The Impact of Macroeconomic and Specific Factors of Commercial and Islamic Banks on Profitability Evidence from Egyptian Market

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ABSTRACT

The purpose of this research paper is to analyze the effectiveness of the economic factors affecting Islamic and commercial banks during the Egyptian financial crisis from 2003 to 2019. A sample was taken from eleven banks registered in the Egyptian financial market, and the data were collected on an annual basis. The variables are as follows: return on assets (ROA); return on equity (ROE); reinvestment rate; size; nonperforming loans; operating leverage; loan growth; inflation rate; Gross domestic product; and deposit growth. Several statistical methods were used, such as a normality test, descriptive statistics, a t-test, and a group unit root. A panel data analysis was also applied to compare data from Islamic and commercial banks. The data revealed a negative relationship between the type of bank and ROA and ROE as well as a positive relationship between the global financial crisis and the banks' ROE and ROE.

Keywords: Macro Economic Factors, Specific Factors, Commercial and Islamic Banks, Financial Crisis
JEL Classifications: E02

1. INTRODUCTION

Today, the banking industry has been greatly affected by the rapid change in technology and information, rendering it difficult to make decisions. Therefore, it is possible to use quantitative and qualitative criteria to evaluate the performance of banks (Yeşildağ et al., 2020).

The banking sector is crucial for savings, investment decisions, and rapid economic growth, and it is the system through which the most profitable and efficient projects in the country are continuously financed, highlighting for its continual economic growth. Current research suggests that the state of the financial system affects economic growth because the measurement of banking development is strongly correlated with economic growth in most countries abroad (Islam, 2003).

Commercial banks, as intermediaries and providers of monetary services, play an important role in the expansion and growth of the economy for any nation. They contribute to regional and international communities and grant credit to help facilities sustain themselves via individual and investment institutions (Hamdi and Hassen, 2021).

The model of Islamic banks differs from that of commercial banks. Islamic banks focus on the principles of Sharia and the basics of business, specifically that banks lend money for a straightforward yield in the shape of a rate of interest. The principles of Sharia note that the rate of interest is the quantity received without counting revenue and loss in popular business transactions conducted in accordance with the basics of profit and loss involvement. Thus, Islamic banking services provide a substitution for banking bargains, which must be conducted in

accordance with the essentials of revenue and loss. Islamic banks consider their operations to be advantageous to society and the interests of individuals by donating money to charitable zakat operations (Mohammed and Muhammed 2016).

The global financial crisis emerged at the end of the decade and led to stagnation in the stock market and ultimately the fall of major banks around the world. As a result, economists were forced to create alternatives to solve the problems resulting from the financial crisis, such as bank performance, profitability, and liquidity. Islamic banking in the Arab Gulf nations reduced dynamically, and Islamic banks in non-Arab Gulf nations were more effective and productive compared to those in the Gulf nations. However, these banks were exposed to an increased risk during and after the financial crisis (Zarrouk, 2014).

2. LITERATURE REVIEW

Islam (2003) explained the development and performance of foreign and local banks in the Gulf countries such as Bahrain, Oman, Abu Dhabi, and Dubai. I evaluated these banks' internal performances by extracting the financial ratios from their balance sheets and income statements. I measured their external performances through an assessment of their market share, compliance regulations, and public confidence. I used both a cross section and a time series to evaluate banks' performances. The following points were concluded:

- Banks in Bahrain, Oman, and the UAE improved their performance over the past years; commercial banks will adopt modern banking services and effectively implement capitalization
- Most banks were established in accordance with international financial standards
- The banks' economic activity shows that financial dependence has increased significantly in Gulf Cooperation Council countries in previous years. In addition, there are increasing attempts to restructure or restructure the financial markets
- Commercial banks that borrow from financial institutions are the dominant in these countries
- Foreign and local banks in the Gulf countries have an opportunity to achieve economic growth, as they play a critical role in economic expansion.

Akbas et al. (2012) explained the impact of macroeconomic and industry factors on the profitability of banks. His study sample consisted of 26 commercial banks located in Turkey from 2005 to 2010. The study variables included two types: dependent variables that measure performance loans, such as return on assets (ROA) and return on equity (ROE), and independent variables that measure profitability, such as the percentage of equity to total assets, the percentage of loan loss allowance to total loans, the percentage of liquid assets to short-term liabilities, and the percentage of total costs to total income (the logarithm of total assets). The study results indicated the following:

- Profitability has a positive effect on the ratio of equity to expected capital
- Profitability has a negative effect on the ratio of the loan loss provisions rate to total loans

- Profitability has a negative effect on the ratio of cost-effectiveness to total income
- Size is a critical factor defining the profitability of a bank, and in general, the increasing volume has a positive moral effect and has a negative impact on profitability for large banks because of bureaucracy
- High inflation percentage can be largely attributed to high interest percentage, which results in higher earnings. Otherwise, banks may delay their interest modification, resulting in a rapid increase in costs and a negative impact on profitability. Gross domestic product (GDP) affects many issues that directly affect supply and demand, such as loans and deposits. Therefore, a negative relationship exists in the event of an increase in default and a consequent decrease in profitability.

Wasiuzzaman and Gunasegavan (2013) analyzed the differences between the characteristics of Islamic banks and commercial banks in a study in Malaysia. The study variables were as follows: profitability, capital adequacy, liquidity, corporate governance, operational efficiency, economic conditions, and asset quality. The study sample consisted of 14 banks, including nine commercial banks and five Islamic banks, in 2005–2009. Three statistical methods used descriptive statistics to detect the differences in the characteristics of banks. I used a t-test to analyze the independent variables and regression analysis to determine the effect of the variables on the performance of banks and the significance of the hypotheses. I concluded that average ROA and bank size are both considered to be of higher value in commercial banks compared to Islamic banks. Variables such as liquidity, operating efficiency, board independence, capital adequacy, and asset quality are of higher value for Islamic banks. Significant differences were also found regarding the type of bank for each variable, particularly the characteristics of the board of directors and the type of bank on profitability.

Zarrouk (2014) studied the performance of Islamic banks in the Middle East and North Africa in 2005–2010. An intertemporal analysis compared profitability, risk, liquidity, efficiency, and solvency in 43 Islamic banks both before and after the global financial crisis. Zarrouk reported the following:

- The financial crisis adversely influenced the performance of Islamic banks. The profitability and liquidity of Islamic banks in the Arab Gulf states decreased dramatically after the global financial crisis, and Islamic banks in non-Arab Gulf states were more efficient and more profitable compared to those in the Gulf states both during and after the financial crisis
- The financial crisis may have given rise to the value of fluidity risk and the development of the rules framework for liquidity management to improve the Islamic banking industry.

Chouikh and Blagui (2017) examined the impact of two types of variables on the performance of banks. The first type related to internal factors, such as bank size, privatization, board size, capital-asset ratio, and efficiency cost. The second type related to external factors such as inflation and GDP growth rate. The authors examined banks in Tunisia using a panel data method and concluded the following:

- Profitability of the bank, the size of the board of directors, and other variables have a significant effect
- Privatization positively influences bank performance
- Volume positively influences bank performance.

Robin et al. (2018) studied the financial performance of banks by taking a sample of Islamic banks in Bangladesh and measuring their profitability prior to and during financial liberalization using panel data regression. They used annual data at the bank level from the primary conventional banks located in Bangladesh in 1983–2021 and reached the following results:

- Financial reformation has no significant effect on the ROA or rate of ROE; however, the net return margin increases
- The strength of the capital and the quality of assets are predominantly determinant of profitability. Therefore, setting a policy aimed at increasing capital based on the quality of the assets is vital to ensure the availability of a banking sector in Bangladesh.

Awo and Akotey (2019) studied the financial performance of commercial and rural banks in southern Ghana that provide small enterprises with financial services. To analyze the financial ratios, they applied statistical methods such as the triangulation–bivariate method and the generalized method of moments (GMMs) to evaluate and review the banks' financial statements over a period of 15 years. The financial analysis showed that the performance of financial banks was higher than the industry average for rural banks. The bivariate analysis showed that, although the loan portfolio was positive, it was not appropriate nor had it been arranged correctly; rather, it deviated from its expected path. The GMM analysis indicated that the financial analysis significantly affected management liquidity, banks' capital, and size, improving the microeconomics of the projects. However, there was an increase in treasury bills, which inevitably leads to a decrease in banks' profitability.

The study also resulted in the presence of a significant relationship between financial performance and a set of factors specific to the bank, such as capital, loans, and liquidity as well as some microeconomic factors such as inflation and treasury bills. The results also indicated that the financial performance of rural banks has been stable over the past 15 years and is higher than the average in the RCB network.

Hassan and Ahmed (2019) studied the effect of the specific characteristics of Islamic banks in Bangladesh on their profitability in 2010–2017. Their study used the Hausman test and the following variables: ROA, nonperforming investment, bank size, cost-to-income ratio, capital-to-risk ratio, assets, and investment-to-deposit ratio. They reported the following:

- A negative profit correlation between capital to risk assets and cost to income
- A negative correlation between liquidity and profitability
- A negative correlation between bank size and profitability
- A positive correlation between nonperforming investment and the rate of ROA.

Hamdi and Hassen (2020) explained the impact of economic uncertainty policy on credit risks, borrowing decisions, and the performance of registered banks in Tanzania in 1999–2019. They used a panel data model, and the study variables were as follows: credit risk, loan size, performance of bank, and economic policy uncertainty. The results illustrated the following:

- A positive effect of economic uncertainty policy on credit risk
- A negative effect of economic uncertainty policy on the size of loans and banks' performance
- State-owned banks are affected by growth in EPU; when credit risks are raised, return decreases. To face the increase in credit risks, banks must review their borrowing policies.

3. DATA AND METHODOLOGY

Our sample comprises 11 banks in Egypt listed on the stock exchange in 2003–2019, including three Islamic banks and eight commercial banks. To estimate the internal performance of the banks, I extracted financial ratios from their income statements and balance sheets and calculated basic financial ratios to assess their performance. I also applied panel data analysis. In this study, we used the descriptive statistics method, a t-test, a group unit root test, the co-integrating equation model, the Pearson correlation matrix, the Hausman test, and a panel data analysis regression model.

4. MODEL

To analyze the relationship between the specific and macroeconomic factors and bank profitability, we prepared a model to interpret the variables of the study:

Dependent variables	Independent variables
ROE	Reinvestment rate
ROA	Size=log total assets
	Non performing loans
	Operating leverage
	Loan growth
	Deposit growth
	Inflation rate
	GDP

ROA: Return on assets, ROE: Return on equity

The empirical model is formulated as follows:

$$ROA = \alpha + \beta0\ RIR + \beta1\ Size + \beta2\ NPL + \beta3\ OP + \beta4\ LG + B4\ DG + IR + GDP + Error$$

$$ROE = \alpha + \beta0\ RIR + \beta1\ Size + \beta2\ NPL + \beta3\ OP + \beta4\ LG + B4\ DG + IR + GDP + Error$$

5. EMPIRICAL STUDY

5.1. Jarque–Bera Test

Table 1 reveals that variables such as ROA, ROE, reinvestment rate, size, operating leverage, loan growth, inflation rate, GDP, and deposit growth are normally distributed at a significant level >0.05. Additionally, the Pearson skewness coefficient is either ≤1 or ≥−1; thus, the data are not significantly skewed. The results of the descriptive statistics are as follows: mean of ROA = 0.006; ROE = 0.066; reinvestment rate = 0.041; size = 16.83; nonperforming

loans = 0.067; operating leverage = 0.001; loan growth = 0.030; inflation rate = 10.01; GDP = 4.46; and deposit growth = 0.035.

5.2. Descriptive Statistics

Table 2 indicates that the average ROA = 0.003901; ROE = 0.065338; reinvestment rate = 0.035625; size = 16.83290; nonperforming loans = 0.074870; operating leverage = 0.007267; loan growth = 0.026838; inflation rate = 9.984918; GDP = 4.442939; deposit growth = 0.035431; standard deviation of ROA = 0.003381; ROE = 0.045026, reinvestment rate = 0.029321; size = 0.818308; nonperforming loan = 0.052089; operating leverage = 0.078365; loan growth = 0.029680; inflation rate = 2.786264; GDP = 1.624013; and deposit growth = 0.019546. Using the Jarque–Bera test, we can observe a normal distribution (and significance level >0.05) for the variables for Islamic banks.

Table 3 displays the following figures: average ROA = 0064060; ROE = 0.0658018; reinvestment rate = 0.0439098; size = 16.82911; nonperforming loans = 0.0640675; operating leverage = -0.0013333; loans growth = 0.0319092; inflation rate = 10.02549; GDP = 4.472797, deposit growth = 0.034179; standard deviation of ROA = 0.002795; ROE = 0.028853; reinvestment rate = 0.026110; size =1.310905; nonperforming loans = 0.032496; operating leverage = 0.032496; loans growth = 0.031898; inflation rate = 2.724982; GDP = 1.593343; and deposit growth = 0.026023. Using the Jarque–Bera test, we can observe a normal distribution of these variables for commercial banks, ranging from 0.20 to 0.87.

Table 4 displays the descriptive statistics of both the commercial and Islamic banks and the comparison between them regarding the following variables: mean and standard deviation, mean of ROA, reinvestment rate, size, loans growth, inflation rate, GDP, and deposit growth. In commercial banks, these values are greater than in Islamic banks. By contrast, the mean of nonperforming loans and operating leverage in Islamic banks is greater than those in commercial banks. As for the average rate of ROE, there is no difference between commercial banks and Islamic banks. Standard deviation for ROA, ROE, reinvestment rate, operating leverage, inflation rate, and GDP in commercial banks is less than in Islamic banks, whereas standard deviation of size, loan growth, and deposit growth in commercial banks is greater than in Islamic banks.

5.3. T–Test

From the data in Table 5, we can observe the following:

- The t-test uncovered a statistically significant difference between the ROA (P-value) = 0.00 in the commercial and Islamic banks; commercial banks had a significant level of <0.001
- No statistically significant difference was found between commercial and Islamic banks regarding ROE, reinvestment rate, bank size, nonperforming loans, operating leverage, loan growth, inflation rate, or deposit growth at a level of significance >0.05.

5.4. Group Unit Root Test

To investigate the stability of the time series and to ensure that the average and variance are stable and that the amount of variance

Table 1: Normality test for dependent and independent variables from 2003 to 2019

Constructs	ROA	ROE	Reinvestment rate	size	Non performing loans	Operating leverage	Loan growth	Inflation rate	GDP	Deposite growth
Mean	0.005654	0.065663	0.041424	16.83025	0.067308	0.001247	0.030388	10.01332	4.463840	0.034555
Median	0.005500	0.063375	0.041616	16.91511	0.067279	0.005469	0.029875	10.07022	4.372019	0.034352
Maximum	0.013500	0.153000	0.120000	19.72423	0.174450	0.170000	0.125750	14.40147	7.156284	0.102125
Minimum	-0.001719	-0.008625	-0.025219	13.60846	0.012392	-0.174500	-0.045500	4.507776	1.764572	-0.029900
Std. Dev.	0.003188	0.034368	0.027292	1.182370	0.039556	0.069304	0.031249	2.735298	1.597843	0.024211
Skewness	0.133124	0.201270	0.050040	-0.031951	0.652318	-0.139687	0.064619	-0.312299	0.100586	0.107247
Kurtosis	2.767889	2.470662	2.712481	2.877694	2.931103	2.840284	2.794573	2.663644	2.211293	2.941995
Jarque-Bera	0.883743	3.132515	0.656507	0.134883	12.08999	0.733545	0.417227	3.564736	4.692909	0.349718
Probability	0.642832	0.208825	0.720180	0.934782	0.002370	0.692967	0.811709	0.168239	0.095708	0.839575
Observations	170	170	170	170	170	170	170	170	170	170

ROA: Return on assets, ROE: Return on equity

Table 2: Descriptive statistics for Islamic banks from 2003 to 2019

Constructs	ROA	ROE	Reinvestment rate	size	Non performing loans	Operating leverage	Loan growth	Inflation rate	GDP	Deposite growth
Mean	0.003901	0.065338	0.035625	16.83290	0.074870	0.007267	0.026838	9.984918	4.442939	0.035431
Median	0.003000	0.057500	0.033000	16.85292	0.067279	0.014833	0.025000	10.07022	4.372019	0.034454
Maximum	0.013000	0.153000	0.095000	18.39658	0.174450	0.170000	0.099600	14.40147	7.156284	0.086400
Minimum	-0.001719	-0.008625	-0.025219	15.03143	0.015938	-0.152500	-0.037500	4.507776	1.764572	0.003500
Std. Dev.	0.003381	0.045026	0.029321	0.818308	0.052089	0.078365	0.029680	2.786264	1.624013	0.019546
Skewness	0.451761	0.225789	0.019344	-0.011372	0.478877	-0.089970	-0.020706	-0.317421	0.106684	0.517347
Kurtosis	2.539028	1.869388	2.362403	2.293217	2.081840	2.420448	2.577869	2.623327	2.183784	2.877139
Jarque-Bera	2.186300	3.149691	0.867057	1.062628	3.740661	0.782549	0.382308	1.157926	1.512436	2.307086
Probability	0.335159	0.207040	0.648218	0.587832	0.154073	0.676194	0.826006	0.560479	0.469439	0.315517
Observations	51	51	51	51	51	51	51	51	51	51

ROA: Return on assets, ROE: Return on equity

Table 3: Descriptive statistics for non-Islamic banks from 2003 to 2019

Constructs	ROA	ROE	Reinvestment rate	size	Non performing loans	Operating leverage	Loan growth	Inflation rate	GDP	Deposite growth
Mean	0.006406	0.065802	0.043910	16.82911	0.064068	-0.001333	0.031909	10.02549	4.472797	0.034179
Median	0.006000	0.064000	0.045750	16.93725	0.061600	0.001250	0.030000	10.07022	4.372019	0.034250
Maximum	0.013500	0.136000	0.120000	19.72423	0.148825	0.155625	0.125750	14.40147	7.156284	0.102125
Minimum	0.000250	0.012375	-0.016000	13.60846	0.012392	-0.174500	-0.045500	4.507776	1.764572	-0.029900
Std. Dev.	0.002795	0.028853	0.026110	1.310905	0.032496	0.065226	0.031898	2.724982	1.593343	0.026023
Skewness	0.395103	0.146702	0.145083	-0.030848	0.388959	-0.225725	0.073943	-0.309530	0.098334	0.050719
Kurtosis	2.883078	2.508882	2.814719	2.588532	2.443119	3.032533	2.827603	2.680718	2.223355	2.769149
Jarque-Bera	3.163895	1.622774	0.587688	0.858349	4.538233	1.015795	0.255804	2.405668	3.182536	0.315261
Probability	0.205574	0.444241	0.745393	0.651046	0.103404	0.601760	0.879939	0.300342	0.203667	0.854165
Observations	119	119	119	119	119	119	119	119	119	119

ROA: Return on assets, ROE: Return on equity

Table 4: Descriptive statistics for islamic and non Islamic banksfrom 2003 to 2019

Type	n	Mean	Std. Deviation	Std. Error Mean
ROA				
Commercial bank	119	0.0064060	0.00279549	00025626
Islamic bank	51	0.0039007	0.00338051	00047337
ROE				
Commercial bank	119	0.00.0658018	0.02885348	00264499
Islamic bank	51	0.0653377	0.04502593	00630489
Reinvestment rate				
Commercial bank	119	0.0439098	0.02610967	00239347
Islamic bank	51	0.0356247	0.02932056	00410570
Size				
Commercial bank	119	16.82911	1.31090538	12017050
Islamic bank	51	16.83290	0.81830818	11458607
Nonperforming loans				
Commercial bank	119	0.0640675	0.03249560	00297887
Islamic bank	51	0.0748705	0.05208864	00729387
Operating leverage				
Commercial bank	119	-0.0013333	0.06522629	00597928
Islamic bank	51	0.0072671	0.07836469	01097325
Loan growth				
Commercial bank	119	0.0319092	0.03189792	00292408
Islamic bank	51	0.0268379	0.02967984	00415601
Inflation rate				
Commercial bank	119	100.02549	2.72498152	24979865
Islamic bank	51	9.9849182	2.78626384	39015498
GDP				
Commercial bank	119	4.4727968	1.59334250	14606147
Islamic bank	51	4.4429399	1.62401333	22740735
Deposite growth				
Commercial bank	119	0.341791	0.02602290	00238552
Islamic bank	51	0.0354313	0.01954561	00273693

ROA: Return on assets, ROE: Return on equity

Table 5: Independent sample test

Variables	Mean	SD	t-test	Significant level
ROA	0.00250	0.00049	50.020	0.000
	0.00250	0.00143	4.654	0.000
ROE	0.00048	-0.01092	0.080	0.936
	0.00048	-0.01318	0.068	0.946
Reinvestment rate	0.00829	-0.00067	1.826	0.070
	0.00829	-0.00116	1.743	0.085
Size	0.00379	-0.39561	-0.019	0.985
	0.00379	-0.33195	-0.023	0.982
Nonperforming loans	-0.1080	-0.02381	-1.640	0.103
	-0.1080	-0.26528	-1.371	0.175
Operating leverage	-00.0086	-0.03153	-0.740	0.460
	-00.0086	-0.03348	-0.688	0.493
Loan growth	0.00507	-0.00526	0.969	0.334
	0.00507	-0.00501	0.998	0.321
Inflation rate	0.4057	-0.86586	0.088	0.930
	0.4057	-0.87942	0.088	0.930
GDP	0.2985	-0.49964	0.111	0.911
	0.2985	-0.50684	0.110	0.912
Deposite growth	-0.00125	-0.00927	-0.308	0.758
	-0.00125	-0.00844	-0.345	0.731

ROA: Return on assets, ROE: Return on equity

Table 6: Group unit root test for dependent and independent variables from 2003 to 2019

Method	Cross-			
	Statistic	Prob.**	sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin and Chu t*	-7.49486	0.0000	9	1492
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-23.0639	0.0000	9	1492
ADF - Fisher Chi-square	433.555	0.0000	9	1492
PP - Fisher Chi-square	338.257	0.0000	9	1521

ADF: Augmented Dickey Fuller

between the two times relies on the space between two times, I will use Augmented Dickey-Fuller (ADF), Philips-Perrron (PP), and Im, Pesaran and Shin W-stat (IPSW).

Table 6 reveals that the time series of the ROA, ROE, reinvestment rate, size, nonperforming loans, operating leverage, loan growth, inflation rate, GDP, and deposit growth at level 1 (0) is based on the constant level, through to the criteria, Levin, Lin & Chu t*, IPSW, PP, and ADF, at a significant level of <0.05.

5.5. Cointegrating Equation Model
This technique is used to estimate stable time series factors such as ROE, ROE, reinvestment rate, size, nonperforming loans, operating leverage, loan growth, inflation rate, GDP, and deposit growth.

Tables 7 and 8 illustrate long-range balance relevance among the dependent variables (ROA and ROE) and independent variables (reinvestment rate, operating leverage, loan growth, inflation

rate, GDP, and deposit growth) in 2003–2019 at a significant level of <0.05.

5.6. Pearson correlation matrix

Table 9 outlines whether there is a linear correlation among the variables of the stable panel data analysis.

- A significant negative linear association exists between ROA and the type of bank; non-Islamic banks are mostly related to

Table 7: Cointegrating test from 2003 to 2019

Dependent	Tau-statistic	Prob.*	z-statistic	Prob.*
ROA	-6.486939	0.0044	-67.67340	0.0039
Reinvestment rate	-7.731739	0.0000	-88.73170	0.0000
size	-4.524133	0.3790	-35.85837	0.4005
Nonperforming loans	-3.598803	0.8191	-24.30557	0.8220
Operating leverage	-10.58552	0.0000	-135.2576	0.0000
Loan growth	-8.586590	0.0000	-103.2822	0.0000
Inflation rate	-10.21041	0.0000	-128.2420	0.0000
GDP	-8.108920	0.0000	-224.4519	0.0000
Deposit growth	-9.617903	0.0000	-120.0194	0.0000

*MacKinnon (1996) P values. ROA: Return on assets, ROE: Return on equity

Table 8: Cointegrating test for from 2003 to 2019

Dependent	tau-statistic	Prob.*	z-statistic	Prob.*
ROE	-7.355012	0.0002	-83.23770	0.0001
Reinvestment rate	-5.414774	0.0808	-60.73105	0.0138
size	-4.478595	0.4013	-35.43085	0.4157
Nonperforming loans	-3.195079	0.9285	-19.57986	0.9332
Operating leverage	-10.47802	0.0000	-133.5970	0.0000
Loan growth	-8.519195	0.0000	-102.2647	0.0000
Inflation rate	-11.13956	0.0000	-142.2496	0.0000
GDP	-8.080605	0.0000	-223.8668	0.0000
Deposit growth	-9.672877	0.0000	-120.9193	0.0000

*MacKinnon (1996) P values. ROA: Return on assets, ROE: Return on equity

ROA; the lower the ROA of an Islamic bank, the lower their return compared to non-Islamic banks at P < 0.001
- A positive linear association exists between the global financial crisis and the rate of ROA at P < 0.05
- A significant positive association exists between the rate of reinvestment, bank size, and growth rate and ROA at P < 0.001.

From Table 10, we can observe the following:
- A significant negative linear association exists between ROE and the type of bank; Islamic banks are more closely related to the rate of ROE than non-Islamic bank; hence, an Islamic bank is less in return than a non-Islamic bank at P < 0.001
- The financial crisis has a statistically significant influence on ROE at P < 0.05
- A significant correlation exists between the rate of reinvestment, size, loan growth, inflation rate, and GDP, and the ROE at P < 0.001.

5.7. Pedroni Residual Cointegration Test

Table 11 illustrates the long-range balance among the all variables of the panel data model (ROA, ROE, reinvestment rate, size, nonperforming loans, operating leverage, loan growth, inflation rate, GDP, and deposit growth) based on a weighted statistic for both the Panel PP-Statistic and the Panel ADF-Statistic at p < 0.05.

6. HAUSMAN TEST FOR CORRELATED RANDOM EFFECTS

This test provides an overview of the constant and random impact assessment of various coefficients.

Table 12 provides the counted value of the test, which is not significant (P > 0.05). Thus, the null hypothesis is validated,

Table 9: Linear correlation matrix

	Correlation									
Probability	ROA	X1	LNX2	X3	X4	X5	X6	X7	X10	SER01
ROA	1.000000									

Reinvestment rate	0.772389	1.000000								
	0.0000	-----								
Size	0.582875	0.486435	1.000000							
	0.0000	0.0000	-----							
Non performing loans	-0.055557	0.049906	-0.078886	1.000000						
	0.4718	0.5181	0.3065	-----						
Operating leverage	0.097416	0.048249	0.050904	0.036711	1.000000					
	0.2063	0.5321	0.5097	0.6346	-----					
Loan growth	0.241662	0.280768	0.012385	-0.045000	0.027286	1.000000				
	0.0015	0.0002	0.8726	0.5601	0.7239	-----				
Inflation rate	-0.204575	0.236545	0.300473	0.202583	-0.037948	0.059366	1.000000			
	0.0075	0.0019	0.0001	0.0081	0.6232	0.4419	-----			
GDP	-0.253458	0.152408	-0.101149	-0.114008	-0.150164	0.177809	0.131522	1.000000		
	0.0007	0.0472	0.1894	0.1388	0.0506	0.0204	0.0873	-----		
Deposit rate	0.033966	-0.059405	0.046677	-0.035071	0.146748	0.262863	0.000991	-0.142583	1.000000	
	0.6601	0.4416	0.5456	0.6498	0.0562	0.0005	0.9898	0.0636	-----	
SER01	-0.361177	-0.139527	0.001474	0.125522	0.057036	-0.074589	-0.006817	-0.008588	0.023771	1.000000
	0.0000	0.0696	0.9848	0.1029	0.4600	0.3337	0.9297	0.9115	0.7583	-----
FC	0.294953	0.121356	0.361644	0.250616	0.091086	0.036061	0.562593	-0.286288		
	0.0001	0.1149	0.0000	0.0010	0.2375	0.6406	0.0000	0.0002		

ROA: Return on assets, ROE: Return on equity

Table 10: Linear correlation matrix

Correlation									
Probabilityon	ROE	LNX2	X3	X4	X5	X6	X7	X10	SER02
ROE	1.000000								

Reinvestment rate	0.826492	1.000000							
	0.0000	-----							
Size	0.583204	0.486435	1.000000						
	0.0000	0.0000	-----						
Non performing loans	0.098480	0.049906	-0.078886	1.000000					
	0.2014	0.5181	0.3065	-----					
Operating leverage	0.067273	0.048249	0.050904	0.036711	1.000000				
	0.3834	0.5321	0.5097	0.6346	-----				
Loan growth	0.260886	0.280768	0.012385	-0.045000	0.027286	1.000000			
	0.0006	0.0002	0.8726	0.5601	0.7239	-----			
Inflation rate	0.316046	0.236545	0.300473	0.202583	-0.037948	0.059366	1.000000		
	0.0000	0.0019	0.0001	0.0081	0.6232	0.4419	-----		
GDP	-0.285780	0.152408	-0.101149	-0.114008	-0.150164	0.177809	0.131522	1.000000	
	0.0001	0.0472	0.1894	0.1388	0.0506	0.0204	0.0873	-----	
Deposit rate	0.058206	-0.059405	0.046677	-0.035071	0.146748	0.262863	0.000991	-0.142583	1.000000
	0.4509	0.4416	0.5456	0.6498	0.0562	0.0005	0.9898	0.0636	-----
SER02	-0.216207	-0.139527	0.001474	0.125522	0.057036	-0.074589	-0.006817	-0.008588	0.023771	1.000000
	0.0062	0.0696	0.9848	0.1029	0.4600	0.3337	0.9297	0.9115	0.7583	-----
FC	0.352270	0.121356	0.361644	0.250616	0.091086	0.036061	0.562593	-0.286288	0.022936
	0.0000	0.1149	0.0000	0.0010	0.2375	0.6406	0.0000	0.0002	0.7666

ROA: Return on assets, ROE: Return on equity

Table 11: Pedroni residual cointegration test for panel data for ROA, ROE

ADF	t-Statistic	Prob.
	-3.342170	0004
Residual variance	1.61E-06	
HAC variance	1.15E-06	
ADF	t-Statistic	Prob.
	-5.428583	0.0000
Residual variance	0.000186	
HAC variance	0.000162	

HAC: Heteroskedasticity and autocorrelation consistent, ROA: Return on assets, ROE: Return on equity, ADF: Augmented Dickey Fuller

Table 12: Hausman test for correlated random effects ROA

Test Summary		Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random		4.782967	8	0.7805
Cross-section random effects test comparisons:				
Variable	Fixed	Random	Var (Diff.)	Prob.
Reinvestment rate	0.073713	0.074065	0.000001	0.6770
Size	0.001119	0.001069	0.000000	0.2373
Non performing loans	0.008173	0.005943	0.000005	0.2967
Operating leverage	0.002026	0.002050	0.000000	0.8827
Loan growth	0.006436	0.006368	0.000000	0.8589
Inflation rate	-0.000093	-0.000080	0.000000	0.0930
GDP	-0.000183	-0.000196	0.000000	0.1113
Deposit growth	0.000217	0.000508	0.000000	0.6565

supporting the convenience of the random effects model and rejecting the alternative hypothesis of the fixed effects model. The next section of the output provides additional test details; there is no difference found between the two methods of the panel model. The evaluated variances are negative such that the prospects cannot be counted.

Table 13: Hausman test for correlated random effects ROE

Test Summary		Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random		75.029594	8	0.0000
Variable	Fixed	Random	Var (Diff.)	Prob.
Reinvestment rate	1.031656	0.913432	0.000581	0.0000
size	0.010094	0.005235	0.000001	0.0000
Non performing loans	0.041787	0.033693	0.002083	0.8592
Operating leverage	0.000861	-0.006393	0.000018	0.0852
Loan growth	0.072949	0.080018	0.000140	0.5502
Inflation rate	0.000377	0.001298	0.000000	0.0000
GDP	-0.003898	-0.004198	0.000000	0.1644
Deposit growth	0.026368	0.069680	0.000477	0.0474

ROA: Return on assets, ROE: Return on equity

Table 13 reveals that he counted value of this test is significant at (P < 0.05), thus, rejecting the null hypothesis convenience and the appropriateness of the random effects model and accepting the alternative hypothesis of the fixed effects model. Finally, we found no variation between the two methods of the panel model for size, nonperforming loans, operating leverage, GDP, and deposit growth. The evaluated distinctions may be negative so that the prospects cannot be calculated.

7. TOTAL PANEL ESTIMATION OF THE FIXED EFFECT MODEL

$R^2 = 68.2\%$ F-test $= 43.1$, sig $= 0.001^{***}$, RMSE $= 0.001$, DW $= 1.99$, U $= 0.11$, JB $= 2.83$, sig $= 0.24$ Pesaran CD $= -0.66$, sig $= 0.51$, BGSC F test $= 0.80$ sig $= 0.45$ Heteroskedasticity Test: BPG Ftest $= 1.12$ sig $= 0.34$ Ramsey RESET F test $= 2.41$, sig $= 0.123$

ROA $= 0.0740648015595^*X1 + 0.00106894947105^*LNX2 + 0.00594337653373^*X3 + 0.00204978431448^*X4$

Table 14: Total panel data model

Variable	Coefficient	Std. Error	t-Statistic	Prob.	VIF
Reinvestment rate	0.074065	0.006053	12.23565	0.0000	1.663363
Size	0.001069	0.000169	6.306825	0.0000	1.693923
Nonperforming loans	0.005943	0.005591	1.062966	0.2894	1.185603
Operating leverage	0.002050	0.001813	1.130760	0.2598	1.061020
Loan growth	0.006368	0.004463	1.426864	0.1556	1.292030
Inflation rate	-7.97E-05	5.25E-05	-1.516772	0.1313	1.789005
GDP	-0.000196	8.46E-05	-2.313616	0.0220	1.409708
Deposit growth	0.000508	0.005806	0.087574	0.9303	1.181462
SER01	-0.001879	0.000266	-7.056505	0.0000	1.059493
fc	0.000859	0.000384	2.236563	0.0267	2.012755
C	-0.014347	0.002805	-5.115085	0.0000	NA

VIF: Variance inflation factor

+ 0.00636805881024*X5 - 7.96926802164e-05*X6 - 0.000195628121589*X7 + 0.000508424105777*X10 -0.001879 *SER01 +0.000859*fc-0.0143468041445.

7.1. Coefficient of Determination (R2)

The independent variables (reinvestment rate, size, nonperforming loans, operating leverage, loan growth, inflation rate, GDP, deposit growth, SER01, FC) explain 68.2% of the overall change in the dependent variable ROA; the remaining percent can be attributed to the random error of the regression analysis model.

7.2. F Test

The result is significant at $P < 0.001$, where the value of the F test is 43.1. Thus, we can observe that the independent variables were agreeable in the model and have been influenced by the ROA.

7.3. T-Test

Most of the important independent variables were agreeable in the model (reinvestment rate, size, GDP, SER01, and FC) at $P < 0.05$.

7.4. Variance Inflation Factor (VIF)

As shown in the previous table, the VIP has a value of <4; thus, the model has not misery from the multicollinearity problem.

7.5. Theil's inequality coefficient U

From the previous table, we observe a value close to zero (0.17), pointing to the quality of fit of the panel model, at a percentage of 83%.

7.6. The Durbin-Watson test statistic

This test ranges in value from 0 to 4. A value near 2 illustrates nonautocorrelation; a value near 0 illustrates positive autocorrelation; a value near 4 illustrates negative autocorrelation. Where the statistic value (1.99) was greater than dU, we cannot decline the null hypothesis.

7.7. Breusch-Godfrey Serial Correlation LM Test

The result is significant because the values of the BGSC test statistic are ≥ 0.05 and 0.45, and thus, we cannot decline the null hypothesis (H0). There is no sequential correlation up to lag order p(2).

7.8. Heteroskedasticity Test

The heteroskedasticity test, conducted for the residual values of the multiple regression model, showed that the level of importance for the F-statistic, Obs, and R2 is >(0.05), which referred to the consent of the null hypothesis, which extends to the homoskedasticity of the error term.

7.9. Ramsey RESET Test

Because the significance value of the t-statistic, F-statistic, and likelihood ratio test statistic (≥0.05 and 0.3961), we would not reject the null hypothesis (H0). The functional form is correct, and there are no omitted variables (the extra terms are not statistically significant) (Table 15).

Table 15: Panel estimation model

Variable	Coefficient	Std. Error	t-Statistic	Prob.	VIF
Reinvestment rate	1.031656	0.047193	21.86026	0.0000	1.663363
Size	0.010094	0.001410	7.158532	0.0000	1.693923
Nonperforming loans	0.041787	0.067435	0.619666	0.5364	1.185603
Operating leverage	0.000861	0.014048	0.061281	0.9512	1.061020
Loan growth	0.072949	0.032791	2.224688	0.0276	1.292030
Inflation rate	0.000377	0.000452	0.835144	0.4049	1.789005
GDP	-0.003898	0.000729	-5.345662	0.0000	1.409708
Deposit growth	0.026368	0.055268	0.477085	0.6340	1.181462
SER01	0.007429	0.002799	2.653570	0.0088	1.059493
fc	0.011401	0.005800	1.065812	0.0511	2.012755
C	-0.139284	0.023007	-6.054039	0.0000	NA

VIF: Variance inflation factor

R^2=85.2% F-test=51.54 sig=0.001*** RMSE = DW= 1.41 U=0.089 JB=27.3 sig= 0.001*** Pesaran CD=0.53 sig=0.59 BGSC F test=0.91 sig= 0.40 Heteroskedasticity Test: ARCH Ftest = 3.37 sig=0.068 Ramsey RESET F test= 1.87 sig= 0.17

ROE = 1.03165556453*X1 + 0.0100943168861*LNX2 + 0.0417873157598*X3 + 0.000860868354646*X4 + 0.0729490074224*X5 + 0.000377457660304*X6 - 0.00389788928982*X7 + 0.0263676370434*X10 +0.007429 * SER01 + 0.011401 *fc - 0.139284490083

According to the panel estimation model using least squares, it can be concluded that:

7.10. The Coefficient of Determination: R2

The independent variables (reinvestment rate, size, nonperforming loans, operating leverage, loan growth, inflation rate, GDP, deposit

growth, SER01, FC) explain 85.2% of the overall change in the dependent variable ROE; the remaining percent can be attributed to the random error of the regression analysis model.

7.11. F Test
The result is significant at $P < 0.001$, where the value of the F test is (51.54) Thus, we can observe that the independent variables were agreeable in the model and have been influenced by the ROE.

7.12. T-Test
Most of the important independent variables were agreeable in the model (reinvestment rate, size, Loangrowth, GDP, SERO1, FC) at $P < 0.05$.

7.13. VIF
As shown in the previous table, the VIP has a value of <4; thus, the model has not misery from the multicollinearity problem.

7.14. Theil's Inequality Coefficient U
From the previous table, we observe a value close to zero (0.17), pointing to the quality of fit of the panel model, at a percentage of 83%.

7.15. The Durbin-Watson Test Statistic
This test ranges in value from 0 to 4. A value near 2 illustrates nonautocorrelation; a value near 0 illustrates positive autocorrelation; a value near 4 illustrates negative autocorrelation. Where the statistic value (1.41) was greater than dU, we cannot decline the null hypothesis.

7.16. Breusch-Godfrey Serial Correlation LM Test
The result is significant because the values of the BGSC test statistic are ≥0.05 and 0.40, and thus, we cannot decline the null hypothesis (H0). There is no sequential correlation up to lag order p(2).

7.17. Heteroskedasticity Test
The heteroskedasticity test, conducted for the residual values of the multiple regression model, showed that the level of importance for the F-statistic, Obs, and R2 is (>0.05), which referred to the consent of the null hypothesis, which extends to the homoskedasticity of the error term.

7.18. Ramsey Reset Test
Because the significance value of the t-statistic, F-statistic, and likelihood ratio test statistic (≥0.05 and1.41), we would not reject the null hypothesis (H0). The functional form is correct, and there are no omitted variables (the extra terms are not statistically significant.

8. CONCLUSION

We found that profitability is closely related to partnership between banks and the level with which the variables are specific to the company and overall scenario. In this investigation, we have identified the determinants of banks and highlighted the importance of variables specific to the banks. Most of the factors that we took into consideration are as follows: ROA, ROE, reinvestment rate, size, nonperforming loans, operating leverage,

loan growth, inflation rate, GDP, and deposit growth.

Islamic banks have unique characteristics that provide them with significant wealth. These characteristics are determined by the structure, assignments, and purposes of Islamic banks. Commercial banks are diverse in their characteristics as well. Islamic banks are forbidden from entering into bargains associated with alcohol and gambling; such trade is contrary to Sharia because gambling does not equate to goods or services, and resulting losses can harm the stability of families. The Sharia observable assembly monitors and supervises banking processes. When extraditing deposits, the Islamic bank is permitted to force service fees upon stable deposits, but it is not allowed to require an interest rate. Islamic banks also put forth profit and loss sharing for loan investments.

There are some challenges that Islamic banks still face in terms of their growth, including the need to confirm a united legal criterion. The accounting standard that uses Islamic banks is identical to that used in commercial banks, and therefore, it is difficult to calculate zakat.

Risk management and risk analysis tools are needed to provide agencies with tools to battle the high volatility that exists in the currency exchange and commodity markets for Islamic banks in Western markets (Mohammed and Muhammed 2016). We provide a set of recommendations for banks to continue to operate and experience growth and profitability:

- Banks should track and monitor loan examination activities to increase their loan recovery rates. Loan recovery rates can be improved by defining or designing collective recovery models
- Individual loans must be secured through microinsurance on negotiable products and securities so that they can be sold in the case of default
- Banks must conduct a descriptive analysis of NPL and understand the impact of treasury bills on profitability
- Precautionary measures should be tightened to prevent a decrease in capital (Awo and Akotey, 2019)
- The results from the panel data analysis indicate the following:
- The independent variables (reinvestment rate, size, nonperforming loans, operating leverage, loan growth, inflation rate, GDP, deposit growth, SER01, FC) explain 68.2% and 85.2% of the total differences of the dependent variables ROA and ROE, respectively.
- The independent variables that were agreeable in the model have been influenced by ROA and ROE
- The most important independent variables that were agreeable in the model are as follows: reinvestment rate, size, GDP, SER01, FC for ROA and reinvestment rate, size, loan growth, GDP, SERO1, FC for ROE at a significant level of <0.05
- The Durbin–Watson statistic ranges in value from 0 to 4; a value near 2 indicates no-autocorrelation; a value near 0 indicates a positive autocorrelation; a value near 4 indicates a negative autocorrelation. Because the statistical test value was greater than dU (1.99, 1.41), we would not decline the null hypothesis.

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