GFC + \varepsilon_{it}$$

It is worth mentioning that, it is not important to test whether or not the independent variables suffer from multi-collinearity problems, due to fact that the independent variables which are used here are tested as shown in Tables (5.4), (5.11).

5.5.1 Testing by model (1)

The study uses Tobit regression in the panel data analyses for seventeen Islamic banks during the Period of q_1 2007- q_4 2010 (quarterly data). The number of observations is 236 and unbalanced panel data are used.

The determinants of banks' efficiency model are as follows:

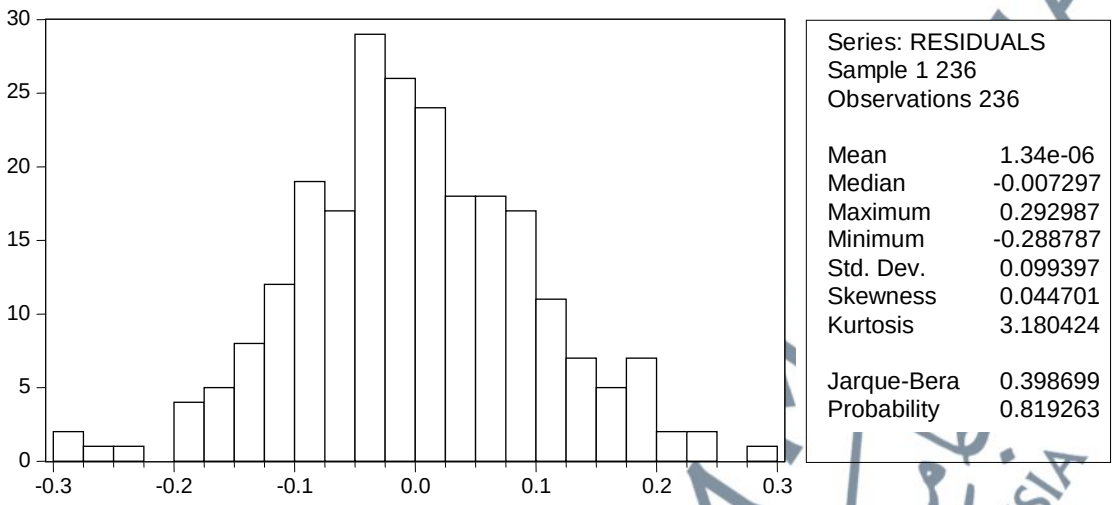
Model (1):

$$TE_{it} = \alpha_{0} + \beta_1 OHTA + \beta_2 LOTA + \beta_3 DTA + \beta_4 GDPGR + \beta_5 GDPPC + \beta_6 CONC + \beta_7 DDF + \varepsilon_{it}$$

5.5.1.1 Testing for normality

The violation of the normality assumption in limited dependent variable models may be quite severe (Gujarati, 2003). Also, Greene (2003) has pointed out that the non-normality of the residual is an important violation that can face the usage of the Tobit regression. Thus, Jarque–Bera (JB) test of normality is used.

Figure 5.5: The probability distribution of the residuals and the results of the Jarque–Bera test, model (1) with TE



The application of the Jarque–Bera test shows that the JB statistics is about .398 and the probability of obtaining such a statistics under the normality assumption is about 0.819. Therefore, the hypothesis is not rejected, and the error terms are normally distributed.

5.5.1.2 Testing for the presence of Heteroscedasticity problem

The heteroscedasticity is important violation that can face the usage of the Tobit regression, as noted by (Brooks, 2008) and Greene (2003). To detect the presence of heteroskedasticity, the white test is used. Table (5.46) displays the results of the White heteroskedasticity test**,** where evidence of heteroscedasticity can be found.

Table 5.46: The results of the White heteroskedasticity test using model (1) and TE as the dependent variable

F-statistic	Prob. F-statistic	Chi-Sq- statistic	Prob>chi2
6.992778	0.0000	127.8849	0.0000

To overcome the problem of the heteroscedasticity corrected test, the Huber/White procedure is automatically used, which is offered in the E-Views software to solve this

problem. The following Table (5.47) presents the results of the Tobit regression after correcting the problem of heteroscedasticity.

Table 5.47: Tobit regression results using a model (1) and TE as the dependent variable

Independent Variables	**Tobit regression**
C	0.557865* (0.0508)
OHTA	-1.823509*** (0.0036)
LOTA	0.734361*** (0.0000)
DTA	0.265080* (0.0918)
GDPGR	-0.045221 (0.7992)
GDPPC	0.000193 (0.6961)
CONC	0.173593 (0.4967)
DDF	0.064206*** (0.0022)
R^2	0.638016
Log likelihood	210.4691
N	236

*, ** and *** indicate significance levels of 10, 5, 1 percent, respectively.

5.5.1.3 Explaining the results

Table (5.47) presents the Tobit regression result. The relative value of the estimated Tobit R^2 indicates that the model is able to explain the influence of the variables on TE. In addition, the estimated log likelihood value confirms the model's ability to explain efficiency.

The results of the determinants of banks' efficiency in the Table above are for all Islamic banks in Malaysia using technical efficiency (TE) as the dependent variable. The variables tested as determinants of banks' efficiency are overhead to total assets

(OHTA), loans to total assets (LOTA), deposits to total assets (DTA), gross domestic product growth rate (GDPGR), gross domestic product per capita (GDPPC), concentration ratio (CONC), also the differences between domestic and Foreign Islamic banks (DDF).

The overhead to total assets (OHTA) have a negative and statistically significant impact on banks' efficiency, which gives support to the efficient structure theory. The result suggests that the high efficiency of banks is consistent with lower OHTA. This result is consistent with studies of Garza-Garcia (2012) and Ismail *et al*., (2012). Therefore, the overhead variable is important in determining the efficiency of Islamic banks in Malaysia.

Loans to total assets (LOTA) have a positive effect on banks' efficiency and statistically highly significant. The result suggests that the high efficiency of Islamic banks is consistent with high LOTA. Sufian & Habibullah (2010b) and Garza-Garcia (2012) have found that banks with higher loans are relatively better to exhibit higher efficiency levels. Based on the current result and results of the determinants of banks' profitability in this study, it can be concluded that the loans variable is important in determining both profitability and efficiency of Islamic banks in Malaysia.

Deposits to total assets (DTA) have a positive effect on banks' efficiency and also statistically significant. This result supports the view that more deposits lead to higher efficiency. Noor & Ahmad (2012) learn that the deposits are negatively insignificant related to bank efficiency, which is in contrast with this result. The findings of this study that the DTA is positively associated with banks' profitability and efficiency reveal that Islamic banks' deposits are important in determining both profitability and efficiency.

For the impact of the gross domestic product growth rate (GDPGR) the result above reveals that the GDPGR has a negative and statistically insignificant impact on banks' efficiency. This result is supported by Sufian and Habibullah (2010b). Therefore, this variable is not significant in determining banks' efficiency.

The macroeconomic variable, the gross domestic product per capita (GDPPC) has a positive and statistically insignificant impact on banks' efficiency. Therefore, the macroeconomic variable GDPPC is insignificant in determining the efficiency of Islamic banks in Malaysia during the period of study. Grigorian and Manole (2006) examine the relationship between the GDP per capita and their efficiency, but have found that the GDP per capita is significantly related to bank efficiency.

The structural variable concentration ratio (CONC) has a positive and insignificant impact on banks' efficiency. This result is supported by studies of Sufian & Habibullah (2010b) and Garza-Garcia (2012). The positive and insignificant impact of the CONC variable implies that the concentration ratio variable is insignificant in determining banks' efficiency.

The different efficiency between domestic and foreign Islamic banks as a dummy variable (DDF) has a positive and significant impact on banks' efficiency. This result is consistent with studies of Grigorian and Manole (2006), Garza-Garcia (2012) and Shah *et al*., (2012). This result reveals that domestic and foreign Islamic banks have different degrees of efficiency. Based on this result and the results which are presented in appendix (F), it can be concluded that domestic banks are more efficient than foreign banks during the period of study. This may be due to the fact that, domestic banks own 76% of the total assets of the Malaysian Islamic banking sector, while, only 24% of the total assets are owned by foreign banks during the period of study, see Appendix (F). Sufian and Habibullah (2010b) further discover that domestic banks were relatively more efficient than their foreign bank peers in the Thai banking sector from 1999 to 2008.

5.5.2 Testing by model (2)

The section above concerns with investigating whether banks' efficiency in the Islamic banking industry in Malaysia is determined by a set of profitability variables using model (1), whereas, this section is devoted to the same aim but by using model (2).

The determinants of banks' efficiency model are established below:

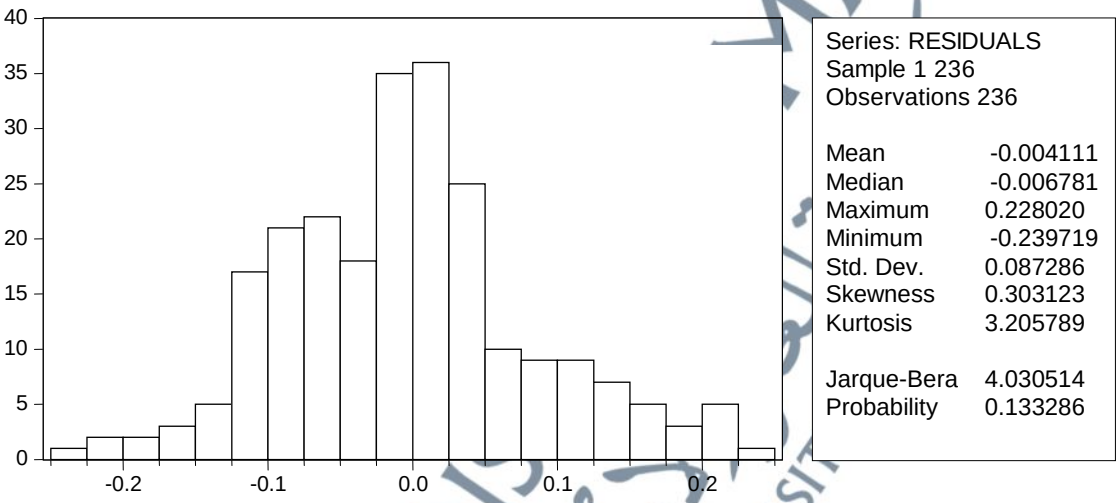
Model (2):

$$TE_{it} = \alpha_{0} + \beta_1 CRTA + \beta_2 LATA + \beta_3 INF + \beta_4 LOGTA + \beta_5 LOGAGE + B_6 GFC + \varepsilon_{it}$$

5.5.2.1 Testing for normality of residuals

The Jarque–Bera (JB) test of normality is used.

Figure 5.6: The probability distribution of the residuals and the results of the Jarque–Bera test, model (2) with TE



As the Figure (5.6) shows, the residuals seem to be symmetrically distributed. The application of the Jarque–Bera test shows that the JB statistics is 4.03 and the probability of obtaining such a statistics under the normality assumption is 0.133. Therefore, the error terms are normally distributed.

5.5.2.2 Testing for the presence of Heteroscedasticity problem

By applying White's heteroscedasticity test, the evidence of heteroscedasticity can be found.

Table 5.48: The results of the White heteroskedasticity test using model (2) and TE as the dependent variable

F-statistic	Prob. F-statistic	Chi-Sq-Statistic	Prob>chi2
2.086769	0.0024	48.63865	0.0046

To overcome the problem of heteroscedasticity problem, the Huber/White procedure can be automatically used to solve this problem. The Huber/White option is used to correct the heteroscedasticity. The following Table (5.49) presents the results of the Tobit regression after correcting the problem of heteroscedasticity.

Table 5.49: Tobit regression results using a model (2) and TE as the dependent variable

Independent Variables	**Tobit regression**
C	0.116184 (0.2725)
CRTA	0.585862*** (0.0005)
LATA	-0.638069*** (0.0000)
INF	-0.043847 (0.8682)
LOGTA	0.100337*** (0.0000)
LOGAGE	-0.055797*** (0.0000)
GFC	-0.009245 (0.5404)
R^2	0.630050
Log likelihood	207.3842
N	236

*, ** and *** indicate significance levels of 10, 5, 1 percent respectively.

5.5.2.3 Explaining the results

Table (5.49) presents Tobit regression result. The estimated Tobit R^2 indicates that the model is able to explain the influence of the variables on banks' efficiency. In addition, the estimated log likelihood value confirms the model's ability to explain the banks' efficiency.

The variables tested as determinants of banks' efficiency are capital and reserves to total assets (CRTA), liquidity to total assets (LATA), inflation rate (INF), bank size

(LOGTA), bank age (LOGAGE) and effect of the global financial crisis on the efficiency (GFC).

Capital and reserves (CRTA) have a positive and significant impact on banks' technical efficiency. Grigorian and Manole (2006), Sufian and Habibullah (2010b), Garza-Garcia (2012), Ismail *et al*., (2012), Sufian *et al*., (2012) and Noor & Ahmad (2012) have come to a similar result that; high level of bank efficiency is consistent with high CRTA. This result indicates that the CRTA variable is important in determining the efficiency of Islamic banks.

Liquidity ratio (LATA) has a negative and statistically significant impact on banks' technical efficiency. This result suggests that banks with more liquidity have lower efficiency, where such banks lead to low funds available to financing, thereby, causing low efficiency. Sufian *et al*., (2012) have found that liquidity has a relationship with Malaysian Islamic banks' efficiency, but, the signal is contrasting with this result. The result of this study indicates that liquidity is a significant factor that contributes towards the efficiency of Islamic banks in Malaysia. Otherwise, the results of the determinants of banks' profitability in this study indicate that the LATA variable is insignificant in determining Islamic banks' profitability.

The macroeconomic variable inflation rate (INF) has an insignificant negative impact on banks' technical efficiency. Sufian *et al*., (2012) have found that the inflation exerts negative influence on Malaysian domestic Islamic banks' efficiency. The result of this study is supported by the studies of Sufian and Habibullah (2010b) and Noor & Ahmad (2012). The insignificant impact of the INF variable indicates that the inflation rate variable is not significant in determining banks' efficiency.

Bank size (LOGTA) has a highly significant positive impact on banks' technical efficiency, which means that the large bank size is associated with high efficiency. This result is in line with the economies of scale theory that the Islamic bank is able to enjoy the economies of scale and to produce at lower cost, and thus, to enhance its efficiency. This result is supported by studies of Ersoy (2009), Ismail *et al*., (2012), Sufian *et al.,* (2012) and Noor & Ahmad (2012). This result and the results of the determinants of banks' profitability in this study have revealed that the LOGTA

variable is important in determining both profitability and efficiency of Islamic banks in Malaysia.

Bank age (LOGAGE) has a negative and highly significant impact on banks' technical efficiency. This result means that old banks are less efficient than the new banks. Grigorian and Manole (2006) examine the relationship between bank age and their efficiency, but, the result is in contrast with this result, that they have found bank age is positively insignificant related to bank efficiency. The results of the determinants of banks' profitability in this study reveal that the LOGAGE variable also has a negative significant impact on banks' profitability.

The global financial crisis (GFC) has a negative and insignificant impact banks' technical efficiency. This result is consistent with study of Noor & Ahmad (2012). This result means that the efficiency of Islamic banks in Malaysia is not affected by the global financial crisis, whereas, the Islamic banks in Malaysia are affected by the global financial crisis in terms of profitability as shown in the results of the determinants of banks' profitability.

CHAPTER SIX

SUMMARY AND CONCLUSIONS

6.1 Summary for the chapters

This study aims to identify the determinants of profitability for Islamic banks operating in the Malaysia for the period from the first quarter of 2007 to the fourth quarter of 2010. In this regard, the study has examined how bank specific determinants, financial structure determinants and macroeconomic variables affect the profitability of domestic and foreign Islamic banks in Malaysia. Furthermore, the study investigates whether banks' efficiency in the Islamic banking industry in Malaysia is determined by a set of profitability variables. In order to construct the relevant time series data that are collected from different sources, the major source of the bank-specific variables depends on quarterly balance sheets and income statements for all seventeen Islamic banks in Malaysia. In terms of the macroeconomics variables the data are collected from the Department of Statistics, Malaysia. Unbalanced panel data multiple regression technique has been applied to analyse the cross-section and time series data to find out the relationship between the variables and the determination of the effect of independent variables on the dependent variable.

The study is presented in six main chapters as follows: Chapter one introduces the problem statement and the research question, which importance is highlighted, in addition to the introduction of its main objectives. Furthermore, this chapter included research motivation and contribution, and organization of the study

Chapter two discusses a brief background on various topics such as the rationale behind Islamic banking, definition of Islamic banks, history and development of Islamic banking in Malaysia, and Islamic banking financing modes in Malaysia.

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Chapter three reviews the literature on the determinants of banks' profitability. This chapter discusses in eleven main sections:

The first section gives a brief introduction. The second section discusses the economic theories concerning banks' profitability that are relevant for the study of the relationship between a set of internal and external characteristics and the profitability in the banks.

The third section discusses the measure of banks' profitability where there are several ratios used to measure the profitability of banks and this study has used two measures of profitability which can be measured for Islamic banks, return on assets and return on equity.

The fourth section to the eleventh section of this chapter review previous studies that have investigated banks' profitability and banks' efficiency worldwide using different methods including; panel data analyses, Tobit regression analyses and data envelopment analysis. This chapter is divided to: previous studies on the determinants of Islamic bank's profitability, previous studies on the determinants of Islamic and conventional banks' profitability, previous studies on determinants of conventional banks' profitability, previous studies on the financial crises and bank performance, previous studies on profitability and efficiency differences between domestic and foreign banks, previous studies on banks' efficiency and the last section summarizes the previous studies. The main findings of these previous studies can be summarised as follows: firstly, regarding the impact of bank specific variables (capital ratios, overhead expenses ratio, loans ratio, deposit ratio, liquidity ratio and bank efficiency) in the banks' profitability, the results of these studies indicate that capital ratios, overhead expenses ratio, loans ratio, deposit ratio and liquidity ratio have a positive impact on banks' profitability in some studies and a negative impact on banks' profitability in other studies. On the other hand, most of the previous studies on efficiency bank have found that banks' profitability has a positive significant impact on efficiency bank. Second of all, the macroeconomic variables (inflation, GDP growth and GDP per capita) have either a positive or a negative, or an insignificant impact on banks' profitability. Finally, regarding the impact of the structural variable (concentration ratio) most of the studies have reviewed either a positive or

an insignificant impact on banks' profitability, whereas, few of these studies indicate the concentration ratio has a negative impact on banks' profitability. On the other hand, the structural variable (bank size) has either a positive or a negative, or an insignificant impact on banks' profitability.

Chapter four explains the research methodology of the study. This chapter with the introduction is divided into eleven main sections:

The second section represents that the population of research includes all Islamic banks operating in Malaysia (local and foreign).

The third section identifies the source of data, that the data of bank-specific variables are collected from quarterly balance sheets and income statements obtained from Malaysian Islamic banks. Regarding the macroeconomics variables, the data have been collected from the Department of Statistics, Malaysia.

The fourth section discussed the software used, that this study uses two software, E-Views software, and Gretl econometric software.

Both the fifth and sixth sections explain the variables of the study and how to measure them. Internal variables or bank specific factors and external variables or macroeconomic variables and the financial structure variables are used. Two dependent variables, namely the return on asset and return on equity are used with a set of independent variables. Internal variables of the bank are capital ratio and reserves, overhead ratio, ratio of total loans, deposit ratio, liquidity ratio and technical efficiency. Macroeconomic variables are the annual inflation rate, gross domestic product growth rate, and the GDP per capita. Structural variables are bank size, bank age and concentration ratio. Two dummy variables are included to account for the differences between the banks (DDF) that may affect the determinants of Islamic banks' profitability, and the variable (GFC) to determine the effect of the global financial crisis on the profitability of Islamic banks in Malaysia.

The hypotheses of the study are shown in the sections seventh. Next, the eighth and ninth section display the estimation model of profitability determinants and estimation method of efficiency determinants used to achieve the objectives of this study. The multiple regression analysis in the linear functional form is applied to analyse the cross-section time series data (panel data) to examine the inter-relation between measures of bank profitability and the determining factors. The use of this form of the equation and the regression analysis is supported by most of the studies on bank profitability, such as Short (1979), Bashir (2003), Naceur (2003), Haron (2004), Bashir and Hassan (2003), Sanusi and Ismail (2005), Alkassim (2005), Vong and Chan (2006), Fotios and Kyriaki (2007), Al-Jarrah *et al*., (2010).

Based on the general consensus of the literature reviewed in the area of the study, the tenth section goes on to explain the panel data analysis structure in different methods that have been used in this study. The Pooled Ordinary Least Squares (POLS), Fixed Effects Models (FEM), and Random Effects Models (REM) are used to find out the relationship between the variables and the determination of the effect of independent variables on the dependent variable. Moreover, the regression analysis and the violation of the regression assumptions are discussed in the last section of this chapter.

Chapter five presents the results and discussion. This chapter starts with the descriptive statistics including mean, median, standard deviation, skewness and kurtosis, and it concludes that the possibility of drawing on the results of the regression model is allowed. Before analysing the regression model, in the next section, we examine if the variables in the models are stationary or non stationary. The results indicate that all the variables are stationary at 1% level of significance.

After what mentioned above, this chapter is divided into four main sections, according to the objectives of the research:

The first section displays and discusses the findings of the determinants of Islamic bank's profitability using the ROA as the dependent variable. The tests were undertaken across the banks selected, using both pooled and panel models. Various tests have been performed to identify the right estimator for the model. To identify which model is appropriate, the pooled model or the panel random effect model, The

Breusch-Pagan Lagrange multiplier (LM) test is used. To choose between the pooled model and the panel fixed effect model the joint significance test is used. To determine the use of the fixed effect model or the random effect model, the Hausman test is used. The linearity test, multicollinearity test, normality of residual test, white heteroskedasticity test and Durbin Watson test for autocorrelation are employed. The results of these tests confirm that the multiple regression analysis is dependable to interpret the dependent variable. The results of this section indicate the following: the first results with return on assets as the dependent variable indicate that specific bank, financial structure and macroeconomic determinants are able to explain the significant part of the profitability of Islamic banks in Malaysia. The results have shown that, the overhead expense ratio, loan ratio, deposit ratio, technical efficiency and bank size have a positive significant effect in determining banks' profitability. Meanwhile, the inflation rate has a negative significant effect in determining banks' profitability. The findings of this section further indicate that capital and reserves, liquidity ratio, bank age, gross domestic product growth rate, gross domestic product per capita and concentration ratio are not able to explain the variability of the profitability of Islamic banks.

The second section has displayed and discussed the findings of the determinants of Islamic bank's profitability using the ROE as the dependent variable. The results with return on equity as the dependent variable indicate that, the loan ratio, deposit ratio, gross domestic product growth rate, and bank size have a positive significant effect in determining banks' profitability. Meanwhile, capital and reserves, banks' age and inflation rate have a negative significant effect in determining banks' profitability. The findings of this section further indicate that the overhead expense ratio, liquidity ratio, technical efficiency, gross domestic product per capita and concentration ratio are not able to explain the variability of the profitability of Islamic banks. The third results reveal that domestic and foreign Islamic banks have different levels of profitability. Other findings of this section suggest that the profitability of Islamic banks is negatively affected by the global financial crisis.

The third section displays and identifies the differences in the determinants of profitability between domestic and foreign Islamic banks in Malaysia. The Chow test is used to test whether the variables that determine the domestic Islamic

banks' profitability are the same as those that determine the foreign Islamic banks' profitability. The results of the Chow test confirm that the determinants of domestic Islamic banks are different from that of the foreign Islamic banks. In order to find out the differences in the profitability determinants, the sample of banks is divided into two sub-samples (domestic and foreign). The results of this section indicate that, domestic Islamic banks are more profitable than foreign Islamic banks. The results also show that some of the profitability determinants of domestic banks are different from those of foreign banks. The findings of the study further indicate that the profitability of domestic and foreign Islamic banks in Malaysia is negatively affected by the global financial crisis when the ROA is used as a measure of banks' profitability but, the profitability of foreign Islamic banks is not affected by the global financial crisis when the ROE is used as a measure of banks' profitability.

The fourth section investigates whether or not banks' efficiency in the Islamic banking industry in Malaysia is determined by a set of profitability variables. This section uses the Data Envelopment Analysis (DEA) Approach to estimate technical efficiency as the dependent variable. Tobit multiple regression method is used to analyse the efficiency determinants of Malaysian Islamic banks. Tobit multiple regression is used, which allows for limited dependent variables. This section examines how bank specific, financial structure and macroeconomic variables affect the profitability and efficiency of Islamic banks. The empirical results indicate that specific bank, financial structure and macroeconomic determinants are able to explain the significant part of profitability and efficiency of Islamic banks in Malaysia. The results further point to the fact that domestic and foreign Islamic banks have different profitability and efficiency. The findings also indicate that some factors have a significant effect in determining both profitability and efficiency of Islamic banks. Other findings have also revealed that some factors are important for banks' profitability but have apparently been unimportant for banks' efficiency. The findings also indicate that the profitability of Islamic banks is negatively affected by the global financial crisis, but the efficiency of Islamic banks is not affected.

6.2 Conclusions for research objectives

As discussed in chapter one, there are four research objectives that are to be achieved in this study. The conclusions for each research objective of this study are presented as follows:

6.2.1 Conclusion for research objective No. 1

"To identify the variables that affects the profitability of Malaysian Islamic banks"

To achieve this objective the following hypotheses are tested:

H_{1a}: There is a significant positive relationship between capital and reserves and banks' profitability.

This hypothesis is tested in sections 5.2 and 5.3. Based on the regression results presented in Tables 5.17 and 5.29, this hypothesis can be rejected when both ROA and ROE are used as a measure of banks' profitability.

H_{1b}: There is a significant positive relationship between overhead expense ratio and banks' profitability.

This hypothesis is tested in sections 5.2 and 5.3. Based on the regression results presented in Tables 5.10 and 5.23, this hypothesis can be accepted when the ROA is used as a measure of banks' profitability. This may give support for the Expense-Preference theory. On the other hand, the same hypothesis is rejected when the ROE is used as a measure of banks' profitability.

H_{1c}: There is a significant positive relationship between the loan ratio (financing) and banks' profitability.

This hypothesis is tested in sections 5.2 and 5.3. Based on the regression results presented in Tables 5.10 and 5.23, this hypothesis is accepted when both the ROA and ROE are used as a measure of banks' profitability. This means that higher loans ratio would increase banks' profitability.

H_{1d}: There is a significant positive relationship between the deposit ratio and banks' profitability.

This hypothesis is tested in sections 5.2 and 5.3. Based on the regression results presented in Tables 5.10 and 5.23, this hypothesis is accepted when both ROA and ROE are used as a measure of banks' profitability. This means that higher deposit ratio would increase banks' profitability.

H_{1e}: There is a negative relationship between liquidity ratio and banks' profitability.

This hypothesis is tested in sections 5.2 and 5.3. Based on the regression results presented in Tables 5.17 and 5.29, this hypothesis is rejected when both ROA and ROE are used as a measure of banks' profitability.

H_{1f}: There is a significant positive relationship between efficiency and banks' profitability.

This hypothesis is tested in sections 5.2 and 5.3. Based on the regression results presented in Tables 5.17 and 5.29, this hypothesis can be accepted when the ROA is used as a measure of banks' profitability. This means that high profits of Islamic banks are consistent with higher efficiency. This may give support for the Efficient-Structure Theory. On the other hand, the same hypothesis is rejected when the ROE is used as a measure of banks' profitability.

H_{1g}: There is a significant relationship between inflation and banks' profitability.

This hypothesis is tested in sections 5.2 and 5.3. Based on the regression results presented in Tables 5.17 and 5.29, this hypothesis can be accepted with a negative relationship when both ROA and ROE are used as a measure of banks' profitability. This means that costs are growing faster than the rate of inflation. Thus, this may suggest that, Islamic banks cannot accurately predict the levels of inflation and the costs of banks have faster increase than bank revenues.

H_{1h}: There is a significant positive relationship between the gross domestic product growth and banks' profitability.

This hypothesis is tested in sections 5.2 and 5.3. Based on the regression results presented in Tables 5.10 and 5.23, this hypothesis can be accepted when the ROE is used as a measure of banks' profitability. This means that banks have benefited from economic growth. On the other hand, the same hypothesis is rejected when the ROA is used as a measure of banks' profitability.

H_{1i}: There is a significant positive relationship between the GDP per capita and banks' profitability.

This hypothesis is tested in sections 5.2 and 5.3. Based on the regression results presented in Tables 5.10 and 5.23, this hypothesis can be rejected when both ROA and ROE are used as a measure of banks' profitability.

H_{1j}: There is a significant relationship between bank size and banks' profitability.

This hypothesis is tested in sections 5.2 and 5.3. Based on the regression results presented in Tables 5.17 and 5.29, this hypothesis is accepted when both ROA and ROE are used as a measure of banks' profitability. This means that the larger size of the bank would increase banks' profitability. Thus, support is found in the economics of scale theory.

H_{1k}: There is a significant positive relationship between bank age and banks' profitability.

This hypothesis is tested in sections 5.2 and 5.3. Based on the regression results presented in Tables 5.17 and 5.29, this hypothesis can be rejected when both ROA and ROE are used as a measure of bank's profitability. This means that older banks do not enhance banks' profitability.

H_{1L}: There is a significant positive relationship between the concentration and banks' profitability.

This hypothesis is tested in sections 5.2 and 5.3. Based on the regression results presented in Tables 5.10 and 5.23, this hypothesis can be rejected when both ROA and ROE are used as a measure of banks' profitability. This means that higher

concentration does not enhance banks' profitability. Thus, no support is found for the structure-conduct-performance hypothesis.

H_{1m}: There is a difference in the profitability between domestic Islamic banks and foreign Islamic banks in Malaysia.

This hypothesis is tested in sections 5.2 and 5.3. Based on the regression results presented in Tables 5.10 and 5.23, this hypothesis is accepted when both ROA and ROE are used as a measure of banks' profitability. This indicates that domestic and foreign Islamic banks have different profitability, and the domestic Islamic banks are associated with high profits.

6.2.2 Conclusion for research objective No. 2

"To examine the effect of the 2008 global financial crisis on the profitability of Malaysian Islamic banks"

To achieve this objective, the following hypothesis is tested:

H_2: There is an effect of the global financial crisis on the profitability of Malaysian Islamic banks.

This hypothesis is tested in sections 5.2 and 5.3. Based on the regression results presented in Tables 5.17 and 5.29, this hypothesis is accepted when both ROA and ROE are used as a measure of banks' profitability. This means that the profitability of Islamic banks in Malaysia is affected by the global financial crisis.

6.2.3 Conclusion for research objective No. 3

"To identify the differences between domestic and foreign Islamic banks in Malaysia in terms of the determinants of their profitability"

To achieve this objective the following hypothesis is tested:

H_3: There are differences in the determinants of profitability between domestic and foreign Islamic banks in Malaysia.

This hypothesis is tested in section 5.4 in this study, which identifies the differences in the determinants of profitability between domestic and foreign Islamic banks in Malaysia. Based on the regression analyses presented in Tables 5.38, 5.40, 5.42 and 5.44, the results show that:

Firstly: empirical results with return on assets as the dependent variable indicate that capital and reserves, overhead expenses, gross domestic product growth rate and banks' age have a significant effect in determining banks' profitability, in which case is applicable to the domestic banks only. In turn, inflation has a significant effect in determining the profitability of only the foreign banks. The results of this section reveal that loans, deposits, efficiency and bank size have a significant effect in determining banks' profitability of both domestic and foreign banks. Meanwhile, gross domestic product per capita, liquidity and concentration are not able to explain the variability of domestic and foreign Islamic banks' profitability. The findings indicate that the profitability of both domestic and foreign banks is affected by the global financial crisis.

Secondly: empirical results with return on equity as the dependent variable reveal that the overhead expenses, loans, efficiency, gross domestic product growth rate and bank size have a significant effect in determining banks' profitability, in which case are applicable to the domestic banks only. In turn, the gross domestic product per capita has a significant effect in determining banks' profitability of only the foreign banks. The results of this section find that, deposits, capital and reserves, inflation and banks' age have a significant effect in determining banks' profitability of both domestic and foreign banks. Meanwhile, liquidity and concentration are not able to explain the variability of domestic and foreign Islamic banks' profitability. The findings indicate that the profitability of domestic banks is affected by the global financial crisis, while the profitability of foreign banks is not affected.

6.2.4 Conclusion for research objective No. 4

"To investigate if the efficiency of Malaysian Islamic banks is determined by the profitability variables"

To achieve this objective the following hypothesis is tested:

H_4: The banks' efficiency in the Malaysian Islamic banks is determined by the profitability variables.

This hypothesis is tested in section 5.5 in this study. This study examines how bank specific, financial structure and macroeconomic variables affect the profitability and efficiency of Islamic banks. Based on Tobit regressions presented in Tables 5.47 and 5.49, the results indicate that: Firstly: results with return on assets as the dependent variable have indicated that the overhead expenses ratio, loan ratio, deposit ratio and bank size have significant effect in determining banks' profitability and banks' efficiency. Meanwhile, the gross domestic product growth rate, gross domestic product per capita and concentration ratio are not able to explain the variability of profitability and efficiency of Islamic banks. The capital and reserves, liquidity ratio and banks' age have significant effect in determining banks' efficiency, whereas these factors have not any significant effect in determining banks' profitability. The findings of this study further indicate that inflation rate has a significant effect in determining banks' profitability, whereas it has not any significant effect in determining banks' efficiency. The findings of the study indicate that the profitability of Islamic banks is negatively affected by the global financial crisis, but the efficiency of Islamic banks is not affected.

Secondly: empirical results with return on equity as the dependent variable reveal that the loans ratio, deposits ratio, bank size and bank age have a significant effect in determining banks' profitability and banks' efficiency. Meanwhile, capital and reserves have a negative significant effect in determining banks' profitability and a positive significant effect in determining banks' efficiency. Meanwhile, Gross domestic product per capita and concentration ratio are not able to explain the variability of profitability and efficiency of Islamic banks. The overhead expenses ratio and liquidity ratio have a significant effect in determining banks' efficiency,

whereas these factors have not a significant effect in determining banks' profitability. Otherwise, the gross domestic product growth rate and inflation rate have a significant effect in determining banks' profitability, whereas they have no significant effect in determining banks' efficiency.

6.3 Implications of the study

Based on the research findings, the study provides some suggestions that could be considered to further enhance the Malaysian Islamic banking industry.

The results of the study show that the loans and deposits of Islamic banks have an important role as the source of profit, which reflects more deposits are transformed into loans, hence, higher lending generates higher income. Therefore, Islamic banks should attract more deposits and play a bigger role as intermediary between the lenders and borrowers to increase its profitability. Other than that, Malaysian Islamic banks have kept a high proportion of liquidity, and the study found that the liquidity is not a significant factor that contributes towards the profitability of Islamic banks in Malaysia, while, the study also found that liquidity has a negative and highly significant impact on efficiency of these banks. This may be due to the conditions of uncertainty of the financial crisis that the banks have resorted to increasing the rate of liquidity and the profits were growing isolation from the liquidity, but that led to a lower rate of operational efficiency of Islamic banks. Therefore, this result has underlined the importance of sound bank liquidity management. In order to improve the profitability and efficiency of Islamic banks, it is important that Islamic banks manage their liquidity very well. Adequate liquidity helps the Islamic banks minimise liquidity risk and financial crises as well as improve their profitability.

A result shows that there is a significant negative relationship between inflation and profitability of Islamic banks. Accordingly, it can be postulated that during the period of study, the Islamic banks were not able to adjust its lending rate to the rising cost of the deposit. This is because Islamic banks used fixed rate of financing. Islamic banks should detach themselves from the fixed rate system by moving away from the fixed rate instruments such as Bai Bithamin Ajil and Murabaha into more profit sharing activities such as Mudarabah, Musharaka and leasing. A system based on profit-

sharing will be more stable than a system based on a fixed charge for capital since the cost of capital in a sharing system automatically adjusts itself to variations in productivity under changing business conditions (Al-Omar and Iqbal, 1999). In the case of leasing, the cost of financing is based on the rental rate which is flexible and not fixed like the Bai Bithamin Ajil and Murabaha rate. The rental rate can be revised periodically to reflect market conditions. Hence, the Islamic bank would be in a better position to mitigate the inflation risk compared to its ability under the Bai Bithamin Ajil fixed rate system (Abdul Kader and Leong, 2009).

Bank size is represented by the natural logarithm of total assets. The study finds that total assets have a significant positive impact on the profitability and efficiency of Malaysian Islamic banks. Therefore, Islamic banks can raise their total asset by increasing the financing to customers. In order to increase the financing, the bank should increase the deposits from customers. Malaysia is a Muslim country; therefore, religious factor can be considered a very important element to attract the Muslim people to deposit their funds in the Islamic banking. Besides, religious factor Islamic banks have to improve their service quality. On the other hand, Islamic banks should engage in socialization programs to educate the public on the Islamic financial services to increase their financing. Meanwhile, through these socialization programs, it is possible that more non-Muslims also use Islamic banking.

The results of study find that the domestic Islamic banks are more profitable than foreign Islamic banks. As an important reason for the differences in profitability that, some profitability determinants between domestic and foreign Islamic banks are different. For example, the study finds that, GDPGR variable is a significant factor that contributes towards the profitability of domestic Islamic banks, whereas, it is not significant in determining the profitability of foreign Islamic banks. Thus, the foreign Islamic banks should focus on the policies which lead to benefit from the economic growth in order to increase its profitability.

The findings of this study indicate that the profitability of Islamic banks in Malaysia is adversely affected by the global financial crisis. This indicates that the Islamic banks were not resilient in facing the financial crisis. The results of study suggest that Malaysian Islamic banks need to strengthen their risk management aspects. Further,

the bank management could formulate strategies that can strengthen and develop the Islamic banking industry to enable the Islamic banking system to absorb financial shocks.

6.4 Limitation of the study

As in other studies, this study is subject to a number of limitations as explained below:

1- This study aims to measure the variables that can affect the profitability of Islamic banks in Malaysia (foreign and domestic). Foreign Islamic banks have emerged in Malaysia after the liberalization of the Islamic banking industry. Furthermore, this study also aims to examine the effect of the global financial crisis in 2008 on the profitability of Islamic banks in Malaysia. Hence, the study covers the period from the first quarter of 2007 to the fourth quarter of 2010 (after the application of that liberalization and during the global financial crisis).

2- This study was undertaken in the Malaysian Islamic banking industry, thus the results of this study cannot be generalized to other banking industry with differences in terms of economic situations, environment, cultures and financial regulations.

3- Based on previous studies, the variable selection is limited to the variables that are of most importance and are frequently used to conduct this study.

4- This study used unbalanced panel data analyses to explore its relationships based on 17 cross sections over a period from the first quarter of 2007 to the fourth quarter of 2010. The study uses unbalanced panel data due to the fact that the starting of the Islamic bank's operations in Malaysia was not the same.

5- This study concerns with identifying the determinants of the profitability and efficiency of Islamic banks in Malaysia, but, the reasons are not studied due to that, the study is based on quantitative data, thus the qualitative data regarding to explain the reasons of some results are not explored in this study.

6- This study uses two measures of profitability which are the return on assets and the return on equity due to these measures of profitability that are most often used in the literature and which can be applied to Islamic banks.

6.5 Recommendation for further researches

Suggestions for future research are given below:

- This study is confined to Malaysian Islamic banks only. It might be interesting to carry out the same research over both conventional and Islamic banks in Malaysia, to determine the differences between them in terms of the profitability variables.

- Another possible extension could include more variables such as zakat (alms), money supply as well as the quality of the offered services.

- As mentioned in the limitations, this study does not explore the reasons of some results due to the study concerned with identifying the determinants. A further research could be combined quantitative and a qualitative approaches to explore the reasons of these results.

- Based on the results of the study which indicate that the efficiency of Islamic banks in Malaysia is not affected by the macroeconomic variables (gross domestic product growth rate and inflation rate). An extended research could be useful to be conducted to investigate these relationships.

- The use of parametric techniques may be more appropriate than the non-parametric approach of the Data Envelope Analysis (which is used in this study) to measure the efficiency of Islamic banks. Nevertheless, the identification of a suitable parametric model would require a significant amount of work. On the other hand, it may be instructive to re-measure the efficiency of Islamic banks via the DEA analysis based on different input/output.