






“Bank-specific and macroeconomic determinants of bank profitability: Empirical evidence from Oman”

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BANK-SPECIFIC AND MACROECONOMIC DETERMINANTS OF BANK PROFITABILITY: EMPIRICAL EVIDENCE FROM OMAN

Abstract

This paper investigates the determinants of bank profitability in Oman. It covers two broad categories of traditional factors that determine bank profitability, namely bank-specific variables: capital adequacy, credit risk, liquidity risk, and operational efficiency; and macroeconomic variables: economic growth, inflation, industry concentration, credit growth, and interest rates. Due to the nature and small size of the Omani economy, the industry-specific factors are clubbed with macroeconomic factors. The findings show that the p-value (0.00) is well below the 5% significance level for both ROE and ROA proxies, leading to the acceptance of the null hypothesis of no co-integration. Moreover, Fisher's chi-squared test statistics are 145.742 for ROE and 150.224 for ROA, strengthening the absence of a long-term relationship between both bank-specific and macroeconomic variables. Co-integration vectors with Fully Modified OLS show that CPI (Inflation) does not significantly influence ROE ($p = 0.280$), indicating that explanatory variables have no significant impact on ROE at 5% significance level. Similarly, in estimating ROA, neither CPI ($p = 0.146$) nor GDP ($p = 0.435$) reflects a significant effect, suggesting that these macroeconomic variables do not have a co-integrating impact on profitability metrics. The study indicates that bank profitability in Oman is sensitive to both internal and external factors. However, the degree to which each determinant affects a bank's profitability in Oman varies from that observed in international studies. The findings have important implications for decision-makers in the banking sector when developing appropriate strategies, considering the sensitivity of each factor indicated in our study to bank profitability.

Keywords

commercial bank, bank profitability, determinants, return on equity, return on assets, bank-specific, macroeconomic

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INTRODUCTION

Oman's economy is transforming from a hydrocarbon-based to a non-oil-based one, leading to diversification over the last few years. This is to reduce over-dependence on the oil sector and focus more on five critical sectors: manufacturing, transportation & logistics, tourism, fisheries, and mining (KMPG, 2016). The momentum in the Omani economy is primarily due to the surge in oil prices. The banking sector remained robust despite macroeconomic challenges stemming from deficits in both the fiscal and current accounts, driven by the persistent decline in oil prices over several years. The banking sector framework falls under the strict control and supervision of the Central Bank of Oman (CBO). "It comprised mainly conventional commercial banks, Islamic banks and windows, specialized banks, non-bank finance and leasing companies, money exchange and draft issuing establishments, and money changing outlets" (CBO, 2018, p. 79). The neo-liberal, free-market Omani econo-

my, where the private sector is the primary driver, requires a conservative, prudent financial regulator that promotes growth, stability, and sustainability in the Omani banking sector (Bank Muscat, 2018). There were 16 commercial banks, comprising seven local and nine foreign bank branches, with a network of 436 branches at the end of 2017 (CBO, 2018). The role of the banking system is vital for an ambitious economy like Oman, which just achieved Vision 2020 and is on its way to achieving Vision 2040.

The literature points out two critical schools of thought on measuring profitability. It includes Harvard and the Chicago schools of thought. Bucevska and Misheva (2017), Bain (1951), Collins and Preston (1968), Evanoff and Fortier (1988), and Mann (1966) provided evidence of an empirically established relationship between two different schools of thought and profitability. This hypothesis is popularly known as the Structure-Conduct-Performance (SCP) hypothesis, as observed by the Harvard School of Thought. However, the works of Demsetz (1973), Webster (1996), Seelanatha (2010), and Staikouras and Wood (2004) have alternatively proved that it is not the market power that delivers better profit, but the superior efficiency or competitive behavior of the firm that leads to higher market share and concentration, which in turn results in higher profits. This proposition is known as the Efficiency Hypothesis (EH) of the Chicago school of thought. However, the literature does not specify any variables to include under each school of thought. It just holds whether structure or efficiency brings profit to the firms. Neither the structure nor even the efficiency is defined. Further, the results under the two schools of thought are mixed. On the other hand, the literature points out yet another set of three hypotheses for measuring profitability. Adeusi et al. (2014) provide an extensive reference for these hypotheses, including the signaling theory, the bankruptcy cost hypothesis, and the risk-return hypothesis. These three hypotheses were tested by Ommeren (2011), Berger (1995), and Sharma and Gounder (2012).

As this paper investigates the determinants of Conventional Commercial Banks' (CCBs) profitability in Oman and assesses the consistency of its results with those from the rest of the world, it considers explanatory variables drawn from studies worldwide, regardless of whether they fall under the structure or efficiency hypotheses. This study embraces the notion that profitability is a function of variables in general, irrespective of preconceived notions from earlier hypotheses. It also confirms that most of the literature reviewed falls under one of the nine hypotheses developed in the present article. Further, the literature indicates that Return on Equity (ROE) and Return on Asset (ROA) are widely used proxies for profitability, rather than merely representing the Profit Identification Approach (PIA) and Net Interest Margin (NIM) as in our study. A description of the variables used as profitability indicators, as well as other explanatory variables, is provided in the Research methodology section.

1. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

The unique contribution of the present study is that it draws substantial literature from the immediate past five years. Second, ample international studies consider both domestic and cross-country variables. However, there is a need for such studies in Oman. Few research findings are based solely on the PIA, not on other major profitability indicators. This article contributes immensely filling this gap in Oman. Third, the study considers seven local CCBs. The government stake in CCBs is negligible. Hence, the study is unique as it is a better

proxy for the performance of private commercial banks. Fourthly, in Oman, being a small economy, the sensitivity of industry-specific and macroeconomic variables was negligible. Hence, a few of the industry-specific variables have been merged with macroeconomic variables. After a thorough analysis, independent variables were identified based on past literature. The most recurring variables are identified under bank-specific and macroeconomic factors, and, in line with this, nine hypotheses have been developed to address the research objectives.

Capital adequacy positively affects profitability (ROA) (Brastama & Yadnya, 2020). Dao and Nguyen (2020) concluded that the relationship be-

tween Capital Adequacy and Banks' Profitability is statistically significant. "Bank capital adequacy has a positive impact on return on assets for small-sized banks. However, we cannot establish the link in the subsample of large-sized banks in Vietnam" (Nguyen, 2020, p. 43). Abbas et al. (2019) found that bank capital positively influences profitability. The study further reveals that profit increases by 1 percentage point for a 6 percentage-point increase in capital. Ramadhanti et al. (2019) reveal that capital adequacy significantly affects profitability (ROA). El-Ansary et al. (2019) concluded that traditional banks show an association between CAR and profitability. However, Islamic Banks (IBs) offer no significant association between CAR and profitability. Madugu et al. (2019) show that the capital adequacy ratio has negatively affected the profitability of foreign banks but has no impact on local banks. Kusumastuti and Alam (2019) demonstrated that capital adequacy has no significant effect on Profitability (ROA). The literature suggests that capital adequacy has shown an impact on bank profitability. However, the significance of this influence varies. We aim to explore the significance of this factor in the Omani context.

Bank profitability is negatively and significantly sensitive to credit. The result reveals that credit levels significantly reduce bank profitability (Abdelaziz et al., 2020). Siddique et al. (2021) indicated that non-performing loans, a surrogate for credit risk, have a significant negative relationship with proxies for bank profitability (ROE and ROA). Munangi and Bongani (2020) concluded that the higher the non-performing loans (Credit risk), the lower the bank's profitability (ROE). Ekinici and Poyraz (2019) found a negative relationship between credit risk and the proxies of bank profitability (ROE and ROA). Gadzo et al. (2019) found that credit risk negatively influences financial performance. They recommend reducing interest rates to lower banks' credit risk. The study further shows that the bank-specific variables affect credit risk. "The estimation results show that all bank-specific determinants, except for credit risk, significantly affect bank profitability in the anticipated way. However, no evidence was found in support of the SCP hypothesis" (O'Connell, 2022, p. 155). Since Oman is a highly regulated market, we want to find out how much the expansion of banks' lending has impacted their profitability in Oman.

Profitability is negatively and significantly sensitive to increased liquidity risk (Abdelaziz et al., 2020). "There is a significant and negative association between liquidity risk and bank performance" (Yahaya et al., 2022, p. 14). Budhathoki et al. (2020) conclude that lower liquidity (a higher loan-to-deposit ratio) has a negative effect on bank profitability, as measured by three proxies (ROE, ROA, and NIM). However, the impact of liquidity on ROE and NIM was statistically insignificant. Duan and Niu (2020) reveal that liquidity creation is associated with higher profitability. Al-Homaidi et al. (2020) show that liquidity affects profitability (ROA). Duho et al. (2020) reveal that bank managers must be committed to effective liquidity risk management to drive profitability. The above reviews indicate that profitability responds differently to changes in liquidity levels. It depends on the bank's ability to balance funds between lending and meeting customer obligations.

"There is a statistically significant relationship between bank profitability and operating efficiency" (Lotto, 2019, p. 10). Kundu and Banerjee (2021) found a relationship between operational efficiency and bank profitability. Ali (2020) found a relationship between operational efficiency and profitability for IBs; however, no such relationship was found for Conventional Banks (CBs). Hussien et al. (2019) found that operational efficiency significantly influenced bank performance. Khan et al. (2020) found a significant negative association between operational efficiency and bank profitability. Gadzo et al. (2019) show that operational efficiency negatively influences bank profitability. They found that operational efficiency influences a bank's performance. Elekdag et al. (2020) found that operational efficiency (cost reduction) is the most promising for bank profitability. As many researchers conclude that operational efficiency affects bank profitability, the bank's efficiency in Oman warrants testing. However, we do not differentiate between IBs and CBs.

Economic growth and bank profitability are associated (Abbas et al., 2021). Batten and Vo (2019) prove that banks do not report a consistent impact of economic growth on bank profitability. Ledhem and Mekidiche (2020) reveal that economic growth significantly impacts bank profitability. Alam et al. (2021) found a substantial relationship

between ROA and economic growth. Singkeruang et al. (2021) showed that GDP growth has a positive effect on bank profitability but is not significant for ROA. Gupta and Mahakud (2020) found a substantial, positive impact of GDP growth on banks' financial performance. "There is a strong and positive association between financial development and economic growth of selected economies (Guru & Yadav, 2019, p. 124). Many studies worldwide reveal a positive relationship between economic growth and bank profitability. However, the significance level varies.

Inflation has a significant negative influence on bank profitability (Jadah et al., 2020). Uralov (2020) found that the inflation rate strongly and favorably affects all three profitability indicators (ROE, ROA, NIM). Prasanto et al. (2020) show that inflation has a positive relationship with bank profitability in the long term. But they show no short-term relationship. Athari and Bahreini (2021) found that inflation significantly impacts the profitability of IBs. Adelopo et al. (2022) showed that inflation is the primary external determinant of profitability. Yakubu (2019) found that inflation significantly positively affects Ghana's profitability. Istan and Fahlevi (2020) prove that inflation has no significant and negative effect on ROA. The inflation in Oman has been steady over the years. Given that many studies show a significant impact of inflation on bank profitability, we intended to test how well this phenomenon holds in Oman.

Increased concentration reduces bank profitability (Yuanita, 2019). Al Arif and Awwaliyah (2019) conclude that industry concentration does not affect bank profitability. Alfadli and Rjoub (2020) found that the concentration ratio significantly negatively affects all performance measures of bank profitability. Basri (2020) has maintained that less concentration improves bank performance. Al-Harbi (2019) found that concentration fosters banks' profitability. Abbas and Arizah (2019) showed that industry concentration positively affects bank profitability. Vera-Gilces et al. (2020) determine that market power strongly determines Ecuadorian banks' profitability. "The performance of the financial sector can be obtained under competitive and efficient conditions without high levels of concentration" (González et al., 2019, p. 1). The studies above show a good impact of bank concentration on bank profitability. Even in

Oman, the banking market is more concentrated, and we want to test whether the hypothesis holds for the Oman market.

The number of loan accounts and the loan-to-deposit ratio do not affect banks' profitability (Kumar et al., 2022). "Negative impact of Economic Policy Uncertainty (EPU) on credit growth is more pronounced in civil law countries, increases with debt maturity, and weakens for banks with a larger number of employees and branches. Furthermore, the unfavorable effects are stronger in well-capitalized banks, banks with foreign subsidiaries, and banks with a higher share of wholesale funding" (Danisman et al., 2020, p. 2). Le (2020) shows a positive interrelationship between bank profitability and loan growth, indicating a bidirectional relationship. "Growth in lending increases loan loss provisions from 2 to 3 subsequent years, lowers bank capital ratio the next year; while bank profitability gains positive effects from loan growth both in the short term and long term" (Dang, 2019, p. 1). Buchory (2021) found that credit growth significantly affects profitability (ROA). Profitability was influenced by 71.2 percent, while other factors accounted for 28.8 percent. Katırcioğlu et al. (2020) provide evidence of the banking sector in Turkey. The relationship is that oil-based bank lending moves in the opposite direction to oil prices. This means that due to the decline in oil prices, banks' lending to this sector is decreasing. The above review emphasizes the strong relationship between credit growth and bank profitability. However, a few exceptions are observed due to the nature of a country's legal system or market, such as the oil market.

Higher liquidity reserves of the banking system drive the Negative Interest Rate Policy (NIRP). In such circumstances, banks are compelled to engage in excessive lending. Consequently, interest rates under NIRP are elastic in nature (Demiralp et al., 2021). Campmas (2020) found that the robustness of banking operations or systems, as measured by the asymmetric Z score and the two ratios, namely ROE and ROA, affects profit but not NIM. Banks with conservative policies generate better results than those with aggressive policy approaches. Even with a conservative interest rate level, a positive impact on NIM is expected. However, the impact on profitability (ROE and ROA) is negative. Lopez et al. (2020) explored the results of negative policy rates on bank perfor-

mance. Under negative interest rate conditions, interest income losses are covered. This is by reducing the servicing cost of deposits and surpluses earned from other incomes (non-interest). Banks cover dwindling interest rates by enlarging their loans and advances and increasing their share of deposits. Literature strongly indicates that bank profits are sensitive to interest rates across all prime indicators. But the significance levels of interest rates vary slightly across different profit indicators.

Prior studies indicate that bank profitability is influenced by a combination of bank-specific and macroeconomic variables, but findings remain inconsistent across countries, time periods, and banking systems. The literature also reveals limited evidence for Oman, especially regarding conventional commercial banks assessed using a unified framework that includes internal and external variables. Therefore, our study aims to analyze the impact of nine variables identified in the literature on Omani conventional commercial banks and to validate these findings by setting the following nine hypotheses. The study will provide deeper insight into the performance analysis of commercial banks in Oman using two widely used performance proxies, ROE and ROA, and assess whether the observed relationships are consistent with prior international evidence.

- H_1 : Capital Adequacy significantly affects bank profitability.
- H_2 : Credit Risk significantly affects bank profitability.
- H_3 : Liquidity significantly affects profitability.
- H_4 : Operational Efficiency significantly affects profitability.
- H_5 : Economic Growth has a significant effect on profitability.
- H_6 : Inflation significantly affects profitability.
- H_7 : Industry Concentration significantly affects profitability.
- H_8 : Credit Growth has a significant effect on profitability.
- H_9 : Interest Rate has a significant effect on profitability.

Figure 1 presents the research model for the study.

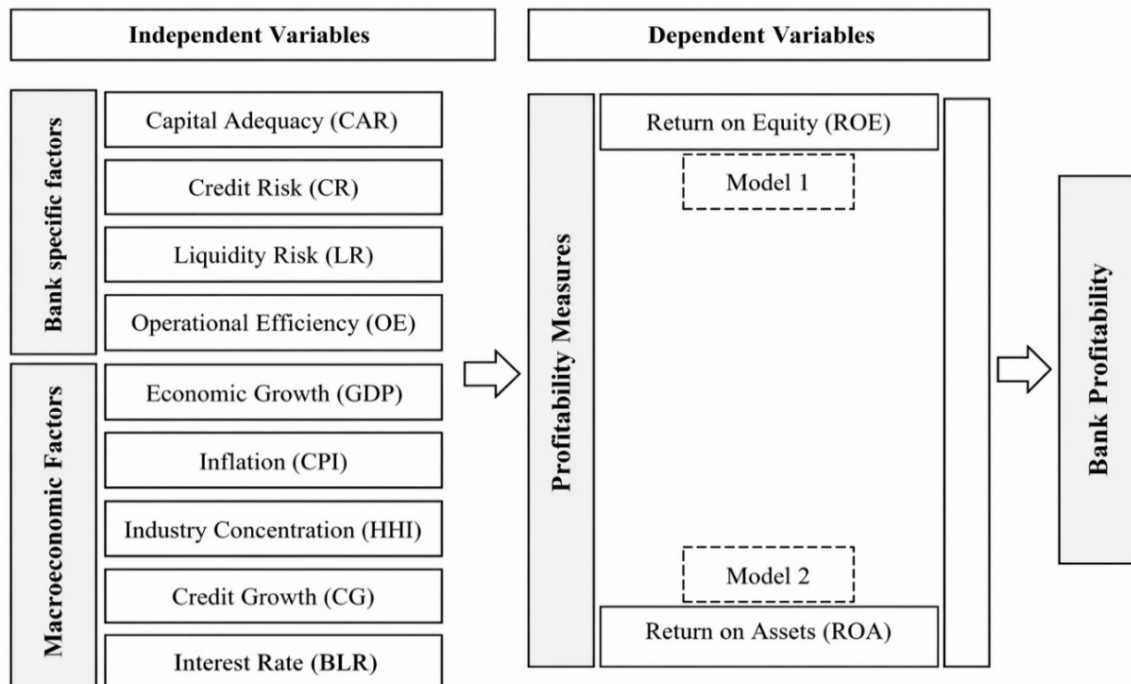


Figure 1. Research model

2. METHODOLOGY

This study considered annual bank-level data of all seven Omani CCBs from 2008 to 2021. The study uses panel data for this period as it was the most recent period for which complete, consistent, and comparable bank-level annual data were publicly available for all sampled Omani CCBs at the time of data compilation. Using a balanced panel was essential to ensure robustness and comparability of the econometric estimations across banks and over time. Moreover, the selected period captures multiple economic phases, including post-global financial crisis recovery, oil price fluctuations, and the COVID-19 period. It provides a comprehensive basis for analyzing the determinants of bank profitability. Furthermore, data collection was a significant effort, and data availability was constrained due to a variety of factors in Oman. The annual reports for the sample banks and the period are collected from the websites of respective banks. The macroeconomic variables are retrieved from the annual reports of CBO and the Oman database, National Centre for Statistics and Information (NCSI). The data from seven CCBs over fourteen years yield 70 observations for analysis.

After thoroughly analyzing the variables used in the previous literature and considering the small size of Oman's economy, the variables have been filtered into two broad categories: bank-specific (internal) and macroeconomic (external). The authors have taken adequate care to reflect the most significant variables observed in the literature by ranking them according to their frequency in prior studies from 1992 to 2023. Further, due to the compact size of Oman's economy and the paucity of specific studies in Oman, industry-specific and macroeconomic variables have been grouped into a single category, macroeconomic variables. However, several international studies have examined the two broad variables. Alternatively, the significant variables covered as industry-specific or macroeconomic factors in international studies are considered under the head of macroeconomic factors in the present study. After reviewing the entire list of variables in the literature, the top two (ROE & ROA) and the top nine factors were identified as dependent and independent variables, respectively. Further, the top four and top

five factors have been identified as bank-specific and macroeconomic variables, respectively, under independent categories. To identify the determinants of commercial bank profitability in Oman and compare their performance with that of other countries, nine explanatory variables were selected and tested. The descriptions of the variables are presented in Table 1.

Table 1. Description of variables

| Variable | Measure | Notation |
|--|---|----------|
| Dependent variable | | |
| Owners Profitability | The ratio of net profit to average common equity stock | ROE |
| Business Profitability | The ratio of net profit to average total assets. | ROA |
| Independent variable: Bank-specific (internal) determinants | | |
| Capital adequacy | The ratio of equity to total assets | CAR |
| Credit risk | The ratio of non-performing loans to total loans | CR |
| Liquidity risk | Loans to deposits ratio | LR |
| Operational efficiency | The ratio of operating expenses to operating incomes | OE |
| Independent variables: Macroeconomic-specific (external) determinants | | |
| Economic growth | Rate of growth in Gross Domestic Product | GDP |
| Inflation | Rate of growth in the Consumer Price Index | CPI |
| Industry concentration | Bank's assets to the banks' total assets in the industry | HHI |
| Credit growth/ Money supply | Aggregate of currency in circulation, savings, and fixed deposits | CG |
| Interest rate | Average of the Base Lending Rate of the banks | BLR |

Note: Variables in Table 1 are widely used in the literature to determine bank profitability

The study employed linear regression and fully modified ordinary least squares, in addition to traditional correlation and cointegration techniques, to analyze the secondary annual panel data. The standard linear regression model is used to estimate the profitability of Omani banks. Profitability is a function of bank-specific and macroeconomic-specific variables. The regression model is formulated as follows:

$$\Pi_{i,t} = \alpha + \beta Y_{i,t} + \varepsilon_{i,t}, \quad (1)$$

where $\Pi_{i,t}$ measures the profit of bank i at time t with banks $1, 2, \dots, N$ ($N = 7$) and time $1, 2, \dots, n$ ($n = 10$). The proxies used for $\Pi_{i,t}$ are ROE and ROA. Constant term is α , and β is the estimated coefficient for control variables $Y_{i,t}$: Capital Adequacy (CAR), Credit Risk (CR), Liquidity Risk (LR), Operational Efficiency (OE), Economic Growth (GDP), Inflation (CPI), Industry Concentration (HHI), Credit Growth (CG), Interest Rate (BLR). $\varepsilon_{i,t}$ is the systematic error that shows the effect of dependent variables that are not explained through the independent variables.

The following ROE and ROA proxies for profitability can be derived for banks using the following regression models:

$$ROE_{N,n} = \alpha + \beta CAR_{N,n} + \beta CR_{N,n} + \beta LR_{N,n} + \beta OE_{N,n} + \beta GDP_{N,n} + \beta CPI_{N,n} + \beta HHI_{N,n} + \beta CG_{N,n} + \beta BLR_{N,n} + \varepsilon_{N,n} \quad (2)$$

$$ROA_{N,n} = \alpha + \beta CAR_{N,n} + \beta CR_{N,n} + \beta LR_{N,n} + \beta OE_{N,n} + \beta GDP_{N,n} + \beta CPI_{N,n} + \beta HHI_{N,n} + \beta CG_{N,n} + \beta BLR_{N,n} + \varepsilon_{N,n} \quad (3)$$

3. RESULTS AND DISCUSSION

This section provides descriptive statistics, normalization of the balanced panel data, estimation method, and empirical analysis of the results. Table 2 shows that the volatility of ROE is much higher than that of ROA. Bank-specific variables, lending rate, and operating efficiency exhibit greater variation than the other variables. While industry concentration showed a large dispersion,

other macroeconomic variables were very weak. Conclusively, industry concentration will have a more significant impact, with the highest dispersion of 11 percent on ROE and ROA, and lending rate will have the least impact, with the lowest dispersion of 0.8 percent on profitability. Industry concentration and lending rates are the most influential factors for commercial bank profitability.

Table 3 shows the correlation matrix of the variables chosen for the study. It is derived from the model cited above and equations (1), (2), and (3). It indicates that ROA and ROE are positively and strongly correlated (0.92). This confirms that the two variables we have considered as measures of profitability are the correct proxies. Table 3 further indicates that the strongest dependence is between the lending rate and operational efficiency, with a significantly negative correlation coefficient of 0.680. Conversely, industry correlation and lending rate show a strong negative correlation. Close to half of the observations in the correlation matrix show a negative sign, indicating a substantial correlation among the explanatory variables, which is unfavorable.

The nine hypotheses mentioned in the previous section have been tested, and the results are shown in Table 4. Each hypothesis has been accompanied by its corresponding coefficient, t-value, p-value, brief interpretation, and implications. Table 4 shows that of the nine variables we selected, five independent variables (CAR, OE, GDP, HHI, and CG) have significantly explained both ROA and ROE positively, and three independent variables (CR, LR, and CPI) have significantly explained both ROE and ROA inversely. The one independent variable (BLR) has significantly de-

Table 2. Descriptive statistics

| Variable | Minimum | Maximum | Mean | Standard Deviation |
|----------|---------|---------|---------|--------------------|
| ROE | -2.42% | 22.86% | 10.74% | 0.04836 |
| ROA | -0.33% | 3.72% | 1.42% | 0.006253 |
| CAR | 8.11% | 20.27% | 13.76% | 0.020673 |
| CR | 0.0025% | 9.1247% | 2.9168% | 0.01669 |
| LR | 54.69% | 129.05% | 99.42% | 0.154472 |
| OE | 28.22% | 87.03% | 48.57% | 0.113008 |
| GDP | -3.40% | 9.30% | 3.04% | 0.037995 |
| CPI | -0.90% | 12.40% | 2.33% | 0.032253 |
| HHI | 3.67% | 48.49% | 14.29% | 0.117312 |
| CG | 7,533 | 20,221 | 13,716 | 4266.996 |
| BLR | 4.76% | 7.44% | 5.74% | 0.008272 |

Table 3. Correlation matrix between dependent and explanatory variables

| Variables | ROE | ROA | CAR | CR | LR | OE | GDP | CPI | HHI | CG | BLR |
|-----------|---------|-------|-------|-------|----------|-------|------|------|------|------|-----|
| ROE | 1 | | | | | | | | | | |
| ROA | 0.92*** | 1 | | | | | | | | | |
| CAR | -0.23 | -0.02 | 1 | | | | | | | | |
| CR | -0.51 | -0.45 | 0.41 | 1 | | | | | | | |
| LR | 0.17 | 0.12 | 0.05 | -0.32 | 1 | | | | | | |
| OE | -0.63 | -0.60 | 0.03 | 0.43 | -0.68*** | 1 | | | | | |
| GDP | 0.35 | 0.39 | -0.23 | -0.22 | 0.01 | -0.11 | 1 | | | | |
| CPI | 0.31 | 0.43 | -0.04 | -0.26 | 0.05 | -0.14 | 0.51 | 1 | | | |
| HHI | 0.12 | 0.10 | 0.02 | -0.02 | 0.25 | -0.32 | 0.00 | 0.00 | 1 | | |
| CG | -0.48 | -0.55 | 0.35 | 0.42 | 0.04 | 0.21 | 0.60 | 0.01 | 0 | 1 | |
| BLR | 0.22 | 0.34 | 0.01 | -0.17 | -0.01 | -0.17 | 0.37 | 0.00 | 0.00 | 0.75 | 1 |

Note: *** indicates the most significant values.

scribed ROE positively and ROA negatively. The results are mixed, as indicated in the literature, compared with those of the rest of the world. The results are mixed not only in terms of the independent variables themselves but also in terms of the extent (coefficient). This could be due to differences in the nature, size, and complexity of each

country and its market when Oman is compared with the rest of the economies.

Tables 5 and 6 present the results of cointegration between ROE and ROA and the independent variables. Since the p-value in Table 5 is less than 5 percent, the null hypothesis is rejected, and the

Table 4. Summary of hypotheses

| Hypothesis | Interpretation and Implication | | | Results of Hypotheses |
|--|--------------------------------|--------|---------|---|
| | Coefficient | | p-value | |
| H ₀₁ : Capital Adequacy has a significant impact on Profitability | ROE | -0.238 | 0.018 | CAR is significantly explained by ROE (p-value < 0.05), whereas ROA is not. The non-stationary deterministic trend indicates increases of 0.238 and 0.028 units in CAR contract ROE and ROA, respectively |
| | ROA | -0.028 | 0.788 | |
| H ₀₂ : Credit Risk has a significant impact on Profitability | ROE | -0.514 | 0.000 | CR significantly explains both ROE and ROA (p-value < 0.05). The non-stationary deterministic trend indicates that a one-unit decline in CR is associated with increases of 0.514 and 0.456 in ROE and ROA, respectively |
| | ROA | -0.456 | 0.000 | |
| H ₀₃ : Liquidity Risk has a significant impact on Profitability | ROE | 0.170 | 0.095 | LR does not significantly explain ROE and ROA (p-value > 0.05). The non-stationary deterministic trend indicates that an increase of one unit of LR escalates ROE and ROA by 0.170 and 0.122, respectively |
| | ROA | 0.122 | 0.231 | |
| H ₀₄ : Operational Efficiency Has a Significant Impact on Profitability | ROE | -0.639 | 0.000 | OE is significantly explained by both ROE and ROA (p-value < 0.05). The non-stationary deterministic trend indicates increases of 0.639 and 0.608 units in OE contract ROE and ROA, respectively |
| | ROA | -0.608 | 0.000 | |
| H ₀₅ : Economic Growth Has a Significant Impact on Profitability | ROE | 0.353 | 0.000 | GDP is significantly explained by both ROE and ROA (p-value < 0.05). The non-stationary deterministic trend indicates an increase of one unit of GDP, which escalates ROE and ROA by 0.353 and 0.392, respectively |
| | ROA | 0.392 | 0.000 | |
| H ₀₆ : Inflation has a significant impact on Profitability | ROE | 0.313 | 0.002 | CPI significantly explains both ROE and ROA (p-value < 0.05). The non-stationary deterministic trend indicates an increase of 1 unit in the CPI, which escalates ROE and ROA by 0.313 and 0.436, respectively |
| | ROA | 0.436 | 0.000 | |
| H ₀₇ : Industry Concentration Has a Significant Impact on Profitability | ROE | 0.124 | 0.234 | HHI does not significantly explain ROE and ROA (p-value > 0.05). The non-stationary deterministic trend indicates that a one-unit increase in HHI escalates ROE and ROA by 0.124 and 0.102, respectively |
| | ROA | 0.102 | 0.318 | |
| H ₀₈ : Credit Growth Has a Significant Impact on Profitability | ROE | 0.484 | 0.000 | CG significantly explains both ROE and ROA (p-value < 0.05). The non-stationary deterministic trend indicates that, for each unit increase in CG-escalated ROE, ROA contracts by 0.524, while CG-escalated ROE increases by 0.484 |
| | ROA | -0.524 | 0.000 | |
| H ₀₉ : Interest Rate Has a Significant Impact on Profitability | ROE | 0.225 | 0.026 | BLR significantly explains both ROE and ROA (p-value < 0.05). The non-stationary deterministic trend indicates that an increase of one unit of BLR escalates ROE and ROA by 0.225 and 0.348, respectively |
| | ROA | 0.348 | 0.000 | |

alternative hypothesis is accepted, indicating no cointegration between ROE and the independent variables. The results of nine hypotheses are consistent with the previous studies of Brastama and Yadnya (2020), Dao and Nguyen (2020), Nguyen (2020), Abdelaziz et al. (2020), Yahaya et al. (2022), Lotto (2019), Abbas et al. (2021), Jadah et al. (2020), Uralov (2020), Yuanita (2019), Al Arif and Awwaliyah (2019), Danisman et al. (2020), Le (2020), Demiralp et al. (2021), and Campmas (2020). The results of Table 5 do not conform to the previous findings of Kusumastuti and Alam (2019), Abdilatif (2020), Batten and Vo (2019), Istan and Fahlevi (2020), Al Arif and Awwaliyah (2019), and Kumar et al. (2022) for the nine hypotheses collectively for all the hypotheses put together.

In the same way, as the p-value in Table 6 is less than 5 percent, the null hypothesis is rejected, and the alternative hypothesis is accepted, indicating no cointegration between ROA and the independent variables. The results are consistent with previous studies, including Madugu et al. (2019),

Elekdag et al. (2020), Guru and Yadav (2019), Gupta and Mahakud (2020), Yakubu (2019), and Vera-Gilces et al. (2020). The results and the analysis presented in Table 6 were not confirmed by the previous studies, such as González et al. (2019), for all nine hypotheses. However, the quantum of impact ranges from significant to insignificant, depending on the respective countries' contextual perspectives and the statistical methods applied.

Table 7 presents the statistical results for cointegration vectors using the fully modified OLS method for ROE and all explanatory variables. As per the P-values in Table 7, the explanatory variables have no significant influence on ROE, except for inflation, as the threshold limit is 5 percent. This table further indicates that, while a positive coefficient of CAR, GDP, CG, CPI, and BLR on ROE, CR, LR, OE, and HHI was observed, the coefficients were inverse with respect to ROE.

Table 8 presents the statistical results for cointegration vectors using the fully modified OLS method for ROA and all explanatory variables. As

Table 5. Statistics of cointegration tests of Fisher's Chi-Square – ROE, internal variables (bank-specific), and external variables (macroeconomic)

| Statistic | t-value | p-value (null hypothesis: no cointegration) |
|---------------------------|---------|---|
| ADF – Fisher's Chi-square | 145.742 | 0.000 |

Table 6. Statistics of cointegration tests of Fisher's Chi-Square – ROA, internal variables (bank-specific), and external variables (macroeconomic)

| Statistic | t-Value | p-value (null hypothesis: no cointegration) |
|---------------------------|---------|---|
| ADF – Fisher's Chi-square | 150.224 | 0.000 |

Table 7. Estimation of cointegration vectors by the fully modified OLS method (dependent variable: ROE)

| Variable | Coefficient | t-statistic | p-value |
|----------|-------------|-------------|----------|
| CAR | 0.456*** | 1.791 | 0.076 |
| CR | -0.697 | -2.291 | 0.024** |
| LR | -0.131 | -3.445 | 0.000*** |
| OE | -0.342 | -6.518 | 0.000*** |
| GDP | 0.134*** | 0.993 | 0.000*** |
| CPI | 0.227*** | 1.085 | 0.280 |
| HHI | -0.165 | -4.052 | 0.000*** |
| CG | 0.000*** | -3.034 | 0.003*** |
| BLR | -1.669 | -1.982 | 0.051 |

Note: *** indicates the most significant values.

Table 8. Estimation of cointegration vectors by the fully modified OLS method (dependent variable: ROA)

| Variable | Coefficient | t-statistic | p-value |
|----------|-------------|-------------|----------|
| CAR | 0.121*** | 4.044 | 0.000*** |
| CR | -0.068 | -1.915 | 0.058 |
| LR | -0.017 | 6.898 | 0.000*** |
| OE | -0.042 | -6.831 | 0.000*** |
| CPI | 0.036*** | 1.466 | 0.146 |
| GDP | 0.012*** | 0.783 | 0.435 |
| CG | 0.000*** | -4.365 | 0.000*** |
| HHI/IC | -0.019 | -4.115 | 0.000*** |
| BLR | -0.267 | -2.697 | 0.008*** |

Note: *** indicates the most significant values.

per the P-values in Table 8, explanatory variables significantly influence ROA, except inflation and economic growth, as the threshold limit is 5 percent. This table further indicates that, while CR,

LR, OE, HHI, and BLR showed inverse coefficients with respect to ROA, CAR, GDP, CG, and CPI, CAR, GDP, CG, and CPI showed positive coefficients.

CONCLUSION

The study aimed to identify the determinants of bank profitability of Omani commercial banks. The question was also raised whether bank-specific or macroeconomic factors affect the profitability of commercial banks in Oman. The results reveal that bank-specific and macroeconomic factors have impacted profitability (proxied by ROE and ROA). Factors affecting bank profitability include CR, OE, GDP, CPI, CG, and BLR. The results are supported by Elekdag et al. (2020), Alam et al. (2021), and Katircioglu et al. (2020). The factors that had no impact on profitability are LR and HHI. The results are supported by Al Arif and Awwaliyah (2019) and González et al. (2019). CAR has shown an impact on ROE but not on ROA. This result is supported by Kusumastuti and Alam (2019). While capital adequacy, operating efficiency, credit growth, and industry concentration positively influenced ROA, credit risk, liquidity risk, inflation, and interest rates negatively influenced it. This indicates that bank performance is influenced by both internal (bank-specific) and external (macroeconomic) variables when ROE and ROA are used to proxy for the profitability of commercial banks in Oman. Our study shows that the explanatory variables influence bank profitability, and this is confirmed by several previous studies. However, the extent of variation in some of the variables (factors) is marginal. However, the results align with studies from other countries.

This study has been conducted using a suitable and valid statistical model based on the literature to identify the determinants of bank profitability and a solid theoretical framework to measure profitability. The study's outcome is also helpful to banks and policymakers in considering and emphasizing the explanatory factors that augment the profitability of commercial banks and in initiating appropriate government regulations. In our study, focusing on the impact of explanatory factors on return on equity (ROE) and return on assets (ROA) can help commercial banks and policymakers in Oman make informed decisions.

LIMITATIONS AND FUTURE RESEARCH

The results should be interpreted and generalized cautiously, as the relationship between bank-specific and macroeconomic factors and profitability varies from minor to moderate. The variables considered under two broad categories – bank-specific and macroeconomic factors – differ from country to country and from researcher to researcher. The same rule applies to the present study. Hence, the results on the

determinants of bank profitability in Oman cannot easily be generalized to other countries. Many earlier researchers focused on regression, correlation, and OLS methods. However, any inherent limitation in the statistical method might be passed on to the results. There is some inconsistency in the understanding of variables. For example, the present study has considered a bank's total assets as a surrogate for bank size. However, a few other studies have considered total credit and total deposits as the base for measuring a bank's size. Hence, there are minor variations due to the conceptual understanding of the terminology. The Kao test in this study is limited to homogeneous data and does not account for heterogeneity in the observations. Further, the studies must be regarded not as a whole but concerning specific variables. While a couple of variables from other studies align with the present study, a few others do not.

There are ample opportunities to extend the present study. First, there is an exhaustive list of variables broadly classified as bank-specific, industry-specific, and macroeconomic factors. The present study may be extended to encompass all factors within three categories. Factors such as ownership, regulation, and international impact may be integrated into future studies in Oman. Second, each factor within the categories, or the set of factors across the categories, may be assessed to determine whether those factors individually (within) or collectively (across) influence the profitability of commercial banks in Oman. Third, a more focused investigation may be conducted on the impact of explanatory variables on the ROE and ROA of CCBs in Oman to confirm the present result of the study by bringing additional commercial banks. Fifth, integrated research can also be conducted covering all categories of banks, such as listed and unlisted, private and public, conventional and Islamic, and even specialized banks such as the National Housing Bank. Finally, a study may also be conducted to examine cross-country comparisons of the determinants of bank profitability, covering closely linked regions such as the GCC or MENA.

AUTHOR CONTRIBUTIONS

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