

## Determinants of bank profitability: An analysis using PMG estimation



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### ABSTRACT

This study offers a new way of analyzing the factors that influence bank profitability. It uses data from 2009 to 2021, covering eight banks, to examine the effects of liquidity, operational efficiency, credit risk, capital adequacy, and deposit ratio (LON). The results, calculated using the pool mean group (PMG) estimator's panel autoregressive distributed lag (ARDL) method, reveal important insights. Notably, bank profitability is significantly and negatively affected by the LON, capital adequacy (CAR), credit risk (CR), and operational efficiency (OE). Liquidity variables showed no effect on profitability. This approach adds valuable understanding to the existing research on internal factors affecting bank profitability and provides useful guidance for regulators and bank managers to improve profitability.

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### 1. Introduction

Banks play a pivotal role in the financial system, facilitating money flow from savers to borrowers. Bank management, investors, and policymakers must comprehend the factors that drive a bank's profitability. A bank's profitability is a crucial indicator of its financial health and performance. The banking system's stability is not just crucial; it's our collective responsibility to expand the financial sector, which boosts economic growth and improves people's quality of life. During times of economic turmoil, the banking system's resilience becomes evident. However, an unstable banking system can harm financial stability, investment, and economic growth, adversely affecting the nation's economy. The aftermath of financial crises, characterized by high levels of leverage, increased loan amounts, loosening of credit standards, credit risk, and inadequate supervision, can persist for extended periods, leading to significant economic contractions and high costs, thereby impacting society. This is evident from global examples like the COVID-19 pandemic in 2019 and the Global Financial Crisis during 2007–2008, underscoring the importance of maintaining a stable banking system.

The growth and transformation of the Qatari economy from 1949 to the present day is mirrored in the establishment of the banking sector in Qatar. During the discovery and production of oil in 1949, the necessity for a financial sector in Qatar arose. The banking sector in Qatar started in 1950. Qatar was home to its first bank, Eastern Bank, formerly Standard Chartered Bank. Following this, in 1954, the Arab Bank, Osman Bank (formerly Grindleys Bank, bought by Standard Chartered), and the British Bank for the Middle East (subsequently acquired by HSBC) all set up shop in Qatar. The Mashreq Bank, a Lebanese financial institution, opened for business in Qatar in 1960. In 1965, the public and the government of Qatar pooled their resources to form the first national bank under the name Qatar National Bank. The expansion of Qatar's economy has been bolstered by more than eighteen banks. There is a total of nine domestic banks and seven international banks operating in Qatar. Important financial performance at the end of year 2022 shows that Qatar's banking sector has remained strong despite recent setbacks. Qatar's bank balances provide insight into the growth of critical financial indicators. Qatar's Bank assets grew by 3.6%, reflecting the increase in the total volume of bank deposits. Gross loans and receivables increased by 3.3%, indicating increased lending activity. Deposits grew by 2.7%, reflecting growth in customer cash flow, but slower than assets due to economic uncertainty and post-World Cup growth. Operating profit grew by 18.1% and pre-tax profit by 20.2%. Fitch Ratings noted that Qatar Bank's profitability is strengthening, supported by higher interest rates

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and economic growth. Non-performance reduced. As a result, average operating profit/risk-weighted assets (RWA) increased to 3% in the third quarter of 2022 (2021: 2.5%; 2019: 2.8%).

We use the PMG estimating approach to investigate the factors that affect banks' profitability in Qatar, including their deposit ratio, capital adequacy, liquidity, credit risk, and operational efficiency. We may better grasp the banking sector's dynamics and make educated judgments to strengthen the financial system if we can determine what elements significantly impact bank profitability. Return on equity (ROE) and return on assets (ROA) quantify a bank's profitability. Using Pooled Mean Group Estimation, the study contributes to our understanding of the internal factors that affect banks' profitability in the banking sector of Qatar. Our literature search revealed no prior research on the factors influencing bank profitability in the Qatari market. Micro (bank-specific) and macro (industry-specific) variables were used to classify the factors impacting banks' profitability in a single study by [El-Kassem \(2017\)](#). Prior research has shown that the time frame, sample size, and data used to conclude can substantially impact the results.

## 2. Literature review

Several elements impacting bank financial performance were uncovered through a literature assessment of prior research on bank profitability. Several criteria were critical to the bank's success: capital sufficiency, asset quality, managerial effectiveness, earnings quality, and liquidity. Furthermore, banks' profitability is impacted by macroeconomic variables, including interest rates, inflation, and economic growth. This research aims to decipher the intricate connection between these variables and bank profitability by reviewing the relevant literature. This study is a compilation of the findings and analyses from several studies concerning the variables impacting the bank's financial performance. While some studies examined macroeconomic variables in addition to bank-specific ones, others examined either macroeconomic or bank-specific factors independently.

The impact of both internal and external variables on the profitability of urban commercial banks in China was examined by [Jigeer and Ekaterina \(2023\)](#) using panel data regression. Through 2020, sixteen listed urban commercial banks will be examined in the project. Commonly used is panel data regression. The study found that liquidity is not a key determinant of profitability, while bank size, capital adequacy, loan quality, and GDP were among the variables that did. This research is helpful for regulators, authorities, and bank managers in China since it sheds light on the profitability of Chinese banks.

[O'Connell \(2022\)](#) examined the factors that affected the profitability of UK banks from 1998 to

2018 and concluded that capital, deposits, liquidity, productivity, and loan growth were bank-specific factors that positively affected profitability. In the study, [O'Connell \(2022\)](#) found that expense control and size had a negative effect on profitability. The profitability of UK banks was impacted by macroeconomic variables such as cyclical output, inflation, and concentration.

From 2008 to 2016, [Jreisat and Bawazir \(2021\)](#) examined the elements impacting the profitability of eleven MENA region banks. The eight variables comprised two macroeconomic factors (economic growth and inflation) and six microeconomic variables. The results demonstrate that the bank's profitability was positively affected by its size, the loan-to-deposit ratio, the capital adequacy ratio, the liquidity ratio, the ratio of loans to total assets, and the credit risk. Various macroeconomic factors contributed to the rise of bank profits in tandem with inflation and economic expansion.

Using the GMM panel data approach, [Horobet et al. \(2021\)](#) investigated the factors influencing bank profitability in Central and Eastern European nations from 2009 to 2018. They discovered that banking performance is negatively impacted by budget balance, inflation, non-governmental credit, non-performing loans, capitalization, and concentration rates.

Using a fixed-effect model for panel data methods, [Islam and Rana \(2019\)](#) evaluated the factors affecting the profitability of Bangladesh's banks from 2013 to 2017. ROA, ROE, and NIM were the three profitability metrics utilized. The results demonstrated that ROA is positively affected by earning variables and asset quality, but capital strength has no such influence. Additionally, they discovered that earning and capital strength positively impact ROE, but GDP, interest, and inflation rates did not significantly impact the bank's performance.

A study conducted by [Shamim et al. \(2018\)](#) used multiple regression analysis to examine the factors impacting the profitability of Saudi Arabian banks from 1999 to 2006. At the same time, macroeconomic variables such as GDP and inflation did not significantly impact bank profitability in Saudi Arabia, five internal variables—capital adequacy, size, liquidity level, credit risks, and operational efficiency.

[Adelopo et al. \(2018\)](#) studied the link between bank profitability and macroeconomic, bank-specific variables before (1999–2006), during (2007–2009), and after (2010–2013) financial crisis. The study employed fixed effect models to examine the connection. At the macro level, GDP and inflation, while at the micro level, credit risk, size, cost management, liquidity, capital strength, and market dominance. The findings indicate that size, cost management, and liquidity were bank-specific characteristics influencing the profitability measure ROA before, during, and after the financial crisis. Conversely, additional capital strength, credit risk, and market power are considered when ROA and

NIM are utilized as profitability metrics. Bank performance was impacted by GDP and inflation both before and after the financial crisis.

In their study of 96 banks across seven Central and Eastern European nations, [Onofrei et al. \(2018\)](#) sought to identify the factors influencing bank profitability. According to the panel research, inflation had a substantial and negative influence on bank profits, although domestic public loans had a beneficial effect.

[El-Kassem \(2017\)](#) addressed the impact of risk and liquidity variables on the performance of Qatari banks from 2008 to 2015, examining the variables influencing bank profitability. Using the fixed-effect model, it has been demonstrated that the profitability of Qatari banks is positively and significantly impacted by the total capital ratio variable and negatively by the cost-income ratio variable. Simultaneously, the debt-to-equity ratio and impaired/non-performing loans have a substantial and detrimental impact on the profitability of banks in Qatar.

Between 2006 and 2013, [Mehta and Bhavani \(2017\)](#) looked at the factors that affected the profitability of commercial banks in the UAE. These factors included bank-specific, macroeconomic, and industry-specific factors. For all profitability metrics, the results reveal that banks' bottom lines are affected by cost efficiency, atypical revenue streams, and asset quality. When looking at profitability metrics like return on assets and equity, the only macroeconomic variable affecting them was GDP.

[Hadriche \(2015\)](#) attempted to examine and identify the factors that influenced the profitability of conventional and Islamic banks in the GCC countries between 2005 and 2012. The results showed that Islamic banks were, on average, more profitable. Operational costs and bank size impacted both conventional and Islamic banks' performance. In contrast, conventional and Islamic banks' performance was influenced negatively by credit risk and positively but insignificantly by inflation and DGP growth variables. Even though inflation impacted Islamic banks' performance, the findings

revealed that conventional and Islamic banks' profitability was affected by different elements.

Previous studies have investigated banks profitability determinants by using multiple methodologies, including random effect panel regression ([Jreisat and Bawazir, 2021](#)), fixed effect models ([Sanusi and Ismail, 2005](#); [El-Kassem \(2017\)](#)), generalized method movement (GMM) ([Horobet et al., 2021](#); [O'Connell, 2022](#)). The determinants variables of bank profitability and results varied across studies. While most empirical studies have focused on developed countries and some developing countries, studies on the banking sector in Qatar are scarce ([El-Kassem, 2017](#)), so this study examines banks' profitability determinants in Qatar.

### 3. Model, data, and methodology

#### 3.1. Model

This study used the Panel Mean Group (PMG) estimate approach to determine what factors influence bank profitability. One reliable method for handling the Endogeneity problem that often arises in panel data analysis is the PMG estimator. This method integrates fixed effects estimators with pooled mean group estimators to handle cross-sectional heterogeneity and dynamic panel data features. We can use the PMG estimator to adjust for unobserved individual effects to get better and more efficient estimates of the link between bank profitability and its determinants. Credit risk, operational efficiency, capital sufficiency, liquidity, and deposit ratio are some of the independent variables utilized in the model. We aim to include these factors in our analysis to shed light on how banks in Qatar might improve their profitability while facing tough competition ([O'Connell, 2022](#)).

This research is to investigate the internal factors that affect the profitability of Qatari banks. We achieved this by following the guidelines laid out by [Pesaran et al. \(1999\)](#) for panel-ARDL (p, q) models, which include two dynamic heterogeneous panel regressions:

$$ROA_{it} = \alpha_i + \sum_{j=1}^p \alpha_{1j} ROA_{i,t-j} + \sum_{j=0}^{q_1} \alpha_2 ADQ_{i,t-j} + \sum_{j=0}^{q_2} \alpha_3 LONI_{i,t-j} + \sum_{j=0}^{q_3} \alpha_4 CR_{i,t-j} + \sum_{j=0}^{q_4} \alpha_5 OE_{i,t-j} + \sum_{j=0}^{q_5} \alpha_6 LIQ_{i,t-j} + \mu_i + \epsilon_{it} \tag{1}$$

$$ROE_{it} = \alpha_i + \sum_{j=1}^p \alpha_{1j} ROE_{i,t-j} + \sum_{j=0}^{q_1} \alpha_2 ADQ_{i,t-j} + \sum_{j=0}^{q_2} \alpha_3 LONI_{i,t-j} + \sum_{j=0}^{q_3} \alpha_4 CR_{i,t-j} + \sum_{j=0}^{q_4} \alpha_5 OE_{i,t-j} + \sum_{j=0}^{q_5} \alpha_6 LIQ_{i,t-j} + \mu_i + \epsilon_{it} \tag{2}$$

where, ROA and ROE denote the return on assets and return on equity of bank *i* at time *t*, respectively. Where *i* = 1, 2, 3, ..., *N* and *t* = 1, 2, 3, ..., *T*,  $\alpha_i$  represents the fixed effects,  $\alpha_1 - \alpha_6$  represents the regressors' and independent variables' lagged coefficients. In contrast,  $\epsilon_{it}$  stands for the error term, which changes over banks and time and is presumed to be white noise.

#### 3.1.1. Dependent variables

1. An indicator of a bank's profitability to its total assets is the ROA ratio. It reveals the efficiency with which a bank generates profits from its assets. To find the ROA, we divide the net income of a bank by its total assets.
2. The second metric is the return on equity (ROE), which is the net income of a bank divided by its

equity. Return on equity (ROE) is a metric for evaluating the profitability and efficiency of a bank. Return on equity (ROE) is calculated by dividing net income by the total equity of a bank.

### 3.1.2. Independent variables

1. Capital Adequacy Ratio (CAR): a measure of a bank's financial health that considers both its current liabilities and its risk-weighted assets. Financial system efficiency and stability were ensured by this ratio, which served to safeguard investors. To find the CAR, we divide the sum of Tier 1 and Tier 2 capital by the total assets, weighted by risk.
2. Liquidity (LIQ): This financial ratio ascertains a bank's capacity to settle its immediate debts. The ratio of liquid assets to total assets is the LIQ metric.
3. Third, the Loan-to-Deposit Ratio (LDR) stands for the ratio of a bank's credit issued to the quantity of deposits received from customers. LDR is a significant metric since it reveals the amount a bank credits its deposits. The ratio of loans to total deposits is denoted as (LDR).
4. Operating Efficiency (OE): The ability of a bank to earn a profit or interest margin on its loan portfolio's interest-bearing assets relative to its non-interest-bearing operating expenses is a measure of operational efficiency. Operating expenses are calculated by dividing non-interest income by interest income minus the provision for credit losses.
5. Credit danger (CR): The lender runs the danger of losing money if the borrower doesn't pay back the loan. This is because the borrower could go into financial default. Find the CR by dividing the total loans by the non-performing loans.

### 3.2. Data

To investigate the internal factors of profitability of Qatari banks, we used annual data of 8 commercial banks listed in Qatar from 2009 to 2021. The information is taken from the bank's financial statements on the bank's website. Fortunately, the data for all 8 banks were complete and detailed so that the study could be conducted with very balanced panel data and 104 observations.

### 3.3. Econometric approach

This study uses several econometric methods. First, this study tests the shock effect using a cross-sectional dependence test. Second, a cross-sectional Augmented Dickey-Fuller (CADF) unit root test was used to examine whether the variables were stationary. Finally, the average estimate of the combined groups of the panel was used to estimate the long-term and short-term equilibrium relationships.

### 3.3.1. Cross-sectional dependence

Because the variables in this study were dependent on each other across time points, economic analysis was likely the method of choice. Because they have been through comparable financial, political, and economic storms, banks are cross-sectionally dependent. Consequently, before searching for unit roots between variables, it is wise to seek cross-sectional dependence. To investigate the possibility of cross-sectional dependence, we employ Pesaran et al.'s (2004) scaled LM test.

### 3.3.2. Panel unit root test

Pesaran and Smith (1995) developed the CADF unit root test to account for cross-sectional dependence in panel data. The following equation can be applied to determine the CADF unit root test. We use Pesaran and Smith's (1995) CADF panel unit test to account for cross-sectional dependence.

## 4. Results and discussions

### 4.1. Descriptive statistics

Table 1 describes the dependent and independent variables chosen for 2009–2021/202. In addition to the variables' means and medians, the description also provides their standard deviations, skewness, and kurtosis, as well as their lowest and maximum values, according to the data collected for every variable.

From 2009 to 2021, banks' ROA and ROE are displayed in Table 2, along with descriptive information. ROA and ROE are ways to evaluate how profitable a bank is. At 11.55 percent, the average ROE for the banks that were part of the study is 2.2%. On the other hand, ROE profitability varies greatly, with a standard deviation of 12.4 and ROA of 3.8%. An ROA of -9.3% and a ROE of -14.4% are the bare minimums. Both 28.5% and 26% are the maximum values. Qatari banks have set aside approximately 3% to cover potential loan defaults, according to CR, which averages 2.5% across the banks assessed. Bank reserves show minimal volatility, with a standard deviation of 2.5%. We may conclude that Qatari banks are appropriately capitalized according to the Basel II framework's recommendation of 8% based on the average capital adequacy ratio of 17.5%. All Qatari banks were appropriately capitalized, according to the minimum and maximum levels of 11.5% and 24.7%, respectively. The bank's average loan-to-deposit ratio (LON) throughout the research period was 52.9%, as shown in Table 2. Furthermore, the range of possible values for LON is 2.9% to 0.896. The reasonableness of the operating costs of Qatari banks is demonstrated by their average OE ratio of 25.5%. The range of OE values is from 7.6% to 42.4%. Regarding liquidity ratio (LIQ), the study's

participating banks had an average LIQ of 52.9%, ranging from 10.1% to 38.5%.

**Table 1:** Descriptive statistics of the variables

	ROA	ROE	LON	CAR	CR	OC	LIQ
Mean	0.022	0.115	0.601	0.175	0.025	0.256	0.529
Median	0.018	0.142	0.642	0.172	0.018	0.239	0.353
Maximum	0.285	0.260	0.896	0.247	0.150	0.421	0.385
Minimum	-0.093	-0.144	0.029	0.115	0.0009	0.076	0.101
Standard deviation	0.038	0.124	0.164	0.025	0.022	0.132	0.054
Skewness	3.543	-4.368	-2.085	0.526	2.440	0.665	2.000
Kurtosis	28.474	24.599	6.959	3.329	12.105	2.683	7.754
Observations	104	104	104	104	104	104	104

**4.2. Correlation analysis**

Our models do not suffer from multicollinearity, as shown in Table 2. The strongest correlations between the model variables (LON, CAR, CR, OC, and LIQ) are 0.294 and -0.469, respectively, between the OC and CR variables and the OC and LON variables. The results in Table 3 show no variable with a correlation greater than 0.70, which is a general rule when investigating multicollinearity. Therefore, we can conclude that the data is free of multicollinearity, and the independent variables are independent.

**Table 2:** Correlation matrix

	LON	CAR	CR	OC	LIQ
LON	1	-	-	-	-
CAR	0.149	1	-	-	-
CR	-0.021	-0.144	1	-	-
OC	-0.469	-0.356	0.294	1	-
LIQ	-0.058	-0.089	0.07	0.107	1

**4.3. Cross-sectional dependence test results**

All research variables have substantial cross-sectional dependence at a 1% level, as shown in Table 3, which gives the results of the Pesaran and Smith's (1995) scaled LM test cross-sectional dependence test along with their corresponding probability values. There is a strong cross-sectional dependence among all banks, which means the assumption of cross-sectional independence is rejected. To avoid incorrect conclusions, the PMG panel ARDL estimation method is used. This method allows us to make both long-term and short-term causal inferences while accounting for variations across banks in the short term. The ARDL model can be applied whether the data is stationary or not.

**Table 3:** A test for cross-sectional dependence exists

	Statistic	P-value
ROA	17.819***	0.000
ROE	5.886***	0.000
LON	8.581***	0.000
CAR	1.338***	0.005
CR	3.033***	0.002
OC	6.735***	0.000
LIQ	3.989***	0.000

\*\*\*: significant at 1%

**4.4. Unit root test results**

This study uses Pesaran and Smith's (1995) Cross-Sectional ADF Unit Root Test (CADF) to handle issues with cross-sectional dependency. Bose et al. (2016) stated that this test considers the sample banks' variability and cross-sectional dependence.

According to the results, LON and OC are level stationary variables, but ROA, ROE, CAR, CR, and LIQ are initially non-stationary variables that become stationary following differencing. Table 4 shows the integration orders, and as all variables must be integrated in the same order, the ARDL approach is preferred over Engel Granger and Johansen's approach. In the ARDL model, the dependent variables do not exhibit steady behavior in the first order.

**Table 4:** CADF unit root test

Variables	Statistic	P-value	Statistic	P-value
	Level		First difference	
ROA	-1.795	0.413	-3.731***	0.000
ROE	-1.908	0.304	2.617***	0.009
LON	-2.261*	0.076	-2.887***	0.001
CAR	-1.779	0.429	-2.398**	0.037
CR	-1.823	0.385	-2.518**	0.018
OC	-2.992***	0.000	-2.566**	0.013
LIQ	-1.636	0.576	-2.976***	0.001

\*\*\*: significant at 1% ; \*\* significant at %5 ; significant at 10%

**4.5. PMG estimation results**

After the series are co-integrated, the long- and short-term associations can be found using the Autoregressive Distribution Lag (ARDL) model.

Table 5 shows the predicted long-term coefficients for banks' profitability, as indicated by their ROA. At the 1% significance level, the PMG estimator shows that LON has a negative and statistically significant influence on bank profitability ROA. With a negative LON coefficient, we can see a clear correlation between LON and long-term bank profitability, so adjusting LON could increase profitability for Qatari banks. LON has a coefficient of -0.094, which means that with everything else equal, a 1% increase in LON causes a 0.094 % drop in bank profitability.

One indicator of a bank's health is its CAR. This is an essential indicator of a bank's capital strength. Profitability and the requirement for outside funding are both enhanced by a higher ratio. According to signaling theory, a bank with sufficient capital attracts investors by offering lower interest rates and better overall returns. Table 5 shows a negative and statistically significant outcome at the 1% significance level. This means that for every 1% change in the capital adequacy ratio, the bank's profit per unit decreases by 12.1%. They are considered in isolation. The correlation between a high Capital Adequacy Ratio and poor bank profitability is seen here. This goes against the

findings of past research that linked higher capital Adequacy ratios to higher profitability (Bourke, 1989). Additionally, García-Herrero et al. (2009) contend that banks with lower bankruptcy risks and higher capital Adequacy ratios can minimize financing costs. Goddard et al. (2004) also discovered a negative correlation between the capital Adequacy ratio and profitability. Therefore, our results are in line with theirs.

Bank profitability is negatively and significantly correlated with CR over the long term. ROA, a metric for bank profitability, drops by about 21.1% for every 1% rise in credit risk, according to the CR coefficient of -0.211. As a result, loans from banks that are not well-managed and controlled pose a higher credit risk. A growth in unsecured assets does not yield an explanation for this detrimental association. When bank management decides to enhance reserves to offset potential credit losses, profitability takes a nosedive. Ndoka and Islamo (2016), Kaaya and Pastory (2013), Bhattacharai (2016), Aduda and Gitonga (2011), and Bhattacharai (2016) all came to the same conclusion: CR has a detrimental effect on bank performance. On the other hand, Afriyie and Akotey (2012) and Alshatti (2015) discovered that CR had a favorable influence on banks. Consequently, bank management should implement appropriate credit risk rules to decrease risks and increase overall profitability.

A negative and statistically significant link was observed between the operating expense return ratio (OC) and the return on assets ratio at the 1% significance level. As a result, OC harms ROA and vice versa. A lower OC indicates that the bank is operating more efficiently. When a bank keeps its operational expenditures within the optimal range of net operating income, it sees an increase in its income. Cutting expenses boosts earnings, which is why this is the case. While the payoff may take some time, banks may ensure long-term viability by investing in infrastructure, technological systems, and employee skill sets. These investments become increasingly crucial for the banking industry's growth and profitability as time passes. A bank's profit margin is proportional to its operational cost efficiency. Conversely, the profitability of the bank decreases as its expenses rise. The findings are in line with those of Buchory (2015), Chen (2016), and Akbar and Afiezan (2018), all of which discovered that operating expenses significantly reduce bank profitability. One measure of a bank's solvency is its liquidity ratio (LIQ), which is the percentage of total assets that are cash and other liquid assets divided by total assets. This ratio shows how quickly a bank can pay its short-term bills. A bank's liquidity and resilience to short-term shocks correlate with its number of liquid assets, just as with its capital level. Storing liquid assets can increase a bank's profitability, according to Bordeleau and Graham (2010). However, there is a point beyond which storing even more liquid assets might reduce profitability due to their impact on revenue generation from credit. Due to the short-term nature

of liquidity risk compared to long-term profitability criteria, the liquidity ratio (LIQ), as shown in Table 5, did not significantly affect profitability for Qatari banks. At least once every three months and once a year, financial indicators must be made public. From 2009 to 2021, banks had an average yearly current ratio of 53.00. A high current ratio suggests much cash on hand, but it also means lost opportunities for profit due to unused money. These findings corroborate those of Jumono and Mala (2019) and Staikouras and Wood (2004). For the short-term association between the independent and dependent variables, Table 5 also displays the empirical data. At the 5% level of significance, only ( $\Delta$  LON) showed a positive and statistically significant correlation with the return on assets ratio. A one percentage point increase in LON results in an improvement in bank profitability of around 0.054 percentage points, everything else being equal, according to the coefficient of LON, which is 0.054. The link between return on assets and other variables was nonexistent.

**Table 5:** The ROA as determined by Panel regression analysis

	Variables	Statistic	P-value
Long-run	LON	-0.094***	0.000
	CAR	-0.121***	0.000
	CR	-0.211***	0.000
	OC	-0.025***	0.000
	LIQ	-0.002	0.795
	ECT	-0.440***	0.001
Short-run	$\Delta$ LON	0.054**	0.024
	$\Delta$ CAR	-0.168	0.325
	$\Delta$ CR	0.026	0.727
	$\Delta$ OC	0.030	0.394
	$\Delta$ LIQ	0.023	0.167
	CONSTANT	0.048***	0.002
Pesaran scaled LM CD test		-1.831*	0.067

\*\*\*: significant at 1% ; \*\* significant at 5% ; significant at 10%

When ROE is used as the dependent variable, the PMG estimator indicates that all the independent factors in the sample hurt ROE. There was a positive correlation between the LON variable and ROE. The findings in Table 5 agree with these findings. All the independent factors negatively influenced ROA when ROA was set as the dependent variable, except for (LIQ), which had a negative influence on ROA but was not statistically significant. Table 6 also displays the short-run empirical results between the dependent and independent variables. The return on equity ratio was negatively and statistically significantly correlated with just ( $\Delta$  OC) at the 5% significance level. A one-point increase in OC results in a drop in bank profitability of around 0.222 percentage points, all else being equal, according to the coefficient of OC, which is -0.222. The link between return on assets and other variables was nonexistent.

## 5. Conclusion

The research team in Qatar set out to find out how various internal factors affected the country's bottom line of different banking institutions. Data

was collected from eight banks' 2009–2021/2 fiscal years' worth of yearly financial statements. The ARDL method of PMG approaches is applied considering the cross-sectional dependence test and other essential diagnostic tests. Research on profitability sheds light on banks' healthy financial health. While only loan deposits impacted profitability in the short term, the results reveal that all bank-specific variables, except liquidity (LIQ), have a statistically significant effect on long-term profitability as evaluated by ROA. Return on Equity (ROE) is statistically affected by all variables in the long run. However, in the short run, operating expenses and income affect profitability.

**Table 6:** Results of panel regression analysis for return on equity (ROE)

	Variables	Statistic	P-value
Long-run	LON	0.037***	0.001
	CAR	-0.083***	0.003
	CR	-0.507***	0.000
	OC	-0.037***	0.000
	LIQ	-0.157***	0.000
	LON	-0.747***	0.009
Short-run	Δ LON	0.180	0.126
	Δ CAR	0.157	0.587
	Δ CR	0.494	0.317
	Δ OC	-0.222**	0.024
	Δ LIQ	0.268	0.415
	CONSTANT	0.132**	0.012
Pesaran scaled LM CD test		-0.149	-0.149

\*\*\*: significant at 1% ; \*\* significant at %5

Bank executives in Qatar may be able to use the findings of this study to develop strategic decisions that would boost the industry's bottom line. The investor also has agency over selecting investment vehicles and financial institutions. To boost the banking sector's bottom line, the government and authorities in Qatar are doing much work. Lastly, the study suggests adding additional factors and using different research approaches for future studies.

The data on Qatari banks was only available in 2009, limiting this investigation's scope. The Gulf Cooperation Council (GCC) and Arab nations are good examples of possible future study subjects. Also, these analyses might look at how conventional and Islamic banks in Qatar fared in profitability. Macroeconomic variables like GDP and inflation could also be included in future studies.

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## Compliance with ethical standards

## Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

## References

- Adelopo I, Lloydking R, and Tauringana V (2018). Determinants of bank profitability before, during, and after the financial crisis. *International Journal of Managerial Finance*, 14(4): 378-398. <https://doi.org/10.1108/IJMF-07-2017-0148>
- Aduda J and Gitonga J (2011). The relationship between credit risk management and profitability among the commercial banks in Kenya. *Journal of Modern Accounting and Auditing*, 7(9): 934-946.
- Afriyie HO and Akotey JO (2012). Credit risk management and profitability of selected rural banks in Ghana. *Ghana: Catholic University College of Ghana*, 7(4): 176-181.
- Akbar T and Afiezan A (2018). Determination of Sharia stock price through analysis of fundamental factors and macro economic factors. *Account and Financial Management Journal*, 3(10): 1739-1745.
- Alshatti AS (2015). The effect of credit risk management on financial performance of the Jordanian commercial banks. *Investment Management and Financial Innovations*, 12(1): 338-345.
- Bhattarai YR (2016). Effect of credit risk on the performance of Nepalese commercial banks. *NRB Economic Review*, 28(1): 41-64. <https://doi.org/10.3126/nrber.v28i1.52552>
- Bordeleau É and Graham C (2010). The impact of liquidity on bank profitability. *Staff Working Paper 2010-38*, Bank of Canada, Ottawa, Canada. <https://doi.org/10.34989/swp-2010-38>
- Bose S, Bhattacharyya A, and Islam S (2016). Dynamics of firm-level financial inclusion: Empirical evidence from an emerging economy. *Journal of Banking and Finance Law and Practice*, 27(1): 47-68.
- Bourke P (1989). Concentration and other determinants of bank profitability in Europe, North America and Australia. *Journal of Banking and Finance*, 13(1): 65-79. [https://doi.org/10.1016/0378-4266\(89\)90020-4](https://doi.org/10.1016/0378-4266(89)90020-4)
- Buchory HA (2015). Banking intermediation, operational efficiency and credit risk in the banking profitability. *Proceeding-Kuala Lumpur International Business, Economics and Law Conference*, 7(2): 141-152. <https://doi.org/10.2991/iceb-15.2015.27>
- Chen X (2016). Research on profitability and influencing factors of listed commercial banks. Ph.D. Dissertation, Tianjin University of Commerce, Tianjin, China.
- El-Kassem RC (2017). Determinants of banks' profitability: Panel data from Qatar. *Open Journal of Accounting*, 6: 103-111. <https://doi.org/10.4236/ojacct.2017.64009>
- García-Herrero A, Gavilá S, and Santabárbara D (2009). What explains the low profitability of Chinese banks? *Journal of Banking and Finance*, 33(11): 2080-2092. <https://doi.org/10.1016/j.jbankfin.2009.05.005>
- Goddard J, Molyneux P, and Wilson JO (2004). The profitability of European banks: A cross-sectional and dynamic panel analysis. *The Manchester School*, 72(3): 363-381. <https://doi.org/10.1111/j.1467-9957.2004.00397.x>
- Hadriche M (2015). Banks performance determinants: Comparative analysis between conventional and Islamic banks from GCC countries. *International Journal of Economics and Finance*, 7(9): 169-177. <https://doi.org/10.5539/ijef.v7n9p169>
- Horobet A, Radulescu M, Belascu L, and Dita SM (2021). Determinants of bank profitability in CEE countries: Evidence from GMM panel data estimates. *Journal of Risk and Financial Management*, 14(7): 307. <https://doi.org/10.3390/jrfm14070307>
- Islam S and Rana MS (2019). Determinants of bank profitability: Evidence from commercial banks of Bangladesh. *Journal of Asian Business Strategy*, 9(2): 174-183. <https://doi.org/10.18488/journal.1006.2019.92.174.183>

- Jigeer S and Koroleva E (2023). The determinants of profitability in the city commercial banks: Case of China. *Risks*, 11(3): 53. <https://doi.org/10.3390/risks11030053>
- Jreisat A and Bawazir H (2021). Determinants of Banks profitability in the Middle East and North Africa region. *The Journal of Asian Finance, Economics and Business*, 8(6): 701-711.
- Jumono S and Mala CMF (2019). Determinants of profitability in banking industry: A case study of Indonesia. *Asian Economic and Financial Review*, 9(1): 91-108. <https://doi.org/10.18488/journal.aefr.2019.91.91.108>
- Kaaya I and Pastory D (2013). Credit risk and commercial banks performance in Tanzania: A panel data analysis. *Research Journal of Finance and Accounting*, 4(16): 55-62.
- Mehta A and Bhavani G (2017). What determines banks' profitability? Evidence from emerging markets-The case of the UAE banking sector. *Accounting and Finance Research*, 6(1): 77-88. <https://doi.org/10.5430/afr.v6n1p77>
- Ndoka S and Islami M (2016). The impact of credit risk management in the profitability of Albanian commercial banks during the period 2005-2015. *European Journal of Sustainable Development*, 5(3): 445-445. <https://doi.org/10.14207/ejsd.2016.v5n3p445>
- O'Connell M (2022). Bank-specific, industry-specific and macroeconomic determinants of bank profitability: Evidence from the UK. *Studies in Economics and Finance*, 40(1): 155-174. <https://doi.org/10.1108/SEF-10-2021-0413>
- Onofrei M, Bostan I, Roma A, and Firtescu BN (2018). The determinants of commercial bank profitability in CEE countries. *Romanian Statistical Review*, 2: 33-46.
- Pesaran MH and Smith R (1995). Estimating long-run relationships from dynamic heterogeneous panels. *Journal of Econometrics*, 68(1): 79-113. [https://doi.org/10.1016/0304-4076\(94\)01644-F](https://doi.org/10.1016/0304-4076(94)01644-F)
- Pesaran MH, Schuermann T, and Weiner SM (2004). Modeling regional interdependencies using a global error-correcting macroeconomic model. *Journal of Business and Economic Statistics*, 22(2): 129-162. <https://doi.org/10.1198/073500104000000019>
- Pesaran MH, Shin Y, and Smith RP (1999). Pooled mean group estimation of dynamic heterogeneous panels. *Journal of the American Statistical Association*, 94(446): 621-634. <https://doi.org/10.1080/01621459.1999.10474156>
- Shamim F, Aktan B, Abdulla MA, and Sakhi NM (2018). Bank-specific vs. macro-economic factors: What drives profitability of commercial banks in Saudi Arabia. *Banks and Bank Systems*, 13(1): 139-149. [https://doi.org/10.21511/bbs.13\(1\).2018.13](https://doi.org/10.21511/bbs.13(1).2018.13)
- Staikouras CK and Wood GE (2004). The determinants of European bank profitability. *International Business and Economics Research Journal*, 3(6): 58-68. <https://doi.org/10.19030/iber.v3i6.3699>