“Determinants of bank capital adequacy: Empirical insights from Arab countries”

AUTHORS	Mohammed Abusharbeh

ARTICLE INFO	Mohammed Abusharbeh (2025). Determinants of bank capital adequacy: Empirical insights from Arab countries. *Banks and Bank Systems*, *20*(1), 221-230. doi:10.21511/bbs.20(1).2025.18
DOI	http://dx.doi.org/10.21511/bbs.20(1).2025.18
RELEASED ON	Tuesday, 18 March 2025
RECEIVED ON	Thursday, 12 September 2024
ACCEPTED ON	Wednesday, 19 February 2025

JOURNAL	"Banks and Bank Systems"
ISSN PRINT	1816-7403
ISSN ONLINE	1991-7074
PUBLISHER	LLC “Consulting Publishing Company “Business Perspectives”
FOUNDER	LLC “Consulting Publishing Company “Business Perspectives”

NUMBER OF REFERENCES	NUMBER OF FIGURES	NUMBER OF TABLES
29	1	6

BUSINESS PERSPECTIVES

LLC "CPC "Business Perspectives"
Hryhorii Skovoroda lane, 10,
Sumy, 40022, Ukraine

www.businessperspectives.org

Mohammed Abusharbeh (Palestine)

DETERMINANTS OF BANK CAPITAL ADEQUACY: EMPIRICAL INSIGHTS FROM ARAB COUNTRIES

Abstract

Capital adequacy plays an important role in the banking system through absorbing potential losses and financial shocks. This study aims to examine the determinants of bank capital adequacy in Arab countries (Bahrain, Egypt, Jordan, Kuwait, Lebanon, Oman, Palestine, Qatar, Saudi Arabia, and UAE). The study uses macroeconomic factors such as economic growth and interest, while bank-specific factors include non-performing loans, profitability, and bank size. This study employed Fully Modified Ordinary Least Square (FMOLS) to examine the panel data from 2017 to 2023. The results showed that annual interest and non-performing loans negatively affect bank capital adequacy, while profitability and bank size positively impact capital adequacy (CAR). In contrast, economic growth has no significant effect on CAR. In addition, as can be seen from pairwise Granger causality, this study provided ample evidence for two ways of causality between the variables of credit risk and CAR, and between profitability and CAR. The results found that Arab banking sectors are compliant with the minimum capital requirements released by Basel Accord III. The findings suggest that bank managers are encouraged to be more selective in credit facilities and consider interest changes while formulating their capital regulations to absorb any potential risk in the banking system.

Keywords capital adequacy, interest rate, non-performing loans, bank size

JEL Classification G21, G24, G28

Received on: 12th of September, 2024
Accepted on: 19th of February, 2025
Published on: 18th of March, 2025

Mohammed Abusharbeh, Dr., Associate Professor, Faculty of Business, Finance Department, Arab American University, Palestine.

INTRODUCTION

The capital adequacy ratio is considered one of the effective tools used to absorb any potential losses or risks associated with the banks' assets. Therefore, capital buffers can deal with the gradual erosion of their invested capital and protect their depositors' funds (Kishibayeva et al., 2023). Regulatory bodies have paid great attention to control this ratio on an ongoing basis. Hence, Basel accord codified the term of capital adequacy to handle the risk inherent in the banking activities.

The scientific problem of this study is examining the influence of economic and bank-specific factors on bank capital adequacy in the Arab context. Despite the severe challenges in carrying out their operations and credit facilities due to economic and political instability, Arab banks implemented various forms of capital buffers to ensure that their system is compliant with minimum capital standards. However, there remains a critical gap in predicting determinants of bank capital adequacy in these countries. Indeed, Arab banking sectors are still underdeveloped and have low experience in hedging from capital risks (Duho, 2023). This opens the door to examine the inherent factors for predicting capital adequacy in these countries. The results of this study are expected to have valuable implications for bank executives and regulators on how to safeguard banks' vulnerability from risks by using capital buffers.

Conflict of interest statement:
Author(s) reported no conflict of interest

1. LITERATURE REVIEW AND HYPOTHESES

Analyzing the impact of economic and bank-specific factors on bank capital adequacy has become a focal point in banking literature, especially in developing countries. Research scholars have approached this issue from different methodologies and inconclusive results. Obeid (2023) investigated the financial and economic factors that could affect bank capital adequacy in the Arab banking sector, by using GMM estimator for 35 listed banks across seven Arab countries during period (2015–2020). Therefore, he found that the GDP growth rate, credit risk, and bank size positively affect bank capital adequacy. But his study further found that profitability negatively contributes to CAR. Naoaj (2023) explored determinants of bank capital adequacy in Bangladesh during the period (2013–2019) using random effects model. He revealed that real GDP and profitability have a positive effect on CAR. Hameed and Siddiqui (2023) investigated the determinants of capital adequacy ratio in private banks of Pakistan for the period (2011–2020). They concluded that bank size and credit risk have a negative impact on CAR. However, the variables including real output and return on assets have a positive effect on CAR. Jouini et al. (2021) examined the impact of bank-specific and economic factors on capital adequacy for 40 Arab banks over the period (2014–2020) by using GMM estimator. They revealed that bank size, credit risk, profitability (ROA), and GDP growth positively affect CAR. Usman (2021) examined the determinant of bank capital adequacy in Nigeria for the period (2012–2019). The study found that loan losses provision has a positive effect on capital adequacy. However, bank return on assets and size did not have a significant effect on CAR. Vu and Dang (2020) identified the factors that significantly affect CAR of 31 Vietnamese banks from 2011 to 2018 using panel data estimates. They revealed that return on assets had a positive impact on CAR. However, other variables such as bank size and credit risk did not have significant impact on capital adequacy. Bhattarai (2020) examined the determinants of bank capital adequacy ratio in Nepal for the period 2013 and 2017 using panel data estimates. He found that bank size negatively influences CAR. Nevertheless, return on assets and non-performing loans did not have a significant effect. Abusharba et al. (2013) analyzed determinants of capital adequacy ratio in the Indonesian Islamic commercial banks for the period (2009–2011) using multiple regression. They found that return on assets positively impacts CAR. However, non-performing financing negatively affects capital adequacy ratio.

A substantial body of literature has examined this topic from an international perspective, elucidating the economic and institutional factors that influence capital ratio across various economies. These studies primarily examine determinants of capital adequacy in different developed countries. Kishibayeva et al. (2023) conducted a comprehensive study that examined determinants of bank capital adequacy in G7 countries for the period 1999 and 2017, using Ordinary Least Squares (OLS). They found that real output growth rate positively impacts CAR. Conversely, bank return on assets is found to have a negative effect. El-Ansary et al. (2019) conducted a comparative study of capital adequacy determinants between Islamic and commercial banks in MENA region using GMM estimator for panel data from 10 countries for 38 Islamic banks and 75 conventional banks during the period (2009–2013). They found that return on assets and credit risk only in conventional banks have a positive effect on CAR. However, the result showed that both Islamic and conventional banks have a significant association between CAR and the variables; bank size and GDP growth. Aktas et al. (2015) identified the factors of capital adequacy in South Eastern European countries using 71 commercial banks from 10 different countries during the period 2007–2012. They found that the variables such as bank size, GDP growth, and credit risk are adversely related to CAR, but bank return on assets negatively impacts capital adequacy.

Based on an in-depth literature review, there is a knowledge gap in prior literature. The difference appears in requiring a comprehensive study that aggregates economic and institutional factors in predicting capital adequacy from a multi-country perspective. Based on this research gap, this study aims to examine the determinants of bank capital adequacy in Arab countries.

http://dx.doi.org/10.21511/bbs.20(1).2025.18

The research hypotheses are formulated as follows:

H_{01}: *GDP growth adversely affects bank capital adequacy.*

H_{02}: *Interest rate negatively affects bank capital adequacy.*

H_{03}: *Non-performing loans adversely affect bank capital adequacy.*

H_{04}: *Bank return on assets positively affects bank capital adequacy.*

H_{05}: *Large size of a bank positively affects bank capital adequacy.*

2. METHODS

This study aims to examine the determinants of bank capital adequacy in Arab countries (Bahrain, Egypt, Jordan, Kuwait, Lebanon, Oman, Palestine, Qatar, Saudi Arabia, and UAE). These countries were selected based on their similar characteristics and economic diversity. In addition, these countries have sufficient data variables to facilitate research findings. Panel data were collected from the World Bank database and financial stability reports for each country. The study uses a panel dataset from 158 banks across 10 Arab countries for the period (2017–2023).

This paper uses the capital adequacy ratio as a dependent variable. This ratio measures the financial solvency of the banking system (Senan et al., 2022). It also indicates the ability of a bank to absorb potential losses or shocks in the period of crisis (Kishibayeva et al., 2023). Additionally, CAR is regressed by groups of independent variables as follows. First, economic growth measured by the growth rate of GDP. Thus, when the GDP growth rate is positive, the banking system may reduce its capital requirements (Naoaj, 2023). Second, the interest rate measures the cost of debts in dollar currency (Mili et al., 2017). The increase in interest rate, the ability of borrowers to repay their loans will decrease. This implies that the value of bad loans increases and adversely affects the CAR. Third, non-performing loans are used to measure credit risk. It represents loans that remain unpaid or the repayments have not been made by borrowers for a period of time, usually from 90 to 180 days (Abusharba et al., 2013). The higher NPLs are expected to have a negative effect on CAR. Fourth, Return on Assets (ROA) is used to measure bank profitability. It indicates how well banks use their assets in generating profits (Vu & Dang, 2020). This ratio is expected to have a positive effect on CAR. Fifth, the current study uses bank size as control variable to predict CAR. Hence, larger bank size tends to achieve higher level of capital adequacy (Jouini et al., 2021). Therefore, Table 1 presents the description and calculation of research variables.

Dynamic of Ordinary Least Square (DOLS) model was carried out to estimate the long-run relationship in co-integrated panel data, as suggested by Kao and Chiang (1999), to detect the inefficient parameters of ordinary least squares. Moreover, Pedroni (2001) proposed a non-parametric approach, namely Fully Modified Ordinary Least Square (FMOLS), to capture endogeneity and autocorrelation in the OLS estimator. Hence, the two models were applied to predict the factors of bank

Table 1. Description of variables

Variable	Symbol	Calculation	References
Interest rate	I	Indicates the cost of the amount borrowed that is measured by the dollar currency	Adão et al. (2022)
Growth in GDP	GGDP	Measures the price of all finished goods and services that are produced in an economy in a specific period	AlZoubi (2021), Al-Tamimi and Obeidat (2013)
Return on Assets	ROA	Calculated by dividing the net profits by a bank's total assets	Badalashvili (2016)
Non-Performing Loans	NPLs	Calculated by dividing non-performing loans to total credit facilities	Sofa et al. (2024)
Bank size	SIZE	Measured by logarithm of bank total assets	Duho (2023), Quynh and Trung (2024)
Capital adequacy ratio	CAR	Calculated by dividing bank capital by weighted assets	Naoaj (2023), Ünvan (2020)

capital adequacy ratio across 10 Arab countries between the period 2017–2023. Moreover, panel unit root test such as Levin-Lin-Chu Test (Levin et al., 2002), Dickey and Fuller (1979), and Phillips and Perron (1988) tests were used to verify the temporal structure of explanatory variables and detect stationarity in the panel data. In this regard, the null hypothesis is rejected if the p-value is less than the significance level of 0.05, and then the existence of stationary series in the panel data. Thus, the model specification is formulated as follows:

$$\begin{aligned} CAR_{it} &= \beta_0 + \beta_1 \left(I_{it}\right) + \beta_2 \left(GGDP_{it}\right) \\ &+ \beta_3 \left(ROA_{it}\right) + \beta_4 \left(NPLs_{it}\right) \\ &+ \beta_5 \left(SIZE_{it}\right) + \varepsilon_{it}, \end{aligned} \quad (1)$$

where CAR_{it} refers to capital adequacy ratio. *I* stands for annual interest rate, GGDP represents GDP growth. *ROA* denotes the bank return on assets. *NPLs* indicate non-performing loans. Bank size measures the logarithm of total assets in each country. β_1, β_2, β_3, β_4, and β_5 are coefficients of explanatory variables. β_0 stands for intercept or constant term, and ε_{it} is the error term.

3. RESULTS

Table 2 shows that the capital adequacy ratio in the Arab banking sector has recorded a mean value of 17.8%. This implies that these banks have achieved the mandatory minimum capital requirements as released by Basel Accord III. The result reveals that the volatility of CAR was relatively low across Arab countries and deviated by 2.8%. Arab countries enjoy a high level of bank capital adequacy on average, most of the Arab nations apply additional capital buffers and set higher limits than Basel III standards to absorb any potential losses during the COVID-19 pandemic. Therefore, this crisis did not affect the CAR in the Arab banking sector except for Lebanese banks, which have CAR less than the regulatory limit between 2020 and 2023, ranging between 6.4%-8%, while the rest of Arab banks have average CAR of 17.8% as shown in Figure 1.

As for economic factors, interest rate and GDP growth have a mean value of 5.6% and 1%, respectively, which deviate slightly by 4.5% and 3.6%, respectively. Table 2 also shows that the return on assets ratio has an average ratio of 1.5% over the last 7 years and deviated by 19.9%. This implies that bank ROA differs between Arab countries, ranging between –0.7%-3.2%. Non-performing loans ratio has reached 4.8% on average, with a small deviation of 3.6%. This result affirms that Arab banks have conservative policy toward granting loans in light of the Corona crisis to control their credit risk except for Lebanon banks that have average NPLs of 14.66% during this period. The result finds that the natural logarithm of assets is 4.214 on average with a large standard deviation of 1.247. This indicates a large difference across Arab countries regarding bank size. Lastly, despite the economic and political challenges that face Arab countries, the Arab banking system is stable and able to achieve the regulatory capital limits for absorbing shocks, which support its vital role in providing funds in light of ambiguity surrounding the Arab world.

Table 2. Descriptive statistics and correlation analysis

Variable	Interest	GGDP	ROA	NPLS	SIZE	CAR
Interest	1	0.162	–0.23	0.411**	–0.513**	–0.488**
GGDP	–	1	0.191	–0.167	–0.044	0.195
ROA	–	–	1	–0.455**	0.024	0.445**
NPLS	–	–	–	1	0.032	–0.844**
SIZE	–	–	–	–	1	0.116
CAR	–	–	–	–	–	1
Mean	0.056	0.01	0.015	0.048	4.215	0.178
Median	0.045	0.013	0.013	0.041	4.598	0.182
Std. Dev	0.045	0.036	0.199	0.038	1.247	0.028
Max	0.20	0.081	0.032	0.18	6.042	0.222
Min	0.002	–0.115	–0.007	0.014	1.983	0.064

Note: ** denotes significance at 1%.

http://dx.doi.org/10.21511/bbs.20(1).2025.18

Source: World Bank database 2023.

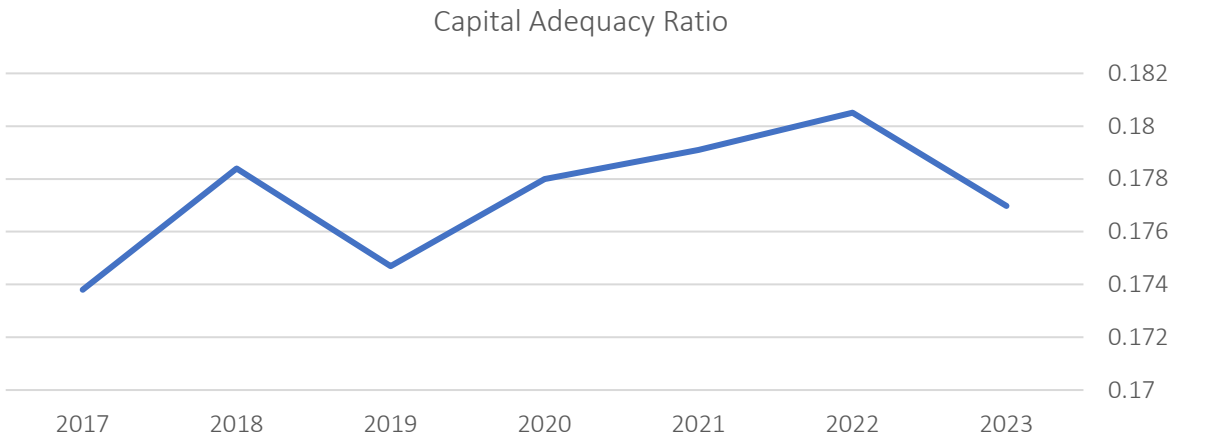

Figure 1. Bank capital adequacy ratio in the Arab region (2017–2023)

Figure 1 exhibits the average CAR across Arab nations from 2017 to 2023. It was noted that this ratio has recorded the highest level of capital adequacy of 18.05% in 2022 and the lowest CAR of 17.4% in 2017. During the coronavirus, the CAR raised up to 17.8% at the end of 2020 and grew to 17.9% in 2021. The result concludes that bank capital adequacy in the Arab region varies between 17.6% and 18% over the entire period, which is higher than the 10% of Basel III capital standards. This affirmed that Arab countries had achieved the minimum capital standards during the crisis.

Table 2 displays the results of correlation coefficients among explanatory variables and CAR. In this sense, the CAR significantly and negatively correlated (the coefficients are –0.488 and –0.844, respectively) to interest and NPLs at the significance level of 0.01. However, the CAR positively correlated (0.445) to profitability at the significance level of 0.01. But, GDP growth and bank size are not significantly correlated to CAR. As for collinearity, the result shows the absence of multicollinearity among explanatory variables, all coefficients' values were below the standard limit of 0.8 (Gujarati, 2004). It can be concluded that there was no multicollinearity problem in the estimated model.

The study employs the methods of panel unit root to validate the stationarity of panel data. The results of the unit root test are shown in Table 3. The results of the LLC test suggest that all the series are stationary at level with intercept. However, ADF and PP tests provide significant evidence that some of the explanatory variables, namely inter-

Table 3. Panel unit root tests for the estimated model (2017–2023)

Variable	LLC	ADF	PP	LLC	ADF	PP
CAR	–4.055**	22.79	53.390**	1.337	12.723	16.648
	(0.0000)	(0.2992)	(0.0001)	(0.9090)	(0.8888)	(0.6756)
I	–7.835**	54.776**	5.688	0.113	8.037	5.395
	(0.0000)	(0.0000)	(0.9973)	(0.5448)	(0.9781)	(0.9995)
GGDP	–9.275**	33.680*	41.235**	–4.949**	52.281**	51.837**
	(0.0000)	(0.0271)	(0.0034)	(0.0000)	(0.0001)	(0.0001)
ROA	–4.675**	25.872	33.094*	–1.088	15.995	22.433
	(0.0001)	(0.1701)	(0.0283)	(0.1581)	(0.7169)	(0.3175)
NPLS	–6.673**	23.036	29.690*	–1.244	16.371	31.069*
	(0.0001)	(0.2870)	(0.0350)	(0.1067)	(0.6933)	(0.0243)
SIZE	–4.390**	15.118	9.276	7.349	1.694	0.3105
	(0.0000)	(0.7696)	(0.9795)	(1.000)	(1.000)	(1.000)

Note: *and ** denote significance at 5% and 1%, respectively. LLC refers to the Levin-Lin-Chu test. ADF stands for Augmented Dickey-Fuller, and PP indicates the Phillips and Perron test.

est and GDP, are stationary at level with intercept, while CAR, NPLs, and SIZE are stationary at different order of co-integration. This indicates the rejection of the null hypothesis of non-stationarity among the variables at the 0.01 significance level for all unit roots tests.

Further analysis was carried out to examine the existence of a long-term relationship between the variables such as interest, GDP growth, ROA, NPLS, SIZE, and CAR. For this reason, we used two cointegration tests were developed by Kao and Chiang (1999) and Pedroni's, (2001) as shown in table 4. Optimal lag length is automatically selected based on Akaike Information Criterion (AIC). The result of the Kao test provides evidence to reject the null hypothesis of no cointegration in the estimated model. Similarly, Pedroni test proves the presence of co-integration among research variables. This study continues processing panel data by using DOLS to estimate the long-run duration effect.

Table 5 presents the DOLS long-run effect of explanatory variables on CAR. Annual interest is estimated by USD dollars in the Arab region adversely affects bank capital at the 5% significance level. This indicates nominal interest is harming the capital adequacy ratio in the Arab banking sector. Nevertheless, GDP growth rate has no significant effect on CAR (t-value =1.42 is less than 1.96 and $p < 0.05$). This means that the capital adequacy ratio is not sensitive to the change in economic growth. The beta coefficient of ROA indicates bank profitability is positively related to CAR at the 10% significance level, revealing that higher profit requires raising the level of capital adequacy. The result shows that non-performing loans are negative and significantly affect capital adequacy at the 1% significance level (t-value = –9.11, $p > 0.01$). However, large-sized banks compared to small ones have no significant effect on CAR as appeared in the DOLS model.

This study employed FMOLS to detect the endogeneity problem and autocorrelation in the context of the DOLS model. Thus, FMOLS provides strong consistent evidence for serial autocorrelation. Therefore, estimated FMOLS yields different results from DOLS, as presented in Table 5. The findings reveal that the interest rate has a negative and statistically significant effect on CAR

Table 4. Panel co-integration tests

Kao (1999) test			Pedroni (2000) test		
Summary test	**Statistic**	**p-value**	**Summary test**	**Statistic**	**p-value**
Panel ADF-statistics	–1.6485	0.0496	Dickey-Fuller t	6.2691	0.000

Table 5. The results of panel data estimates

Dynamic of Ordinary Least Square (DOLS)				
Variable	**Coefficient (β)**	**Standard errors**	**t-Statistic**	**p-value**
Interest	–0.1117	0.0542	–2.06*	(0.0436)
GGDP	0.0727	0.0512	1.42	(0.1619)
ROA	0.0168	0.0093	1.80	(0.0771)
NPLS	–0.5152	0.0565	–9.11**	(0.0000)
SIZE	0.0012	0.0017	0.71	(0.480)
C	0.2003	0.0086	23.17	(0.0000)
R-squared	0.7613	–	–	(0.0000)
Fully Modified Ordinary Least Square (FMOLS)				
Variable	**Coefficient (β)**	**Standard errors**	**t-Statistic**	**p-value**
Interest	–1453	0.071	–2.17*	(0.0349)
GGDP	0.0256	0.0385	0.695	(0.4906)
ROA	0.025	0.0912	2.72**	(0.0093)
NPLS	–0.4477	0.1051	–5.22**	(0.0000)
SIZE	0.0295	0.0321	2.13*	(0.0383)
R-squared	0.8902	–	–	(0.0000)

Note: ** and * denote significance at 1% and 5%, respectively.

http://dx.doi.org/10.21511/bbs.20(1).2025.18

(β1 = –0.0145, p > 0.01). This implies that a 1% increase in banking interest causes a decrease in risk weighted capital by 1.45%. The finding further suggests that growth in GDP has no significant effect on CAR (β2 = 0.0256, p < 0.05). For profitability, this result indicates that ROA is positive and significantly affects CAR (β3 = 0.025, p > 0.01). However, credit risk is negative and significantly affects CAR (β4 = –0.441, p > 0.01). This implies that a 1% increase in the NPLs ratio tends to decrease the capital adequacy by 44.8%. Furthermore, FMOLS estimate found that bank size is positive and significantly affects the capital adequacy ratio (β5 = 0.0295, p > 0.05).

Table 6 illustrates the bi-directional relationship between explanatory variables and CAR using pairwise granger causality at first and second order of differences (lag 1 and lag 2). The results provide robust evidence of significant two-way causalities between the variables; capital adequacy (CAR) and non-performing loans (NPLS) at 1st lag order (NPLS ↔ CAR). Moreover, the significant two-way causalities between ROA and CAR at second order lag (ROA ↔ CAR). The result reveals that non-performing loans Granger cause CAR at a significance level of 1%. In addition, it shows that return on assets Granger causes CAR at a significance level of 1%. This finding affirms that the above mentioned variables can be reliable in determining future long-term trends in this model.

Table 6 also gives evidence of four significant one-way causalities (CAR ↔ Size, GGDP ↔ NPLS, NPLS ↔ I, and NPLS ↔ Size). This implies that past behavior of one of these variables can predict past and present of the other variable in the estimated model, and the opposite is not true. Only two cases of causalities (interest and SIZE) do not granger cause one another at 1st lag order within the estimated model.

4. DISCUSSION

This study compares its results with prior studies conducted in other countries. It was found that capital adequacy has a negative relationship with interest rate. Therefore, this finding supports H_1, suggesting that higher interest leads to lower bank capital adequacy. This can be attributed to the fact that higher interest would increase the cost of debts and credit risk for borrowers, which in turn lowers the level of capital adequacy. This finding is consistent with Aktas et al. (2015) and Mili et al. (2017), who supported the negative relationship between interest and CAR. The Arab banking sector requires additional capital buffers to face higher costs of credits. However, these results are contrary to the finding of Senan et al. (2022) who pointed out that interest rate did not have significant effect on capital adequacy ratio.

It was also found that the growth rate in GDP is positive and statistically significant affects CAR. This finding supports H_2, indicating that GDP growth does not impact the capital adequacy ratio. This result could be explained by the rapprochement of growth rate in GDP across Arab countries in general. This finding contradicts the results of Naoaj (2023), Boyarchenko et al. (2020), and Aktas et al. (2015) who found a positive relationship

Table 6. Pairwise Granger causality test

Variable	Lags	CAR	I	GGDP	ROA	NPLs	SIZE
CAR	L1	–	0.2634	0.4085	2.073	3.160*	4.039*
	L2	–	1.573	0.5267	49.788**	0.6522	4.152*
I	L1	2.548	–	0.0057	1.009	0.8226	0.9397
	L2	2.037	–	0.0374	5.356*	1.5471	0.4192
GGDP	L1	1.524	2.153	–	1.614	4.093*	0.0728
	L2	0.800	2.692	–	3.0227	0.2453	0.0991
ROA	L1	3.055	0.3039	1.434	–	6.456*	0.4706
	L2	17.378**	0.2437	0.5281	–	16.241**	1.0151
NPLs	L1	9.492**	6.631*	0.0988	3.733	–	13.006**
	L2	6.221**	5.935*	1.0201	73.019**	–	18.313**
SIZE	L1	0.0005	0.1750	0.0003	0.1145	0.7181	–
	L2	0.3687	0.4604	1.0656	14.234**	0.2595	–

Note: ** and * denote significance at 1% and 5%, respectively.

between GDP growth and capital ratio. They explained that economic growth increases the level of capital adequacy and reinforces the financial stability of the banking system.

The results reveal that bank return on assets has a positive and statistically significant effect on CAR. This finding supports H_3, implying that an increase in the ratio of shareholders' fund to total assets positively supports the bank capital ratio. This finding could be explained by the fact that these banks efficiently utilize their assets to generate more profits during the COVID-19 pandemic and is attributable to the banking sector reform embarked upon during the economic crisis in early 2020. This evidence is consistent with the findings of Vu and Dang (2020) who posit a positive relationship between profitability and capital adequacy ratio. Banks with higher profit rates are more solvent and can absorb potential losses to protect their customers' deposits (Jouini et al., 2021). However, this result contradicts the finding by Kishibayeva et al. (2023) who found a negative relationship between bank profitability and capital ratio.

Regarding credit risk, the result points to the adverse effect of NPLs on bank capital adequacy. This finding supports H_4, indicating that when the probability of loan losses increases persistently, the capital adequacy ratio will be low, which in turn threatens bank depositors' funds. This result can be justified by the default probability due to the credit policy expansion that may cause a potential loss in bank capital. As a result, the bank requires additional funds to absorb capital losses. This evidence aligns with Sofa et al. (2024) and Abusharba et al. (2013). They reported that bank capital adequacy is negatively responsive to a change in banking credit risk.

In literature, investors are motivated to allocate more funds to larger banks compared to their small counterparts (Obeid, 2023). This study found that the control variable of bank size positively affects bank capital adequacy. This result supports H_5, suggesting that large-sized banks compared to small ones require a higher degree of the capital adequacy ratio. This positive effect can be counted for by banks with large assets, which have high probability of expansion and investment, which in turn exposes higher degree of risk. Therefore, it is necessary to add more capital buffers to absorb the probability of losses. This finding is consistent with the finding by Senan et al. (2022) who supported the positive nexus relationship between bank size and capital adequacy.

The result also reveals that credit risk has pairwise granger causes bank capital adequacy. In addition, it shows that return on assets granger causes CAR. This result supports the finding of Gharaibeh (2023) who affirmed the unidirectional nexus relationship between the variables NPLS, ROA, and CAR. This result indicates that the CAR in the Arab banking sector has a sensitive response to changes in credit risk and profitability in the long run, and the opposite is true.

CONCLUSION

This study aims to examine the determinants of bank capital adequacy in Arab countries, including Bahrain, Egypt, Jordan, Kuwait, Lebanon, Oman, Palestine, Qatar, Saudi Arabia, and UAE. Capital adequacy ratio is used as a dependent variable, while GDP growth, interest, NPLs, ROA and bank size are used as independent variables. Finally, the effect of economic and bank-specific factors on CAR was estimated using Fully Modified Ordinary Least Square (FMOLS) for the period (2017–2023).

The finding shows that fluctuations in interest and non-performing loans negatively affect the bank capital ratio. This indicates that higher interest rates lead to an increase in the degree of non-performing loans, which in turn decreases the level of capital adequacy. As a result, capital adequacy ratio tends to be more responsive to the higher degree of credit risks. In contrast, the result finds that return on assets and bank size positively impact CAR. This implies large size and profitable banks require additional capital buffers. On the other hand, economic growth (GDP) has not been able to predict the change in CAR. The result also provides evidence of the unidirectional relationship between NPLs and CAR; ROA

http://dx.doi.org/10.21511/bbs.20(1).2025.18

and CAR. This means that the past level of these variables can predict the future changes in the other variable in two-way causalities. However, the variables of interest and bank size do not granger cause one another in the estimated model.

The research findings provide new insights to bank managers and regulators on the need to be more sensitive to the impact of interest rate and loan disbursements on the capital adequacy ratio. Bank managers should be attentive to prudential credit policy tools to absorb any potential risk that could face the bank. Additionally, regulators in these countries should expedite the implementation of the amendments made by Basel III in the capital adequacy ratio while formulating their regulations to stimulate resilience and financial soundness of the banking system in Arab countries.

AUTHOR CONTRIBUTIONS

Conceptualization: Mohammed Abusharbeh.
Data curation: Mohammed Abusharbeh.
Formal analysis: Mohammed Abusharbeh.
Funding acquisition: Mohammed Abusharbeh.
Investigation: Mohammed Abusharbeh.
Methodology: Mohammed Abusharbeh.
Project administration: Mohammed Abusharbeh.
Resources: Mohammed Abusharbeh.
Software: Mohammed Abusharbeh.
Supervision: Mohammed Abusharbeh.
Validation: Mohammed Abusharbeh.
Visualization: Mohammed Abusharbeh.
Writing – original draft: Mohammed Abusharbeh.
Writing – reviewing & editing: Mohammed Abusharbeh.

REFERENCES

1. Abusharba, M., Triyuwono, I., Ismail, M. & Rahman, A. (2013). Determinants of Capital Adequacy Ratio (CAR) in Indonesian Islamic Commercial Banks. *Global Review of Accounting & Finance, 4*(1), 159-170. Retrieved from https://www.researchgate.net/publication/315553622_Determinants_of_Capital_Adequacy_Ratio_CAR_in_Indonesian_Islamic_Commercial_Banks
2. Adão, L., Silveira, D., Ely, R., & Cajueiro, D. (2022). The impacts of interest rates on banks' loan portfolio risk-taking. *Journal of Economic Dynamics and Control, 144.* https://doi.org/10.1016/j.jedc.2022.104521
3. Aktas, R., Acikalin S., Bakin B., Celik G., (2015). The Determinants of banks' capital adequacy ratio: Some evidence from South Eastern European countries. *Journal of Economics and Behavioral Studies, 7*(1), 79-88. https://doi.org/10.22610/jebs.v7i1(J).565
4. Al-Tamimi, K. A. M., & Obeidat, S. F. (2013). Determinants of capital adequacy in commercial banks of Jordan. an empirical study. *International Journal of Academic Research in Economics and Management Science, 2*(4), 44-57. http://dx.doi.org/10.6007/IJAREMS/v2-i4/53
5. AlZoubi, M. (2021). Bank capital adequacy: The impact of fundamental and regulatory factors in a developing country. *Journal of Applied Business Research, 37*(6), 205-216. https://doi.org/10.19030/jabr.v37i6.10395
6. Badalashvili, I. (2016). *Determinants of capital adequacy ratio in banking sector of Greece* (Master's Thesis). School of economics, business administration and legal studies. International Hellenic University. Retrieved from https://core.ac.uk/download/pdf/236165426.pdf
7. Bhattarai, B. (2020). Determinants of capital adequacy ratio of commercial banks in Nepal. *Asian Journal of Finance & Accounting, 12*(1), 194-213. https://doi.org/10.5296/ajfa.v12i1.17521
8. Boyarchenko, N., Giannone, D., & Kovner, A. (2020*). Bank capital and real GDP growth* (Staff Report No. 950). FRB of New York. https://doi.org/10.2139/ssrn.3742961
9. Dickey, D. A., & Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. *Journal of the American Statistical Association, 74*(366), 427-431. https://doi.org/10.2307/2286348

10. Duho, K. C. T. (2023). Determinants of capital adequacy and voluntary capital buffer among microfinance institutions in an emerging market. *Cogent Economics & Finance, 11*(2), 2285142. https://doi.org/10.1080/23322039.2023.2285142

11. El-Ansary, O., El-Masry, A., & Yousry, Z. (2019). Determinants of capital adequacy ratio in MENA region: Islamic vs. commercial banks. *International Journal of Accounting and Financial Reporting, 9*(2), 287-213. https://doi.org/10.5296/ijafr.v9i2.14696

12. Gharaibeh, A. (2023). The determinants of capital adequacy in the Jordanian banking sector: An autoregressive distributed lag-bound testing approach. *International Journal of Financial Studies, 11*(2), 1-22. https://doi.org/10.3390/ijfs11020075

13. Gujarati, D. N. (2004) *Basic Econometrics* (4th ed.). McGraw-Hill Companies.

14. Hameed, K., & Siddiqui, D. (2023). *Impact of bank-specific and macroeconomics variables on Capital Adequacy Ratio (CAR) in the private banks of Pakistan*. SSRN. http://dx.doi.org/10.2139/ssrn.4432261

15. Jouini, J., Obeid, R., Saro, H., & Zaidi, K. (2021). *Sensitivity of capital adequacy ratio to bank-specific and economic factors in the Arab banking sector.* Arab Monetary Fund. Retrieved from https://www.amf.org.ae/sites/default/files/publications/2022-01/sensitivity-of-capital-adequacy-ratio-to-bank-specific-and-economic-factors-in-the-arab-banking-sector.pdf

16. Kao, C., & Chiang, M.-H. (1999). On the estimation and inference of a cointegrated regression in panel data. In Baltagi, B. H., Fomby, T. B. and Carter Hill, R. (Eds.), *Nonstationary panels, panel cointegration, and dynamic panels (Advances in Econometrics)* (vol. 15) (pp. 179-222). Leeds: Emerald Group Publishing Limited. https://doi.org/10.1016/S0731-9053(00)15007-8

17. Kishibayeva, B. Jaxybekova, G., Nurgalieva, G., Wada, I., & Faizulayev, A. (2023). Determinants of bank capital adequacy: International evidence from G7 countries. *International Social Science Journal, 73*(249), 737-752. https://doi.org/10.1111/issj.12401

18. Levin, A., Lin, C. F. & Chu, C. S. J. (2002). Unit root tests in panel data: Asymptotic and finite-sample properties. *Journal of Econometrics, 108*(1), 1-24. https://doi.org/10.1016/S0304-4076(01)00098-7

19. Mili, M., Sahut, J.-M., Trimeche, H., & Teulon, F. (2017). Determinants of the capital adequacy ratio of foreign banks' subsidiaries: The role of interbank market and regulation. *Research in International Business and Finance, 42,* 442-453. https://doi.org/10.1016/j.ribaf.2016.02.002

20. Naoaj, M. S. (2023). Exploring the determinants of capital adequacy in commercial banks: A study of Bangladesh's banking sector. *European Journal of Business and Management Research, 8*(2), 108-112. https://doi.org/10.24018/ejbmr.2023.8.2.1887

21. Obeid, R. (2023). Determinants of capital adequacy ratio in the banking sector: Evidence from the Arab Region. *International Journal of Business and Management, 18*(5), 64-71. https://doi.org/10.5539/ijbm.v18n5p63

22. Pedroni, P. (2001). Fully modified OLS for heterogeneous cointegrated panels. In Baltagi, B. H., Fomby, T. B., & Carter Hill, R. (Eds.), *Nonstationary panels, panel cointegration, and dynamic panels (Advances in Econometrics* (vol. 15) (pp. 93-130). https://doi.org/10.1016/S0731-9053(00)15004-2

23. Phillips, P., & Perron, P. (1988). Testing for a unit root in time series regression. *Biometrika, 75*(2), 335-346. https://doi.org/10.1093/biomet/75.2.335

24. Quynh, N., & Trung, N. (2024). Determinant of capital adequacy ratio: Evidence from commercial banks in Vietnam. In Ngoc Thach, N., Kreinovich, V., Ha, D. T., & Trung, N. D. (Eds.), *Optimal transport statistics for economics and related topics. Studies in systems, decision and control* (vol. 483). Cham: Springer. https://doi.org/10.1007/978-3-031-35763-3_34

25. Senan, N., Belhaj, F., Al-Matari, E., Al-Faryan, M. A. S., & Al-Homaidi, E. A. (2022). Capital adequacy determinants of Indian banks listed on the Bombay Stock Exchange. *Investment Management and Financial Innovations*, *19*(2), 167-179. https://doi.org/10.21511/imfi.19(2).2022.14

26. Sofa, M., Husain, T., & Hakim, L. (2024). Function of non-performing loans in the capital adequacy ratio model of the banking sector. *International Journal of Scientific Multidisciplinary Research, 2*(3), 215-230. https://doi.org/10.55927/ijsmr.v2i3.8552

27. Ünvan, Y. (2020). Determinants of bank capital adequacy ratio in Ghana. *Journal of Yasar University, 15*(58), 160-166. Retrieved from https://dergipark.org.tr/tr/download/article-file/1097760

28. Usman, A. (2021). Determinants of capital adequacy in listed deposit money banks in Nigeria. UMYU *Journal of Accounting and Finance Research, 2,* 29-53. Retrieved from https://accountingjournal.umyu.edu.ng/index.php/ujafr/article/view/62

29. Vu, H. P., & Dang, N. D. (2020). Determinants influencing capital adequacy ratio of Vietnamese commercial banks. *Accounting, 6,* 871-878. Retrieved from https://www.growingscience.com/ac/Vol6/ac_2020_47.pdf

http://dx.doi.org/10.21511/bbs.20(1).2025.18