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Determinants of Islamic Bank's Profitability Performance in Malaysia During Covid-19 Using Panel Data Analysis

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ABSTRACT

When the World Health Organization (WHO) declared COVID-19 as a pandemic that will be rapidly spreading around the world, it had significant implications on financial institutions, including Islamic banks, as they faced challenges in maintaining operations and managing risks during this unprecedented crisis. Thus, this study was conducted to analyse the relationship between the independent variables with return on assets and to determine the significant determinants of Islamic banks' profitability performance during COVID-19. The dataset for this study were derived and collected from annual reports of the ten local Islamic banks in Malaysia for three years (2019-2021). Capital adequacy ratio (CAR), non-performing loan (NPL), operational efficiency (OEF) and bank size (SIZE) are chosen as the independent variables, while return of assets (ROA) as the dependent variable. Using Pearson correlation, it is found that CAR has a weak positive relationship, while NPL, OEF and SIZE have a weak negative relationship with ROA. This study also employs panel regression analysis, using a fixed effects model as the best estimator to determine the significant factors. The findings of the panel data regression analysis shows that only two variables were found to be positively significant, which are CAR and NPL, while OEF and SIZE are found to be insignificant with the profitability performance of Islamic banks.

Keywords: Profitability performance, Islamic banks, COVID-19, Malaysia

INTRODUCTION

Islamic banking, also known as Islamic finance, is a banking system or financial activities that comply to its underlying principles following Shari'ah Islamic law. The underlying principles governing Islamic banking are mutual risk, profit sharing, and fairness assurance, and those transactions are based on underlying business activity or assets. The Islamic banking and finance industry has developed in size and numbers over the years. International Monetary Fund (2017) stated that despite its small percentage of the global financial industry, Islamic finance has developed substantially, particularly in Asia and the Middle East.

When the World Health Organization (WHO) announced that COVID-19 virus, which was first detected in Chinese city of Wuhan in December 2019, is a pandemic that will be rapidly spreading around the world, it had significant implications for the global economy. The pandemic led to lockdowns, travel restrictions, disruptions in supply chains, and a decline in economic activity worldwide (Zhang et al., 2020). These impacts affected financial institutions, including Islamic banks, as they faced challenges in maintaining operations and managing risks during this unprecedented crisis. Research on bank performance has become more and more of focus since the outbreak. This has enabled the financial, accounting and management fields to advance considerably in terms of performance and measurement. The current literature on accounting, Islamic banking and finance provides a basis for studies examining the performance of the banking sector in different countries.

Islamic banking itself is unique in its products are based on Shariah principle, which are prohibited from being interest-based and encourage profit and loss sharing. This makes its management heavier during a pandemic compared to conventional banks. Islamic banking offers unique financial products and services such as Islamic bonds (sukuk) and Islamic financing contracts such as Murabaha and ijarah. The way Islamic banks respond to and are affected by pandemics compared to conventional banks can be influenced by these different characteristics. In order to evaluate how COVID-19 affects the Islamic banks' profitability performance, it is crucial to understand these differences.

This study is carried out by using secondary data from 10 local Malaysia's local Islamic banks between the years of 2019 and 2021, quarterly. This study also had particular attention paid to the period of COVID-19 with a view to ascertaining whether the Islamic bank's profitability performance is affected greatly during the pandemic. This study is important in understanding how Islamic banks can endure bank-specific factors and operate effectively during the COVID-19 pandemic. As is well known, COVID-19 has become a source of concern for the profitability and resiliency of Islamic banks in Malaysia. Therefore, this study is essential in determining whether these concerns will threaten the profitability of all financial institutions.

Furthermore, it is necessary to recognize which financial ratios or bank-specific variables could have a significant impact on Islamic banks' profitability performance. There is still little available research done on factors that influence the profitability performance of Islamic bank in Malaysia during COVID-19. A study on this issue can bring useful information about the effects of a pandemic on businesses, economies, and financial markets. Understanding the extent to which internal or external factors influence profitability and stability of Islamic financial institutions is an important consideration in examining the determinants of profitability performance during COVID-19. Therefore, this study is established in order to achieve these objectives:

1. To analyze the relationship between capital adequacy ratio, non-performing loan, operational efficiency and bank size with return of assets of selected Islamic banks in Malaysia.
2. To identify the significant determinants that affect the profitability performance of selected Islamic banks in Malaysia.

LITERATURE REVIEW

Overview of Islamic Banking and Finance

Islamic banking can be defined in a variety of ways. According to the General Secretariat of the Organization of the Islamic Conference (OIC), an Islamic bank is a financial institution whose laws, principles, and operations reflect its adherence to the Shariah principle. It follows the restriction from receiving or paying interest on any of its operations (Mannan, 1982). Meanwhile, the Islamic Banking Act of 1983 stated that Islamic banking is defined as a firm that conducts Islamic banking business. Islamic banking is a type of business whose goals and operations do not include any aspects that are forbidden by Islam. According to both definitions, Islamic financial institutions are totally based on Shariah principles. It must incorporate, but is not limited to, the following principles:

(i) The prohibition of unjustified increase or interest (*riba'*),
(ii) Avoidance of uncertainty and speculation (*gharar*),
(iii) Permissible or lawful in Islam (*halal*) activities, and
(iv) Focusing on justice and other ethical and religious goals

The next section provides an overview of Islamic banking contracts in general. Islamic banking contracts are financial agreements and arrangements that correspond to Islamic law or Shariah principles. These contracts are designed to adhere to Islamic ethical and legal rules, which forbid certain financial activities such as payment or receiving of interest (*riba'*) and participation in transactions with significant uncertainty (*gharar*) or components approaching gambling (*maisir*). Table 1 provides a general overview and definition of several popular Islamic banking contracts:

Table 1: Islamic banking concepts

Islamic Banking Concepts	Definition
1. *Mudharabah*	A profit-sharing agreement, in which one party contributes by providing the capital, and the other party provides the labour or management for a business venture. Profits are divided according to a predetermined ratio, while the losses are paid alone by the capital supplier.
2. *Musharakah*	A partnership or joint venture contract, which two or more parties contribute funds and expertise to a business project. The profits and losses are distributed in accordance with a predetermined ratio or the amount of capital contribution.
3. *Murabahah*	A cost-plus-profit sale contract in which the seller discloses to the buyer the cost and profit margin of an asset. The buyer agrees to pay the seller either in instalments or all at once. The seller does not bear any risk of the asset after the transaction.
4. *Ijarah*	A leasing contract in which the owner of an asset leases it to another party for a given amount of time and a fixed rent. The owner retains ownership of the asset and is responsible for its management and insurance. At the end of the lease term, the lessee has the choice of purchasing the asset or

	returning it to the owner.
5. *Istisna'*	A contract where a manufacturer is ordered to develop or construct a specific asset according to agreed-upon specifications and deliver it at a predetermined price on a future date. It is commonly used to fund long-term projects such as infrastructure, housing, or machinery.
6. *Wakalah*	A certificate that reflects a proportional ownership in an underlying asset or a pool of assets and entitles the holder to a share of the generated income by it. It functions similarly to a bond, except that it is not subject to the Islamic prohibition on interest and uncertainty. There are various types of sukuk based on different Islamic contracts, such as *mudarabah*, *musharakah*, *ijara*, *salam*, etc.
7. *Sukuk*	A contract where an agent (*wakil*) is appointed to make decisions on behalf of a principal (*muwakkil*) in a specific matter or transaction in exchange for a fee or commission. It is regularly used in fund management, investment, or trade finance.

Source: Bank Rakyat (2022)

The Islamic banking industry has grown significantly over the years, from an interest-free financial structure to the establishment of Islamic Financial Institutions (IFIs). The authors of the IMF working paper on the topic of An Overview of Islamic Finance (Hussain et al., 2016) stated that the ultimate purpose of this system is described in desirable social terms. For example, the promotion of economic well-being, poverty reduction, fulfilling of 7 basic human needs, optimising natural resource usage, implementing universal brotherhood, fulfilling spiritual needs, and economic and social justice.

Furthermore, the Islamic banking sector's interest-free products have aggressively enticed capital investments in a number of countries. Rogoff (2011) found that the industry of this Shari'ah banking remained stronger in terms of asset share, despite the fact that more capital investments were involved in Islamic products during the recession era. The key aspect of Islamic banking is that it gives a higher risk-sharing percentage, reduces loan dependency and limits the financing gap, as well as short-term and long-term financing.

Islamic Banking and Finance in Malaysia

Global Islamic finance development has had a direct impact on the development of Islamic finance and banking in Malaysia. Malaysia is a one-of-a-kind country that runs alongside both conventional and Islamic banking systems. Tabung Haji was Malaysia's first Islamic financial institution, followed by Bank Islam Berhad (BIMB), Malaysia's first Islamic bank, which began operations in 1983 (Department of Statistics Malaysia, 2019). Consequently, since 1963, the Islamic finance and banking business has seen tremendous acceptance, demand, and development expansion.

Recent research includes a study by Komijani and Taghizadeh-Hesary (2018) that provides a summary of the Islamic financial business and industry throughout Asia. The Islamic finance business has risen in conjunction with Asia's growing Muslim population, particularly in Southeast Asia, over the previous two decades. According to the study, the appeal of Islamic finance over its conventional counterpart is anticipated to expand further throughout Asia due to the rapid growth of

the Muslim population and the improvement of living conditions. Other factors include strong political support, an increase in the number of investors seeking to invest in Islamic financial services and favourable taxation, considering that the Islamic finance business has risk-sharing components in comparison to conventional ones.

Idris et al. (2011) mentioned in their study that the establishment of Malaysia's Islamic bank, Bank Islam Malaysia Berhad (BIMB) in 1983 contributed to the advancement of the Islamic banking system, which is today generally accepted in this country by Muslims and non-Muslims alike. The Islamic Banking System, which follows Shariah law, is significant in Malaysia since its profitability contributes to the country's economic progress.

According to Haron and Ahmad (2011), the first Malaysian Islamic bank was created during the development phase of Islamic banking. Much has changed in the country's general financial structure since then. It has even been said that Malaysia's Islamic financial system today provides the most modern assortment of services in the Islamic economic world. Malaysia's Islamic financial system is maturing, offering Shariah-compliant securities and financial derivatives as well as traditional financial instruments.

The Islamic financial industry has undergone a recent shift, becoming one of Malaysia's main financial system components. This industry propels the country's growth and development. According to Bank Negara Malaysia (BNM), there are 16 Islamic banks registered in Malaysia with either foreign or local ownership. Malaysia is a global leader in Islamic finance, with a comprehensive Islamic finance system that includes 10 Islamic banks, Takaful, an Islamic capital market, and specialised organisations. Malaysia has also been a major source of information and education for Islamic finance around the world.

Islamic Bank's Financial Performance

Bank performance is a crucial area of research that focuses on evaluating the financial and operational effectiveness of banks. It involves analyzing various aspects such as profitability, efficiency, risk management and asset quality. The subject of the effectiveness of the banking system has been discussed between academics and policymakers for a long time. However, interest in this area has been steadily growing over the last couple of years, especially following the worldwide pandemic that had made some banks vulnerable to insolvency. It is precisely for this purpose that a thorough debate needs to be had in academia on the effectiveness of banks and their relationship with stability. The existing literature offers a large number of studies in response to this expectation.

Prior to and during COVID-19, Muhammad (2022) investigated how financial stability of Islamic banks are affected by the bank-specific characteristics and macroeconomic factors. Data from the year 2012 until 2017 is analyzed and it was discovered that just two variables were found to be significant before the pandemic, whereas four variables were found to be significant during the pandemic. This concluded that Islamic banks in Malaysia are more stable before COVID-19 compared to during the pandemic where there is a declining tendency in stability but no substantial impact.

Recently, attempts have been made to examine Islamic banks in terms of stability, cost management and risks. Miah and Uddin (2017) compare and contrast Islamic banks (IBs) and conventional banks (CBs) in terms of stability, efficiency and the business orientation. Data for this study was collected from 48 CBs and 28 IBs in Gulf Cooperative Council (GCC) nations between 2005 and 2014. Accounting ratios, Stochastic Frontier Analysis (SFA), and the ordinary least square (OLS) regression technique are the techniques that are employed to access the acquired data. The data show that CBs are less expensive than their Islamic counterparts. Regression analysis

demonstrates that IBs are functionally distinct, and this distinction holds even when bank-specific characteristics are controlled for.

According to a recent study conducted by Abdulla and Ebrahim (2022), IBs outperform CBs. 49 banks from five GCC nations were evaluated from the year 2017 until 2020, quarterly. Cost-income ratio, bank size, loan loss provisions, deposits to total assets ratio, capital ratio, COVID-19 and inflation rate are used to evaluate the performance. The authors claimed that the pandemic had a significant influence on GCC banks performance, with CBs bearing the brunt of the damage. They also stated that the features of IBs minimized the adverse impacts of the pandemic.

Other research explored performance indicators of banks on a geographical basis, with an emphasize on the GCC region. According to Hadriche (2015), who intended to compare and determine the performance drivers for IBs and CBs operating in GCC nations between 2005 and 2012. Hadriche (2015) discovers that when applying the CAMEL test to compare the profitability of 71 CBs and 46 IBs, IBs are on average more profitable than CBs. In terms of performance factors, the findings show that bank size has an effect on both CB and IB performance. The cost of operations has a favourable and considerable effect on performance in CBs and IBs. Credit risk is negative and significant in CBs, while positive but non-significant in IBs. In terms of macroeconomic variables, inflation and DPG growth have no major impact on CB performance. Inflation is a positive and significant coefficient for IBs. The data show that the factors influencing performance differ between CBs and IBs. Credit risk has no impact on IB performance, whereas inflation and DGP growth have no impact on CB performance.

There is additional research being performed to assess how Islamic banks fared during a financial crisis. Hasan and Dridi (2010) conclude that IBs were affected differently than CBs evaluated using the sample of selected 120 Islamic and conventional banks (one-fourth of them are Islamic banks) collected between 2007 and 2009 from eight selected nations. This conclusion was obtained after examining the influence of the financial crisis on bank performance through the use of four financial ratios: credit and asset growth, external rating and profitability. This study also looks into the factors that can explain the performance gap between IBs and CBs, such as bank-specific parameters like investment portfolio level, leverage, and bank size and type.

Ahmed Sulub and Che Mohd Saleh (2019) assess the financial performance IBs and CBs in Malaysia using a dual financial system in the Malaysia's financial market. For this study, 4 full-fledged Islamic banks and 4 conventional banks were chosen to investigate the four different financial measures, which are Return on Equity (ROE), Return on Assets (ROA), Bank Leverage (BL), and Earning per Share (EPS). Secondary data is obtained from annual reports of selected banks between the year of 2012 until 2016 to evaluate the banks' financial performance. According to the conclusions of this study, CBs outperformed IBs in terms of profitability (ROE, ROA, and EPS). Furthermore, liabilities dominated the capital structure of IBs (debt ratio). As a result, IBs not only perform worse than CBs, but they also have a greater debt-to-assets ratio.

Overview of Islamic Banking and Finance

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METHODOLOGY

Data Collection

Quarterly data for all variables have been collected quarterly from 2019 to 2021. The dataset used for analysis is extracted by doing content analysis from the financial statements covering ten Islamic banks in Malaysia from 2019 to 2021. These include 10 local Islamic banks currently in operation, in accordance with Bank Negara Malaysia (BNM) as listed in Table 2.

Table 2: List of local Islamic banks being selected

No.	Name
1	Affin Islamic Bank Berhad
2	Alliance Islamic Bank Berhad
3	Ambank Islamic Berhad
4	Bank Islam Malaysia Berhad
5	CIMB Islamic Berhad
6	Hong Leong Islamic Bank Berhad
7	Maybank Islamic Berhad
8	Bank Muamalat Malaysia Berhad
9	Public Islamic Bank Berhad
10	RHB Islamic Bank Berhad

Variables

Variables in this study included return on assets (ROA) as the dependent variable representing the profitability performance of the Islamic banks, and financial ratios including capital adequacy ratio (CAR), non-performing loan (NPL), operational efficiency (OEF) and bank size (SIZE), served as the independent variables. The summary of variables, data sources and formulas are stated in Table 3 and 4.

Table 3: Variables and data sources

Variables	**Measures**	**Proxy**	**Data Source**
Dependent Variable			
Islamic banks profitability performance	Return on Assets	ROA	Islamic banks financial statements
Independent Variables			
Financial ratios	Capital Adequacy Ratio	CAR	Islamic banks financial statements
	Non-performing Loan	NPL	
	Operational Efficiency	OEF	
	Control Variable		
	Bank Size	SIZE	

Table 4: Formula of variables

Variables	Proxy	Measurement	Scale
Return on Assets	ROA	Net Income/Total Assets	Ratio
Capital Adequacy Ratio	CAR	Total Capital/Risk-weighted Assets	Ratio
Non-performing Loan	NPL	Non-performing Loan/Total Loan	Ratio
Operational Efficiency	OEF	Operating Expenses/Net Income	Ratio
Bank Size	SIZE	Natural logarithm of total assets	Ratio

Correlation Analysis

The Pearson correlation coefficient (r) is the commonly used method to measure a linear or direct correlation. A value between -1 and 1 represents the direction and intensity of the relationship between the two variables. The correlation between the dependent and independent variables (return on assets, capital adequacy ratio, non-performing loan, loan-to-deposit ratio and operational efficiency) are being determined in this study using the Pearson correlation.

Table 5 and Figure 1 below shows the different results may be obtained, where positive and negative indicate their correlation type.

Table 5: Pearson correlation coefficient indicator

Pearson Correlation Coefficient (r)	Correlation Type	Interpretation
Between 0 and 1	Positive	When one variable changes, the other one changes in the same direction.
0	No correlation	The variables do not have any relationship.
Between 0 and -1	Negative	Whenever a variable shifts, another one shifts in the reverse direction.

Source: QuestionPro (2020)

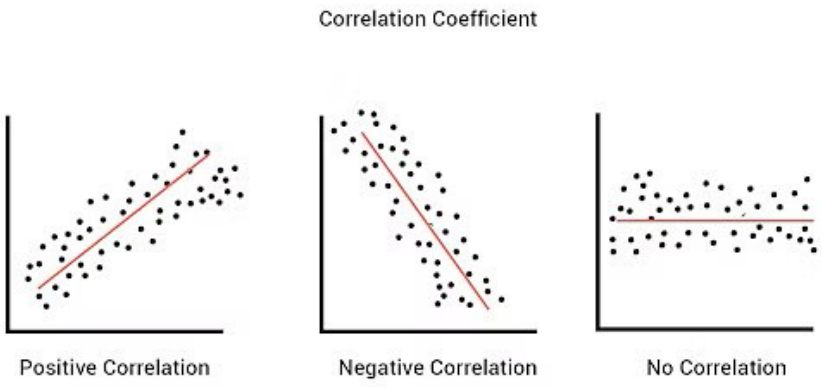

Figure 1: Graph of Pearson correlation coefficient

Source: Investopedia (2019)

The more significant the relationship between the two variables, the more likely your answer will be 1 or -1. Having a value of 1 or -1 implies that all of the data points are plotted on the straight line of 'best fit.' That is, any change in factors has no effect on the correlation between those two variables. The greater the variety in variables, the closer the answers are to zero. The correlation value interpretation is shown in Table 6 below:

Table 6: Correlation value interpretation

Strength of Association	Positive	Negative
Weak	$0.1 < r < 0.3$	$-0.1 < r < -0.3$
Medium	$0.3 < r < 0.5$	$-0.3 < r < -0.5$
Strong	$0.5 < r < 1.0$	$-0.5 < r < -1.0$

Source: QuestionPro (2020)

Model testing

Model testing is conducted to determine the best and most appropriate model for panel regression analysis. Three panel regression models are:

(i) Ordinary Least Square (OLS) or Common Effects Model
(ii) Fixed Effects Model, and
(iii) Random Effects Model

1) Chow Test

The Chow test is intended to assess whether Common Effect (CE) or Fixed Effect should be applied to estimate panel data. The hypothesis of the Chow test can be written as follows.

H_0: Common Effect Model is consistent
H_1: Fixed Effect Model is consistent

The null hypothesis must be rejected if the p-value is less than 0.05. Thus, the hypothesis that the common effects model is consistent is rejected, resulting in using a fixed effects estimator. In contrast, a more significant p-value of larger than 0.05 implies that it fails to reject the null hypothesis. Hence, the common effects estimator is more appropriate for the panel data regression analysis.

2) Hausman Test

The Hausman test is needed if the Fixed Effect model is selected during the Chow test. It is to choose, then between Fixed Effect (FE) and Random Effect (RE) model. The test is conducted to assess the following hypothesis.

H_0: Random Effect Model is consistent
H_1: Fixed Effect Model is consistent

The null hypothesis must be rejected if the p-value is less than 0.05. Thus, the hypothesis that the random effects model is consistent is rejected, resulting in using a fixed effects estimator. In contrast, a more significant p-value of larger than 0.05 implies that it fails to reject the null hypothesis. Hence, the random effects estimator is more appropriate for the panel data regression analysis.

Panel Regression Analysis

Panel data regression analysis is a method for estimating combined datasets consisting of time series and cross-sectional data. All cross-sectional units are arranged and surveyed over time, allowing data to be pooled over space and time. To put it simply, panel data regression analysis is observations of those same subjects throughout time (Zulfikar, 2018).

In line with the aim of this research, panel data is more applicable compared to cross-sectional data. The key to using the panel is the amount of observation in a panel dataset because of its multidimensional characteristic, allowing it to include many observations for various entities. Hence, it is efficiently suitable for this study as it aims to examine the Islamic banks' profitability performance, which comprises ten local Islamic banks in Malaysia within 3 years of study periods.

The empirical model used in this study takes the following form (1)

$$ROA = f(CAR, NPL, OEF, SIZE) \quad (1)$$

Equation (3) can be expressed in a general panel equation as follows (2).

$$ROA_{it} = \beta X_{it} + \varepsilon_{it} \quad (2)$$

By substituting the variables into (4), the empirical model used in this study is given as (3):

$$ROA_{it} = \alpha + \beta_1 CAR_{it} + \beta_2 NPL_{it} + \beta_3 OEF_{it} + \beta_4 SIZE_{it} + \varepsilon_{it} \quad (3)$$

Where,

α = constant term

B = Coefficient of the corresponding independent variable

i = bank

t = time period

ε_{it} = Error term of bank *i* on time *t*

Dependent variable:

ROA = Return on Assets

Independent variable:

CAR = Capital Adequacy Ratio

NPL = Non-performing Loan

OEF = Operational Efficiency

SIZE = Bank Size

As mentioned in the previous section, three approaches can be used to estimate the regression model using panel data:

1) Common Effects Model

Ordinary Least Squares (OLS) method or least square method can be used for estimation of panel data from the Common Effect model. The model assumes to have the same coefficients for all observations, hence may result in heterogeneity bias.

This model attempts to deal with (4):

$$ROA_{it} = \alpha + \beta X_{it} + \varepsilon_{it} \quad (4)$$

2) Fixed Effects Model

The fixed effect assumes that different intercepts will be able to accommodate differences in individuals' cross sections. The dummy variable method shall be used for the estimation of the fixed effect model with different intercepts between individuals. The Least Squares Dummy Variable (LSDV) technique is frequently used to describe these estimation models.

The model is given as (5).

$$ROA_{it} = \alpha_i + \beta X_{it} + \varepsilon_{it} \quad (5)$$

3) Random Effect Model

The Random Effect model will estimate panel data where interference variables may be interconnected between time and between individuals. In this model, the difference between intercepts is accommodated by the error terms of each variable. The advantage of using this model is to eliminate heteroscedasticity. This model is also called the Error Component Model (ECM) or Generalized Least Square (GLS) technique.

The regression equation of the model is given as (6):

$$ROA_{it} = \alpha + \beta X_{it} + u_i + \varepsilon_{it} \quad (6)$$

RESULTS AND DISCUSSION

Skewness and Kurtosis Analysis

Skewness and kurtosis are two statistical indicators that depicted the shape of a data distribution.

Skewness is a measure of how much a probability distribution is asymmetric. It captures how much the data is tilted or shifted to one side. As shown in Table 7, all of the variables have a positive skewness value, which indicates a longer tail on the right side of the distribution or being right skewed.

Kurtosis is a measure of how the data are heavy-tailed or light-tailed compared to a normal distribution. A normal distribution has a kurtosis value of 3. The kurtosis of all the variables for this study is less than 3, indicating that it is platykurtic and tends to have fewer and less extreme outliers than the normal distribution. This means that no extreme outliers are detected for the collected data of this study.

Table 7: Skewness and kurtosis

	Skewness	Kurtosis
ROA	0.489387	-0.611281
CAR	0.232882	-1.093208
NPL	0.533540	-0.443824
OEF	0.504678	-0.626296
BANK	0.163629	-0.499199

Correlation Analysis

The correlation analysis shows how the variables are related to one another. It aims to identify the high correlation values above 0.8 between the variables. Multicollinearity is said to have occurred if there is a high correlation value above 0.8, and it should be avoided.

According to the correlation matrix, only one independent variable, CAR is positively correlated with the dependent variable, ROA with a coefficient of 0.188912. Since it is between 0.1 and 0.3, it indicates that CAR has a weak positive relationship with ROA. Other independent variables such as NPL, OEF and SIZE are negatively correlated to ROA. The value of the coefficient for the other 3 variables are also between 0.1 and 0.3, thus indicating that they have a weak negative relationship with ROA. Furthermore, all variables have a correlation value less than 0.8, indicating that all variables are independent of multicollinearity; thus, the research can be proceeded accordingly.

Table 8: Correlation matrix of variables

	ROA	CAR	NPL	OEF	SIZE
ROA	1.000000				
CAR	0.189912	1.000000			
NPL	-0.171880	0.343504	1.000000		
OEF	-0.182500	0.282496	0.166185	1.000000	
SIZE	-0.109790	0.109280	0.226815	-0.40945	1.000000

The Durbin-Watson test is also applied to check the autocorrelation errors in this regression model. As Table 9 shows, the p-value is higher than 0.05, which implies that null hypothesis “no first order autocorrelation exists” is failed to reject. This is also supported by the general rule of thumb, which states that DW statistic values ranging from 1.5 to 2.5 are considered normal and acceptable. This model has a DW statistic value of 1.87. It can be concluded that this regression model satisfies the condition of no autocorrelation.

Table 9: Durbin-Watson test results

Durbin-Watson test	
DW	1.8739
p-value	0.2384

Model Testing

Chow test and Hausman test are conducted to identify the most appropriate method. Table 10 depicts the result of the Chow test where it is designed to determine whether common effect or fixed effect is more appropriate. It is revealed that the p-value is less than 2.2e-16, which is significantly smaller than 0.05. Hence, we rejected the null hypothesis and chose fixed effect as the appropriate method.

Table 10: Chow test results

Chow test	
p-value	<2.2e-16

Hausman test is conducted next since fixed effect is selected during the Chow test. According to Gujarati & Porter (2010), the Hausman test is applied to determine whether the fixed effects model (FEM) or the random effects model (REM) is more appropriate for the model employed in this research. The results shown in Table 11 indicates that the p-value of the test is 0.007688, which is smaller than 0.05. Therefore, the null hypothesis is rejected, of which fixed effect model is consistent, resulting in the ineffectiveness of random effect for the panel regression analysis.

Table 11: Hausman test results

Hausman test	
chisq	13.88
p-value	0.007688

Panel Regression Analysis

After conducting the Hausman test, panel regression analysis proceeded with the best estimator, the fixed effect model. Table 12 comprises the fixed effect estimation results, including the capital adequacy ratio (CAR), non-performing loan (NPL), operational efficiency (OEF) and bank size (SIZE) on return on assets (ROA).

Table 12: Panel Regression results

Regression results	**Estimate**	**p-value**
Independent variables		
CAR	0.01263278	0.02104*
NPL	-0.03697540	0.015964*
OEF	-0.00581954	<2.2e-16
Control variables		
SIZE	-0.00356532	2.625e-06
R Square	0.67269	
Adjusted *R* Square	0.62928	
F statistics	50.3534	
Estimation Model	Fixed Effect Model (FEM)	

Note(s): p-value are shown in parenthesis. The symbol * denote significance at 5% level.

The panel regression takes the following equation (7).

$$ROA = 0.0669 + 0.01236CAR - 0.03697NPL - 0.00582OEF - 0.00356SIZE \quad (7)$$

From the panel regression result, the R-squared value of 0.67269 or 67.27% implies that the explanatory variables of capital adequacy ratio, non-performing loan, operational efficiency and bank size can be explained for about 67.27% variation in return of assets of standalone Islamic banks in Malaysia during COVID-19. In comparison, other factors influence the other 32.73%. The coefficient of determination (R^2) is significant in every research; however, it is limited to how much variation of the dependent variable is explained by the independent variable in the regression.

The results found that capital adequacy ratio (CAR) and has a positive and significant effects on the return of assets (ROA) of Islamic banks in Malaysia, while non-performing loan (NPL) has a

negative and significant effects on ROA. For capital adequacy ratio, a 1% increase in ROA will change the CAR by 1.24%. It is the same for non-performing loan here when ROA increases by 1%, then NPL is predicted to change by 3.7%. These positive and negative signals illustrate that these two variables strongly influence the return of assets of the Islamic banks in Malaysia. The finding CAR is consistent with the previous literature by El-Chaarani (2022) and Ichsan et al. (2021), which revealed that CAR has a positive and significance influence on the Islamic banks' profitability performance. However, the finding of NPL opposed the results of research by Ichsan et al. (2021) and El-Chaarani (2022) which includes the NPL as a variable that has a positive and significant impact on profitability performance.

Susanti et al. (2023) argued that the CAR is crucial for banks to improve their situation, as it indicates the adequacy of capital, which is a key factor for any business, especially in banking, where they rely on other people's money to operate. Thus, if the bank's value of the CAR is higher, it can achieve a better situation. Moreover, Abdullah et al. (2023) claimed that the NPL values, which reflect the situation of loans or financing that are in trouble at a bank, will be affected by an increase in non-performing loans at banks. High NPL will raise expenses, so the more the NPL ratio of a bank goes up, the more the bank's profitability goes down. Both of the preceding studies significantly confirmed the findings of this investigation.

In addition, the remaining variables, referring to operational efficiency (OEF) and bank size (SIZE), yields a negative association with Islamic banks' profitability performance. These variables do not significantly influence, and there is a negative relationship with the dependent variable (ROA). This finding is supported by the study conducted by El-Chaarani (2022) which revealed that SIZE is insignificant, thus indicates that these variables do not impact the profitability performance during COVID-19. The findings of OEF, however, opposed the results of research by Ichsan et al. (2021) and El-Chaarani (2022), which includes the OEF as a variable that has a significant impact on the profitability performance.

CONCLUSION

A number of studies have been conducted by researchers or academicians regarding Islamic banking or finance, particularly for financial performance which is determined by profitability. Similarly, this study measured Islamic banks; profitability performance variables and implemented a panel data approach to analyse more efficiently. This paper provides empirical evidence of determinants of 10 Islamic banks' profitability performance during COVID-19 in Malaysia within 3 years of data from 2019 to 2021. No multicollinearity occurred, for this paper eliminated no variables following the correlation analysis. Accordingly, Chow test and Hausman test is performed, resulting in fixed effects model as the better suited model for this study.

After all, the first objective has been achieved, which is to analyse the relationship between the capital adequacy ratio, non-performing loan, operational efficiency and bank size with the return of assets of selected Islamic banks in Malaysia. This study found that capital adequacy ratio is positively correlated and has a weak relationship with the return of assets. The other variables, which are non-performing loan, operational efficiency and bank size are negatively correlated and also have a weak relationship with the return of assets.

This study then discovered a positive and significant relationship between the capital adequacy ratio and the non-performing loan with the return of assets of selected Malaysia's Islamic banks. In contrast, operational efficiency and bank size has a negative relationship with the return of assets of Islamic banks. It shows that Islamic banks' profitability performance has positively and

significantly influenced by capital adequacy ratio and non-performing loan. This indicates that the second objective of this study have been achieved, which is to identify the significant determinants that affect the profitability performance of selected Islamic banks in Malaysia.

This paper has limitations on the collection and interpretation of the data, nonetheless. This study did not measure country differences from other countries. Hence, the sample size was restricted to only full-fledged Islamic banks and their financial ratios on profitability performances indicators. The confidence in the results could also be strengthened by access to country data on important variables, for example, demographic factors, market capitalization, and other related variables.

Consequently, future studies should expand their scope to a wider area or nation instead of limiting themselves to a particular country. Other than that, more investigations are also needed to identify the factors that affect the profitability performance of Islamic banks. Other important topics, such as the worldwide financial crisis, the Islamic viewpoint and legal impact, should be explored in more detail, rather than focusing only on a few financial ratios and bank-specific factors. However, researchers should be cautious when selecting the variables, as this may lead to inaccurate results.

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APPENDIX

Descriptive Statistics

	ROA	CAR
nobs	112.000000	112.000000
NAs	0.000000	0.000000
Minimum	0.002077	0.142333
Maximum	0.007717	0.207800
1. Quartile	0.003737	0.157608
3. Quartile	0.005525	0.187897
Mean	0.004754	0.172422
Median	0.004521	0.170267
Sum	0.532414	19.311296
SE Mean	0.000132	0.001693
LCL Mean	0.004492	0.169067
UCL Mean	0.005015	0.175778
Variance	0.000002	0.000321
Stdev	0.001395	0.017921
Skewness	0.489387	0.232882
Kurtosis	-0.611281	-1.093208

	NPL	OEF
nobs	112.000000	112.000000
NAs	0.000000	0.000000
Minimum	0.002200	0.254901
Maximum	0.036000	0.971793
1. Quartile	0.008300	0.380379
3. Quartile	0.020250	0.635439
Mean	0.015755	0.521690
Median	0.016000	0.503486
Sum	1.764600	58.429255
SE Mean	0.000834	0.016302
LCL Mean	0.014102	0.489387
UCL Mean	0.017409	0.553993
Variance	0.000078	0.029764
Stdev	0.008829	0.172522
Skewness	0.533540	0.504678
Kurtosis	-0.443824	-0.626296

	BANK
nobs	112.000000
NAs	0.000000
Minimum	16.309552
Maximum	19.455833
1. Quartile	17.131882
3. Quartile	18.293371
Mean	17.839272
Median	17.985586
Sum	1997.998433
SE Mean	0.075206
LCL Mean	17.690246

```
UCL Mean      17.988297
Variance       0.633465
Stdev          0.795905
Skewness       0.163629
Kurtosis      -0.499199


        Durbin-Watson test for serial
        correlation in panel models

data:  ROA ~ CAR + NPL + OEF + BANK
DW = 1.8739, p-value = 0.2384
alternative hypothesis: serial correlation in idiosyncratic errors


Chow Test

F test for individual effects

data:  ROA ~ CAR + NPL + OEF + BANK
F = 59.595, df1 = 9, df2 = 98,
p-value < 2.2e-16
alternative hypothesis: significant effects


Hausman Test

data:  ROA ~ CAR + NPL + OEF + BANK
chisq = 13.88, df = 4, p-value =
0.007688
alternative hypothesis: one model is inconsistent
```

FIXED EFFECT METHOD

```
Unbalanced Panel: n = 10, T = 9-12, N = 112

Residuals:
       Min.     1st Qu.      Median
-8.0467e-04 -3.1147e-04 -2.1045e-05
    3rd Qu.        Max.
 1.9943e-04  2.4771e-03

Coefficients:
        Estimate  Std. Error  t-value
CAR   0.01263278  0.00538685   2.3451
NPL  -0.03697540  0.02609302  -1.4171
OEF  -0.00581954  0.00043975 -13.2337
BANK -0.00356532  0.00071457  -4.9894
      Pr(>|t|)
CAR    0.02104 *
NPL    0.15964
OEF  < 2.2e-16 ***
BANK 2.625e-06 ***
---
Signif. codes:
  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’
  0.1 ‘ ’ 1

Total Sum of Squares:    8.5801e-05
Residual Sum of Squares: 2.8083e-05
R-Squared:      0.67269
Adj. R-Squared: 0.62928
F-statistic: 50.3534 on 4 and 98 DF, p-value: < 2.22e-16
```