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Determinants of Capital Adequacy Ratio in the Banking Sector: Evidence from the Arab Region

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Abstract

The capital adequacy ratio is one of the most important indicators used to assess the ability of the banking sector to absorb shocks. Therefore, central banks have paid attention to the importance of monitoring this ratio on an ongoing basis, given the vital role of the banking sector in supporting the economy. In this paper, we investigate the banking and economic factors that could affect the capital adequacy ratio in the Arab banking sector, by using dynamic panel data model for a panel of 35 banks spread across seven Arab countries during the period 2015 to 2020.

The results show that there is a positive and significant relationship between credit risk (ratio of non-performing loans to total loans) and the size of the bank on the one hand, and capital adequacy ratio on the other hand. There is also a negative significant relationship between bank profitability (return on assets) and capital adequacy ratio, while there is no significant relationship between dynamic provisions and capital adequacy ratio. Finally, regarding the role of economic variables, the study shows that the real GDP growth rate has a significant positive impact on the capital adequacy ratio in the Arab region.

Keywords: capital adequacy ratio, Basel requirements, dynamic panel data models, Arab region, central banks

1. Introduction

Since its establishment, the Basel Committee on Banking Supervision (BCBS) has been supporting the efforts of central banks in various countries of the world, by setting standards that enhance the soundness of the financial positions of banks as the main component of the financial system. In this context, Basel standards were concerned with enhancing the ability of banks to withstand the financial and economic shocks that they might be exposed to, as Basel requirements focused on enhancing financial solvency by improving capital and liquidity requirements in quantity and quality, and interest in financial solvency came because of its great importance in preserving the soundness of the financial positions of banks. Capital adequacy ratio is considered one of the most important ratios used to measure financial solvency, as this ratio measures the ability of banks to absorb losses, the BCBS has issued Basel I requirements in the year 1988, so that commercial banks are committed to applying it at the end of 1992, which included setting a minimum capital adequacy ratio for commercial banks of not less than 8 percent of the risk-weighted assets. In 1999 a new proposal was issued for the framework of the capital adequacy ratio to replace the requirements of Basel I, and in 2004 Basel II requirements were issued that contain a modified framework for capital requirements and include the development of three basic pillars, the first pillar is the capital adequacy requirements framework, and the second pillar is the Internal Capital Adequacy Assessment Process (ICAAP) and Supervisory Review and Evaluation Process (SREP), while the third pillar was market discipline (disclosures). With regard to the first pillar, it kept the level of capital adequacy ratio at 8 percent, but with the expansion of the scope of risk measurement to include, in addition to credit risks, both operational and market risks, as well the standard included a new mechanism for calculating risk weights so that it relates to the client according to risk weights for each asset class, based on the Standardized Approach (SA) and the Internal Rating Based-Approach (IRB), the standard included the development of two methodologies for calculating operational risks (the SA and the IRB Methodologies) and three methodologies for calculating market risks (the SA methodology, the basic indicator methodology, and the advanced measurement methodology).

During the recent global financial crisis in 2008, it was found that a number of banks did not possess capital of

high quality sufficient to face risks, and the excessive debts of banks On-balance sheet and Off-balance sheet led to a gradual erosion of their capital and thus a decline in their solvency, and the BCBS revised Basel II requirements through the issuance of new guidelines regarding capital and liquidity (Basel III), aimed at enhancing the capacity and quality of banks' capital to absorb shocks and absorb losses. Perhaps one of the most important amendments within the Basel III standard is to enhance and improve the quality and quantity of capital in banks through the banks' retention of high-quality capital that is characterized by a high ability to face risks and absorb losses, as well as setting standards for capital buffers consisting of high-quality assets that have a high capacity in terms of absorbing losses, these buffers are: Conservative Capital Buffer (CCoB), Systemic Banks Capital buffers for domestic and global systemically important banks (G-SIBs & D-SIBs), and Countercyclical Capital Buffer (CCyB). The standard focused on redefining capital and focusing on the highest-quality portion called Common Equity Tier1 Capital (CET1). Under Basel III, banks' regulatory capital must be at least 10.5 percent of risk-weighted assets, it includes the highly quality part of the capital, the core capital Tier1 (minimum 6%), comprising the Common Equity Tier 1 "CET1" (minimum 4.5%) and additional Tier 1 (maximum 1.5%). The standard also included setting a minimum leverage ratio with the aim of increasing the capital scale by a simple percentage that does not depend on risk weights, as well as controlling the risks resulting from increasing the containing leverage ratio (Basel Committee on Banking Supervision, 2023).

In the Arab region, most Arab countries have implemented the requirements of Basel III related to capital adequacy ratio (Arab Monetary Fund, 2022), and a few Arab countries have not yet implemented the requirements of Basel III considering the political turmoil and economic instability they faced during the previous years. The importance of the banking sector in the Arab countries is highlighted through its vital role represented in supplying the national economy with the necessary liquidity for various economic activities. In addition, the banking sector in the Arab countries is large in size when compared to the gross domestic product, as the volume of its assets, denominated in dollars, at the end of 2022 amounted to about $4 trillion, accounting for 136 percent of the gross domestic product of all Arab countries (Arab Monetary Fund, 2022), which illustrates the importance of enhancing the strength of this sector in a way that reflects positively on the economic and financial stability in the Arab countries, especially that this sector has faced and continues to face many challenges and risks posed by the local, regional and global conditions and variables. It is worth mentioning that the study (Obeid, 2022) showed that the capital adequacy ratio plays an important role in avoiding bank failure in the Arab region. Therefore, Arab central banks should analyze the risks facing the solvency of the banking sector, whether by applying stress tests, early warning systems and other risk management tools, or by using statistical models to analyze factors affecting capital adequacy, hence the importance of this paper. We analyze the determinants of capital adequacy in the Arab countries and providing recommendations to economic and banking policy makers.

We organize our paper as follows. Section 1 reviews previous studies in related literature. Section 2 provides an overview of the developments of the capital adequacy ratio in the Arab banking sector in the study sample during the period (2015-2020). Section 3 describes the data and preliminary analysis. Section 4 introduces our model and estimation issues. Section 5 discusses the empirical results, and we analyze the diagnostic tests. The last section provides the conclusion with recommendations for the economic and financial decision makers.

2. Literature Review

Many literatures have tried to analyze and study the banking and economic factors affecting the solvency of the banking sector, specifically the capital adequacy ratio (CAR), and we review below a number of those literatures.

Bouri and Ben Hamida (2006) examined the impact of Basel II requirements on the Tunisian banks by analyzing variables including banks' size, credit risk, equity to total loans, provisions to total deposits and banks' risk measurements. The results indicated positive correlations between capital adequacy standards and the banking risks.

Asarkaya and Ozcan (2007) revealed that the return on assets (ROA), the credit risk, and GDP growth, and return on assets have a positive significant effect on the capital adequacy ratio in Turkish banking system, while the ratio of deposits to assets has a negative effect. Al-Tamimi and Obeidat (2013) found that the ROA has a positive effect on the capital adequacy ratio in the Jordanian banking sector, whereas credit risk has no effect on the CAR.

According to Polat and Al-Kalaf (2014), the leverage ratio and the ROA are significant determinants of the CAR for the Saudi banking sector, whereas there is a negative relationship between the loans to deposits and the loans to assets ratios, and the capital adequacy ratio. Furthermore, the results revealed that non-performing loans

(NPLs) have no effect on the CAR. El-Ansary and Hafez (2015) demonstrated that the liquidity indicators, the size of bank, and the operational efficiency are the most influential factors in determining the CAR for 36 Egyptian banks. In addition, they showed that prior to the global financial crisis of 2008, the size of bank, the credit risk, and the profitability are the most influential factors in explaining the CAR. Regarding the period after the global financial crisis, the results revealed that the credit risk, the operational efficiency, the size of bank, and the liquidity indicators are the most significant determinants of the CAR.

Badalashvili (2016) showed that there is a positive relationship between the CAR and the asset structure, the ROA, and the inflation rate for the four largest banks in Greece. The CAR is negatively impacted by the NPLs, and the net interest margin (operational efficiency), and unemployment.

Ben Moussa (2018) used a sample of 18 Tunisian banks from 2000 to 2013. The study showed that the CAR is significantly affected by the net interest margin, the ROA, the liquidity levels, the inflation rate, the private and foreign ownerships.

Vu and Dang (2020) attempted to identify the factors influencing the CAR of Vietnamese banks from 2011 to 2018. Considering that the number of banks has decreased because of mergers and acquisitions. The Bank size, deposit and loans, the liquidity ratios, the loan loss reserves, the ROA, the return on equity (ROE), the credit risk (NPLs), and the operational efficiency (The net interest margin), and leverage ratio are among the variables that may influence the CAR of Vietnamese banks. The results revealed that the ROA had a positive impact, while the leverage ratio, the loan loss reserves, and the ROE had a negative impact, and the remain variables did not significantly impact the CAR of Vietnamese banks.

Jouini et al. (2021) tried to analyze the determinants of the CAR in the Arab region for 30 banks in six Arab countries during the period 2014-2020, the estimated results indicated that the size of banks, the NPLs, the ROA, and the real GDP growth rate have a positive significant impact on the CAR, while the dynamic provisions have no significant effect on the CAR in the banking sector in the Arab region.

Usman (2021) investigated the determinants of the CAR of the Nigerian banks. The empirical results showed that the liquidity indicators and the loan loss provisions have a positive impact on capital adequacy ratio of the Nigerian banks. The study also found that the ROA and the assets have no significant impact on the CAR of the Nigerian banking system.

3. An Overview of the Developments of the Capital Adequacy Ratio in the Arab Banking Sector in the Study Sample during the Period (2015-2020)

In general, the Arab banking sector enjoys high levels of capital adequacy ratio on average, and many Arab countries apply additional capital buffers for systemically important banks (D-SIBs) ranging between 0- 2.5% (it depends on the systemic importance of the bank), taking into account that Arab central banks constantly evaluate the private credit gap and apply an additional buffer (Countercyclical Capital Buffer CCyB) ranging between 0-2.5% in the event that the difference between the private credit to GDP ratio and the historical trend of the ratio exceeds 2%. Although Basel requirements included a minimum capital adequacy ratio of 10.5%, most Arab central banks were conservative and set higher limits than Basel requirements except for Tunisian and Omani banks, which have the minimum regulatory limit of 10.0% and 10.5%, respectively, while the rest of the Arab countries are in the study sample is between 12.0-13.0%.

Regarding the average capital adequacy ratio of the banks included in the study sample during the period (2015-2020), the average ranged between 16.3% and 17.0% (Figure 1), and this indicates the strength of the Arab banking sector, as it achieved a higher average than required under Basel requirements. Despite the emergence of the Corona virus pandemic at the end of 2019, and the subsequent sharp decline in economic indicators, this pandemic did not affect the indicators of capital adequacy in the Arab banking sector, as the average capital adequacy at the end of 2020 was about 17.0%, bearing in mind that other indicators declined in the banking sector, such as indicators of profitability and credit quality. During the pandemic, Arab central banks such as Kuwait, Oman and Morocco allowed the use of some capital and liquidity buffers, but the commercial banks in those countries did not use those buffers because they have high levels of liquidity (Arab Monetary Fund, 2020), especially since Arab central banks (like other countries in the world) adopted an accommodative monetary policy, as the lowering interest rates on monetary policy tools led to an injection of additional liquidity into the market, taking into account that commercial banks were conservative in granting loans during the pandemic in light of the state of uncertainty and the decline in cash flows and creditworthiness of the individual and corporate sectors.

Therefore, since the capital adequacy ratio was not affected by the coronavirus pandemic, it will not be

considered when studying the determinants of capital adequacy ratio in this paper.

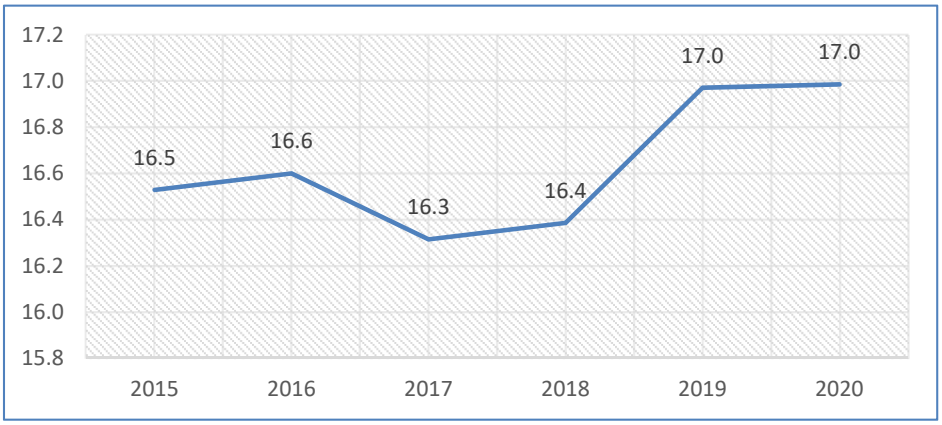

Figure 1. The average capital adequacy ratio of the Arab banking sector included in the study sample (at the aggregate level) during the period (2015-2020), %

Source: Arab Monetary Fund (2021), Financial Stability Report in the Arab countries.

It should be noted that despite the Arab region's exposure to many challenges and economic shocks witnessed by the world in general and the Arab region in particular, the banking system in the Arab countries was stable and generally able to withstand shocks, which supports its role of providing liquidity to the economy, which reflect positively on the financial stability. However, the regulatory authorities - in light of the risks and circumstances surrounding the Arab region - must continue to strengthen their supervision over the banking sector, continuously verify the validity of its business and performance, and develop its infrastructure and legislation, in order to reach the requirements of banking safety and financial stability in accordance with the best international standards and practices.

4. Data and Preliminary Analysis

According to previous literature, various banking and economic factors may influence the CAR, with country-specific effects. Several studies indicated that banking factors are the most important determinants of the CAR, whereas other studies showed that macroeconomic variables, particularly real GDP growth, may be among the determinant factors of the CAR. Notably, previous studies in the related literature have examined the determinants of the CAR in the Arab banking sector, but the analysis was limited to a single country and not at the whole level of the Arab banking sector. This paper investigates the determinants of the CAR for a panel of 35 banks across seven Arab economies (Jordan, Bahrain, Kuwait, Tunisia, Morocco, Oman and Palestine) using annual data from 2015 to 2020.

4.1 Variables

In our model, we use banking and economic factors as independent variables to measure the determinants of the CAR in the banking system in the Arab region. Regarding banking indicators, the logarithm of assets of bank (SIZ), is anticipated to have a positive impact on the CAR (Badalashvili, 2016). This is since large banks usually try to maintain comfortable levels of capital adequacy ratio. Moreover, according to Basel III requirements, systemically important banks (D-SIBs) must maintain an additional capital buffer to enhance their ability to withstand and absorb shocks. We also analyze the relationship between the credit risk (NPLs), which is anticipated to have positive correlations with the CAR (Asarkaya & Ozcan, 2007) since credit risks are associated with higher CAR requirements. The provisions growth (PRO) is may also play a role in determining the CAR levels, this factor is expected to have a positive effect on the capital adequacy ratio, as an increase in credit risk leads to an increase in the provisions made to strengthen the financial positions of banks, thereby increasing the CAR (Jouini et al., 2021). We also use the ROA in our model, which is anticipated to be positively correlated with the CAR (Polat & Al-Kalaf, 2014). The ROA refers to the operational efficiency of the bank's management by generating more profits, thereby increasing the CAR, particularly if a portion of these profits are directed to the banks' capital bases. But at the same time, this variable may be associated with a negative relationship with capital adequacy ratio, since the bank may withhold a percentage of the profits to meet some of the regulatory requirements related to capital in accordance with the requirements of Basel III.

Regarding the economic environment, we use the real GDP growth rate, which is anticipated to have a negative impact on the CAR. We can easily explain the expected relationship between the CAR and the real GDP growth, since a decline in economic growth increases may create uncertainty risk, this may reflect negatively on the balance sheet of individuals and corporate sectors, thereby increasing the risk that they will be unable to meet their obligations toward banks. In addition, the market's economic sentiment may be influenced, resulting in an increase in market risk, which may force the bank to increase its CAR. Nevertheless, some studies have revealed that the relationship between the CAR and the real GDP growth rate may be positive (Asarkaya and Ozcan, 2007), as economic expansion periods may cause banks to generate more profits and enhance capital buffers as a precaution to face any potential shocks during the stressful times.

In this paper, we collect the data on banking variables from the financial stability report in the Arab region, while the data on real GDP are gathered from the World Bank data base (World Development Indicators).

4.2 Preliminary Analysis of Data

Table 1 reports the descriptive statistics for all variables, the Omani banks achieved the highest average of the CAR (18.8%). This indicates that the Omani banking sector has the highest capacity among the sample countries in absorbing potential losses. The Tunisian banks achieved the lowest average CAR (13.0%). We can explain the relatively low percentage of the CAR in Tunisia due to the regulatory requirements related to capital adequacy are lower compared to the selected sample countries. It is worth noting the Arab banking system in the sample countries enjoy high levels of capital adequacy compared to Basel III requirements, which is 10.5% taking into account that the average ratio for the whole sample reach 16.9%, the results also show that the volatility of the CAR is low, as shown by the standard deviation values. Furthermore, Table 1 shows that there is some variation in the averages and volatility of factors likely to affect the capital adequacy ratio across Arab countries.

Table 1. Summary statistics of the variables

Variable	Kuwait	Tunisia	Morocco	Palestine	Bahrain	Jordan	Oman	Full panel
CAR								
Mean	0.173	0.130	0.148	0.152	0.214	0.177	0.188	0.169
Std. Dev.	0.015	0.080	0.089	0.035	0.067	0.054	0.044	0.026
SIZ								
Mean	17.233	10.570	21.677	7.319	22.664	12.480	14.284	15.175
Std. Dev.	0.683	1.823	1.966	0.757	0.627	0.180	1.472	0.342
PROV								
Mean	0.075	0.078	0.021	0.460	0.254	0.221	0.904	0.288
Std. Dev.	0.186	0.303	0.123	0.915	1.184	0.401	1.684	0.716
NPL								
Mean	0.018	0.142	0.060	0.026	0.073	0.071	0.048	0.063
Std. Dev.	0.009	0.241	0.022	0.014	0.043	0.022	0.068	0.061
ROA								
Mean	0.015	0.007	0.015	0.016	0.014	0.019	0.011	0.014
Std. Dev.	0.003	0.008	0.014	0.006	0.006	0.017	0.017	0.015
GDP								
Mean	0.013	0.008	0.026	0.008	0.018	0.025	0.015	0.016
Std. Dev.	0.030	0.032	0.041	0.055	0.032	0.031	0.035	0.033

Source. author's calculations.

Table 2 shows the correlations between the CAR and the independent variables, the table reveals that there are a negative and positive correlations between the CAR and the other potential determinants across the selected Arab countries. The values of the correlations are not determinants of the CAR with regard to the nature of the relationship between the CAR and the other variables in this study, which establishes a deeper analysis to measure the determinants of CAR in the Arab region to achieve the objectives of the study.

Table 2. Correlations between the capital adequacy ratio and the other variables

Country	Kuwait	Tunisia	Morocco	Palestine	Bahrain	Jordan	Oman	Full panel
SIZ	-0.138	-0.201	-0.461	-0.528	0.012	0.070	-0.265	0.152
PROV	-0.035	-0.023	-0.123	0.084	-0.019	-0.121	-0.011	-0.045
NPL	-0.362	-0.153	-0.290	-0.251	0.142	0.134	0.546	0.293
ROA	0.148	0.229	-0.049	0.069	0.312	-0.211	-0.697	-0.115
GDP	-0.082	0.117	0.149	0.029	0.028	0.056	-0.224	0.063

Source. author's calculations.

5. Model and Estimation Issues

5.1 Model

We attempt to assess the determinants of the capital adequacy ratio in the Arab banking sector by estimating the following model:

$$\begin{cases} CAR_{it} = \alpha_0 + \alpha_1 SIZ_{it} + \alpha_2 PRO_{it} + \alpha_3 NPL_{it} \\ \quad + \ \alpha_4 ROA_{it} + \alpha_5 GDP_{it} + u_{it} \\ \quad i = 1, 2, \dots, N, \ t = 1, 2, \dots, T \end{cases} \tag{1}$$

where i refers to bank (cross-section dimension) and t to time period (time series dimension), CAR_{it} is the capital adequacy ratio, SIZ_{it} is the logarithm of bank assets, PRO_{it} is the provisions growth, NPL_{it} is the non-performing loans to total loans ratio, ROA_{it} is the average of return on assets, GDP_{it} is the real GDP growth rate, while u_{it} is the error term. The coefficients α_1, α_2, α_3, and α_4 assess the effects of the banking variables on the CAR, and α_5 measures the effects of the real GDP growth rate on the CAR.

5.2 Estimation issues

We use the generalized method of moments (GMM) methodology to estimate the above model, which links the CAR with the banking and economic factors over six-year period for a panel of 35 banks from seven countries, by combining cross-section and time series data. The advantage of using the GMM approach is to control any potential endogeneity that may arise from independent variables. This paper uses the system GMM technique within dynamic panel data models framework conducted and developed by Blundell and Bond (1998), the mentioned framework taking into account the lagged and differenced versions of the explanatory variables as instruments to estimate the coefficients of the model.

Under the GMM approach, the model can be written as follows, note that $E(\mu_i) = 0$, $E(\varepsilon_{it}) = 0$, and $E(\mu_i \varepsilon_{it})0$:

$$Y_{it} = \beta_0 + \beta_1 Y_{i,t-1} + \beta_2 X_{it} + \mu_i + \varepsilon_{it} \tag{2}$$

where Y_{it} represents the CAR, X_{it} represents a vector contains the banking and economic variables, and μ_i refers to unobserved bank specific effects. By taking the first difference, we can transform the model given by Equation (2) as follows:

$$\Delta Y_{it} = \beta_1 \Delta Y_{i,t-1} + \beta_2 \Delta X_{it} + \Delta \varepsilon_{it} \tag{3}$$

So, the usage of the ordinary least squares (OLS) approach to estimate the model will generate a biased estimation of the coefficient β_1, this lead to adopt an alternative method to address this issue. Assuming that the errors are not serially correlated and that the independent variables are not correlated with the future values of the errors, the GMM method can be used for this purpose (see Carkovic and Levine, 2005):

$$E\left[Y_{i,t-j}\left(\varepsilon_{it} - \varepsilon_{i,t-1}\right)\right] = 0, \quad j \geq 2, 3, \dots, (T-1); \ \ t = 3, 4, \dots, T \tag{4}$$

$$E\left[X_{i,t-j}\left(\varepsilon_{it} - \varepsilon_{i,t-1}\right)\right] = 0, \quad j \geq 2, 3, \dots, (T-1); \ \ t = 3, 4, \dots, T \tag{5}$$

Blundell and Bond (1998) suggest integrating the models in differences and levels in a system of equations to solve the week instruments problem as following:

$$E\left[Y_{i,t+p}\varepsilon_{it}\right] - E\left[Y_{i,t+q}\varepsilon_{it}\right] = 0, \qquad \forall \ p, q \tag{6}$$

$$E\left[X_{i,t+p}\varepsilon_{it}\right] - E\left[X_{i,t+q}\varepsilon_{it}\right] = 0, \qquad \forall \ p, q \tag{7}$$

As a next step, the following additional moment conditions are imposed in this context:

$$E\left[\Delta Y_{i,t-1}(\mu_i + \varepsilon_{it})\right] = 0 \quad (8)$$

$$E\left[\Delta X_{i,t-1}(\mu_i + \varepsilon_{it})\right] = 0 \quad (9)$$

The GMM system procedure based on the moment conditions given by Equations: (4), (5), (8), and (9) determines consistent and effective estimates of the coefficients in the model.

6. Discussion of the Results

6.1 The Determinants of the CAR in the Arab Region

Table 3 presents the system GMM results of the determinants of the CAR for 35 Arab banks over the period 2015-2020. The results indicate that the CAR is positively affected by its lagged value. Regarding the banking factors, the results reveal that the relationships between the assets of the bank and the NPLs ratio on the one hand, and the CAR on the other hand are positive and significant. In fact, a one percent increase in bank size and the NPLs ratio leads to an increase in the CAR by 0.079 unit and 0.239 unit respectively. In terms of bank size, the result can be explained by the fact that larger banks usually have more efficient risk management as well as higher capital requirements due to their systemic importance in the financial system (Obeid et al. 2017). Regarding the relationship between the NPLs and the CAR, this result is consistent with the findings of Ahmad et al. (2008), according to Basel III requirements and the regulatory requirements, higher credit risk results in higher capital adequacy requirements, to improve the banking system's ability to withstand credit risks and shocks. The ROA has a significant and negative impact on the CAR. Indeed, a one percent increase in the ROA results in a 0.370 unit decrease in the CAR., this results not in line with the findings of some studies, such as Asarkaya and Ozcan (2007) and Vu and Dang (2020), but it is consistent with the findings of Jouini et.al.(2021), this result can be explained by the fact that the bank's high profits may increase its appetite for risk rather than directing it to strengthen its capital bases, given that the Arab banking sector already enjoys high and comfortable levels of CAR compared to the minimum regulatory requirements and Basel III standards (Arab Monetary Fund, 2022). Regarding the provisions, it has no significant effect on the CAR.

As expected, the findings also indicate that the real GDP growth rate has a positive significant impact on the CAR. A one percent increase in the real GDP growth rate results in a 0.492 unit increase in the CAR, which is expected because, during economic prosperity times, banks build up their capital buffers in preparation for stress periods, and to enhance their abilities to face any unexpected financial or economic crises (Asarkaya & Ozcan, 2007; Obeid & Awad, 2017). Also, this result shows the importance of continuous evaluation of the interactions between economic and macroprudential policies and the side effects on the objectives of each (Obeid & Awad, 2018).

Table 3. System GMM estimates (CAR is the dependent variable)

	Estimate	Standard Error
CONSTANT	-0.982***	0.105
CAR (-1)	0.052***	0.003
SIZ	0.079***	0.007
PRO	-0.004	0.004
NPL	0.239*	0.120
ROA	-0.370***	0.009
GDP	0.492***	0.008
Wald Test	149429.260	
	[0.000]	
Second-Order Autocorrelation Test	-0.698	
	[0.472]	
Sargan Test	16.031	
	[0.213]	

Notes. we use Wald test for overall significance of the model, Second-order autocorrelation test for no serial correlation in first-differenced errors, and Sargan test for over-identifying restrictions. The values in brackets are the *p*-values of the tests. *** / ** / *denote statistical significance at the 1%, 5% and 10% levels, respectively.

Source. author's calculations.

6.2 Diagnostic Analysis

We use the Wald test to check the overall significance of our model, while we use the second-order autocorrelation test to examine the absence of serial correlation in the first-differenced errors, and finally, we employ the Sargan test for the validity of the over-identifying restrictions to determine the fit of the estimated model. The outcomes of the tests summarized in Table 3 show that the diagnostic tests support the validity and consistency of the GMM estimators in the system.

7. Conclusion

This paper presents a comprehensive analysis of the determinants of the capital adequacy ratio in the Arab region, we use banking and economic factors for a panel of 35 banks across seven Arab countries from 2015 to 2020 using the system GMM method within the framework of dynamic panel data models. The estimation results highlight the significance of banking and economic factors in determining the CAR in the Arab region. Indeed, the CAR responds positively and significantly to changes in the lagged values of the CAR, bank size, the NPLs, and the real GDP growth rate. Nevertheless, the ROA has a significant and negative effect on the CAR. Regarding the provisions, it has no significant impact on the CAR. Based on our findings, the paper suggest that the Arab central banks should enhancing the application of Basel III requirements, continue to develop the stress tests and early warning systems, and adopt the best practices for banking supervision. Since capital adequacy requirements are among the important tools that enhance the resilience of the banking sector and its ability to absorb unexpected shocks. Therefore, central banks should analyze the determinants of the CAR, taking into account the banking factors and the macroeconomic environment, which provides a clear vision for banking and economic policy makers to enable them to understand the risks and challenges surrounding the banking system, especially systemically important banks. Finally, it is important for the Arab central banks to expedite the application of the amendments made to the Basel III requirements, and it is possible to conduct an impact study for the application of these requirements, in order to know the challenges and risks.

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