

Analysis of the Determinants of Capital Adequacy Ratio: The Case of Full-Fledged Islamic Banks in the Gulf Cooperation Council (GCC)

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Abstract- This study empirically analyzes bank-level and macroeconomic factors that have impact on the capital adequacy ratio (CAR) of the full-fledged Islamic banks in the Gulf Cooperation Council (GCC) and how they influence the banks' capitalization decisions. This study covers a six years period ranging from 2013 to 2018. CAR ratio is a key stability indicator that measures the capability of banks to absorb unforeseen losses. To conduct the analysis, secondary data gathered from the annual financial reports of the banks as well from international economic database are used. Using multiple linear regression model, the effect of return on assets (ROA), return on equity (ROE), financing to deposit ratio (FDR), operating expense to operating income (OEOI), bank size (SIZE), non-performing financing (NPF) as bank-specific explanatory variables and economic growth (GDP) and inflation (INF) as a proxy for macroeconomic explanatory variables on the CAR of the banks are studied. Due to multicollinearity issues, ROA is dropped. As a result of the regression analysis, OEOI and FDR are observed to positively and strongly impact CAR of the examined banks while SIZE is found to have negative and significant effect. ROE, NPF, GDP and INF demonstrated insignificant influences on the banks' CAR. This study reveals varying and significant under and over regulatory capitalization decisions across the banks. Additionally, extreme expenditures and financial losses suffered by some banks are also discovered.

Keywords: Capital adequacy ratio, Full-fledged Islamic banks, Gulf Cooperation Council.

I. INTRODUCTION

The Islamic banking sector in the Gulf States has always been the biggest campaigner for Islamic financial system in the world as it the birthplace of the official Sharia-complaint financial products offering institutions in the world following the opening of Dubai Islamic Bank in the UAE and Islamic Development Bank in the kingdom of Saudi Arabia in the 1970s. Since then, this sector continued playing a key role in the Islamic banking system and currently dominates the industry as it represents the biggest share in the Islamic financial system. The stability of GCC Islamic banks became the focal point of many researchers [1]–[3], as it attracted investments not only from Muslim

customers but also from Non-Muslim clients who developed adverse inclination against the conventional banking system following the global financial crisis (GFC). The consequential realization of the impermissibility of the interest-based banking lead to the ample growth of the Islamic banking industry [4]. According to Biancone and Radwan [5], the ethical-based operations of the Islamic financial system, which is quite analogous to the ethical finance promoting aspect of social responsibility investment, appealed to the Western countries as an attractive system. As compared to the conventional banks, Islamic banks in the GCC remained relatively resilient to the spill-overs of the GFC up until it spread out to the real economy [6]. As a measure for financial stability, capital adequacy ratio (CAR) has long been recognized as one of the most efficient among other indicators in the realm of finance. As per Estrella, Park, & Peristiani, if the risk-weights assigned to bank assets precisely represent the risk level of the weighted assets then an enhanced and meaningful separation between safe and vulnerable banks can be realized using capital adequacy ratio [7].

Capital adequacy ratio is defined as the level of capital a bank is required to hold in order to withstand risk exposures emanating from credit, market, and operating risks, and also to absorb possible financial damages and to guard their debtors [8]. According to the official definition of the Basel Committee on Banking Supervision (BCBS), “The capital ratio is the amount of regulatory capital divided by the amount of risk-weighted assets. The greater the amount of risk-weighted assets, the more capital is needed, and vice versa” [9]. In reference to universal regulatory standards, banks are required to maintain a minimum CAR of 8% to be labelled as safe and stable and to show adherence to banking regulations. However state bank regulators can set different capital ratios they deem appropriate for their banking sectors. For instance, central banks in the GCC, except for Saudi Arabia, all set a CAR in the range of 11% to 14.2% except state bank of Saudi Arabia who sets specific CAR requirements for each individual bank even though 8% is the minimum benchmark [10]. The capital adequacy ratios of the Islamic banks in the GCC are

found to be generally higher than that of other banks in the region. Post implementation of the Basel III norms, the average CAR of the Islamic banks in the GCC in 2015 stood at 17.89% indicating the comfortable satisfaction of the enhanced Basel III framework in the bloc [11]. Nonetheless, higher CAR does not necessarily imply immunity from insolvency as seen in the case of Berhad Islamic Bank in Malaysia who became bankrupt despite having an extremely higher CAR of 31% [12]. According to the authors, Berhad Islamic Bank reduced other banking ratios like profitability or leverage to raise its capitalization ratio which resulted the dooming of the bank despite having immense capital base. Reference [2] stated that the higher level of capital ratio in the Islamic banking sector of the Gulf States could be due to reliance on shareholder equity funds as a pivotal source of capital rather than debt-like financing instruments or the lack of rigorous risk-management tools at their disposal. As apparent as it is, the number of factors impacting the capitalization level of banks is plenteous.

Despite the number of studies conducted by numerous researchers to determine factors that influence the decision of banks when setting their capital adequacy ratios, a very few number of studies focused on the banking sector in the GCC. Yet, none of them attempted to study purely the Islamic banking institutions in the region. Henceforth, this study attempts to study and analyze the determinants of capital adequacy ratios of the full-fledged Islamic banks in the GCC. In section II, a brief review of the GCC Islamic banks is presented followed by literature review in section III. Section IV presents research methodology whereas section V contains the finding and discussion of the results gathered. In the last section (VI), conclusion and recommendation of the study is provided.

II. ISLAMIC BANKING INSTITUTIONS OF THE GCC

Over the years, the GCC, which comprises oil-rich countries of Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and UAE, experienced buoyant economic activities resulting from - alongside other factors – a booming Islamic banking sector which played a key role by intensifying credit extensions and assisting the overall financial stance of the banking industry in the region. Such improvements in the banking sector is accompanied by a wave of reforms including modernizing the financial stability strategy frameworks and financial safety nets, and enhancing the supervisory policy of the banks which contributed to the improved resilience of the banking sector in general [13]. The importance of Islamic banking sector in the region is unquestionable one given the demographic dominance of Muslim customers and the constant growth witnessed in the sector. According to the International Monetary Fund (IMF), the year-to-year total asset growth of the Islamic

banking sector was nearly the double of its conventional counterparty with a growth rate of 11% and 6% respectively since 2006 [13]. The Islamic banking sector takes huge credit for the inclusion of previously non-banking customers due to religious reasons into the banking system by offering Sharia-compliant financial products which consequently developed the banking industry of the region. One major player for the growth of this sector and provision of Islamic financial instruments is the ambition of banks in the start-up or growth phases who are longing to gain market share [14].

With respect to market share, the Islamic banking sector in the GCC established its solid ground in the market by crossing the 25 percent threshold that necessarily suggests that banks in this sector to be considered as systematically important banks in the member states [15]. More specifically, the share of Islamic banking institutions in the region witnessed a significant upsurge raising from 31% in 2008 to 45% in 2017 indicating the substantial penetration of this sector in the Gulf financial market [16]. According to the IMF report [13], Islamic banks in Saudi Arabia claimed the biggest portion in terms of market power in the GCC Islamic banking industry with a 29% market share, which is 1 percent more than the market share of UAE Islamic banks in region that stood at 28% in 2016. The market share of Qatari and Kuwaiti Islamic banks in the region were 17% and 15% respectively whereas Bahraini Islamic banking institutions enjoyed a 9% market share. The Islamic banks in the Sultanate State of Oman remained the least among the member states with only a 2% market share in the region. The state of Oman houses only two Islamic banking institutions that are the most recently opened ones in the region. Yet, in 2016 Omani Islamic banks were named as one the fastest growing countries in term assets alongside the Islamic banking institutions in Maldives and Palestine [17]. In terms of Global Islamic Financial Service Industry (IFSI), the GCC, apart from Sukuk products, outperformed all the other regions in every other segments with a total market share of 42%, which is almost 13% higher than its nearest competitor in 2017 as stipulated by the Islamic Financial Services Board (IFSB) in Table 1 below [18].

The Global Islamic commercial banking market in the year 2017 was valued at around 1.7 trillion dollars with a projected growth amounting to about 2.4 trillion dollars in the year 2023. Such growth is suggested to be driven by the

TABLE 1: GLOBAL IFSI BY SECTOR AND BY REGION
(USD BILLION, 2017)

Region	Banking Assets	Sukuk Outstanding	Islamic Funds' Assets	Takaful Contributions	Total	Share (%)
Asia	232.0	239.5	24.8	3.3	499.6	24.4
GCC	683.0	139.2	26.8	12.6	861.6	42.0
MENA (ex. GCC)	569.0	17.8	0.1	9.5	596.4	29.1
Africa (ex-North)	27.1	2.0	1.6	0.7	31.4	1.5
Others	46.4	1.5	13.3	0.0	61.3	3.0
Total	1,557.5	399.9	66.7	26.1	2,050.2	100.0

Source: IFSB [2018].

Islamic Fintech which enjoyed an investment of nearly 12.6 billion dollars from 2015 to 2018 [16]. As stated in the report, a number of Islamic banks in the GCC, mainly in Bahrain and Kuwait are exerting tangible efforts to lead the way. For instance, Kuwait Finance House (KFH) in Bahrain launched a digital service called BenefitPay to support its cashless society. On the other hand, Bahrain Islamic Bank partnered with Bahrain Fintech to make Bahrain a leading Fintech hub for the Arab world. Bahrain also houses one of the first sharia-compliant digital bank called Meem. The locus of GCC Islamic banks in the global Islamic banking system clearly goes beyond the mentioned undertakings. Wilson [19] stated that the Islamic banking sector in the Gulf region have long been a highly innovative one regarding product development and provision of services owing to the ongoing competition with its conventional counterparty for the domestic markets. Considering the significant developments carried out by the GCC member states, the author dubbed the region as the center for Islamic capitalism where the Western capitalism elements are objected.

Measuring the impact of the developments of Islamic banking system in the GCC on the economic growth of the region, Mohd. Yusof & Bahlous [20] concluded that this sector is colossal to spur the regional economic growth, supporting the theoretical nexus between finance and growth. The Islamic banking sector in the Gulf bloc is credited for the conversion of revenues generated from petroleum exports into investment projects including innovations which contributed to the growth of the GCC economy [21]. The Gulf region is a region that is highly dependent on proceedings from oil sales as it is one of the major oil exporting blocs in the world. However, the non-oil sectors is expected to be the main driving force behind the economic growth of the region in the approaching years [22]. The banking industry as a channeling institution plays a key role in providing funding to other non-oil sectors in the economy especially small and medium-sized enterprises (SMEs) who strongly rely on bank funds as they find it extremely hard to acquire funds from the under-developed capital markets. Considering the cited facts and references, it is apparent that the GCC Islamic banking institutions is

not exclusively at the heart of the banking system of the Gulf States but also at the wider global Islamic financial system.

III. LITERATURE REVIEW

Capital adequacy ratio is a percentage indicator developed initially by the BCBS to evaluate the solvency level or soundness of banks. It refers to the amount of regulatory capital maintained by a bank to offset the inherent risk exposures of its risky assets. This ratio equips banks with a tool that can measure the level of losses they can absorb. Based on capital adequacy ratio, the sufficiency of bank capital and the loss endurance level of banks during financial downturns can be measured or 'judged' [23]. To preserve depositor confidence and prevent banks from becoming bankrupt, capital adequacy is a requirement for banks [8]. According to Hadjixenophontos & Christodoulou-volos [24] and Pham & Nguyen [25], CAR serves two main purposes: first, it shows banks how safe they are from financial shocks. Second, it shows bank stakeholders, like shareholders and depositors, that their interests are protected. Asserting on the crucial part played by the banking system in the economic development, Reference [24] argued that it is imperative rather than an option for banks to understand the significance of capital adequacy ratio to act as a preventive measure and the elements influencing a bank's decision regarding their capital structures.

In an attempt to investigate which factors influence how banks set their capital adequacy ratios, a number of researchers conducted empirical studies on different banking sectors. This study presents all prior similar studies covering Islamic banking institutions to have a better reflection on the influencers of bank capitalization decisions.

Darwanis, & Mursal (2019) studied the entire Islamic commercial banks operating in Indonesia from 2015 to 2017. Using multiple regression model, the author investigated the effect of Return on Assets (ROA), Financing to Deposits Ratio (FDR), Bank Size, Net Interest Income (NIM), and Deposit (DEP) on the capital adequacy ratios (CAR) of the banks. The results of the study revealed that ROA, FDR, NIM, and Size inversely influence CAR while DEP effects CAR positively. These banks raised their CAR as their level of ROA, FDR, Size, and NIM dropped but the rising level of DEP warranted parallel increase. The author recommended the said banks to keep the CAR at 14% set regulators [26].

Sutrisno (2018) conducted similar examination on a sample of 55 Islamic banks serving rural customers in Indonesia from 2015 to 2016. The author analyzed the degree and direction that Return on Assets, Net Profit Margin (NPM), FDR, Nonperforming Financing (NPF), and Operating Efficiency (OEIR) influence the CAR of these

banks utilizing a quarterly data obtained from the banks' financial reports. As a result of the multiple linear regression analysis, it was concluded that, apart from ROA and OEIR, all other variables NPM, FDR, and NPF have a significantly positive effect of the CAR reported by the banks, implying that the increasing level of efficiency (NPM), risky financing (NPF), and liquidity (FDR) caused the capitalization level of these banks to upsurge to be cautious [27].

Mohammed (2018) examined the effect of some bank-level variables on the CAR of a combination of conventional and Islamic banks operating in the Gulf region for the period of 2006 to 2015. Employed a multiple linear regression on a panel of data, it was established that asset quality, management quality, and return on assets have a positive and significant association with CAR, whereas bank size and liquidity proved to inversely influence CAR of Islamic banks. Net interest income and credit risk demonstrated a poor association with the main variable. However, different findings were observed when the analysis was conducted on both industries simultaneously or on conventional banks only. In terms of connection between bank efficiency and CAR, the author revealed that capital ratios of Islamic banks negatively affects their efficiency but in a lower magnitude as compared to the conventional banks [28].

Hewaify & Alyousef (2018) conducted similar investigation on all listed banks in Kuwait between 2009 and 2016. Remarkably, Bank Type is stated to have no significant effect on CAR, implying that explanatory variables investigated under this study have similar effect on the CAR of both Islamic and conventional bank. Apart from profitability metrics like ROA, ROE, and NIM and macro-economic factors like GDP and Inflation, which are found to be insignificant, factors like Bank Size, Loan Loss Reserves to Total Loans (asset quality), and Net Loans to Asset (liquidity) indicated a negatively significant association with CAR whereas Loans to Deposits (management quality) demonstrated a positive and significant relation with CAR of Kuwaiti banks [29].

Ayub & Javeed (2016) observed the financing approach of five Islamic banks in Pakistan from 2004 to 2014, a ten year period. The authors found that capital regulations in Pakistan had an adverse impact on these banks financing strategies and recommended the reduction of risky assets and investment in low risk government securities to represent themselves as well-capitalized banks. Allocating a portion of retained earnings to capital bucket or issuing new equity shares were another effective approaches the authors recommended as well, since acquisition of capital from the market proved to be expensive [30].

Valipour Pasha (2015) studied the possible cause for the surge of Nonperforming Loans (NPL) in the Iranian banks and its correlation with the capital ratios of 19 Islamic banks in Iran from 2007 to 2012. The findings of the study suggested an inverse association between the two variables. Thus, increasing the capital ratios, banks could manage to

lower their level of nonperforming loans and hedge themselves from hazardous financial situations arising from lack of provisioning for loans. The author stated that NPL shows the vulnerability level of banks, thus it should be lowered by serving only high quality debtors [31].

Prior from this study Bateni, Vakilifard, & Asghari (2014) studied the same jurisdiction and investigated the factors influencing capital ratios of six banks between 2006 and 2012. As found from the regression analysis, the CAR increased when the percentage of Return on Equity (ROE), Loan Asset Ratio (LAR), and Equity Ratio (EQR) went up. However CAR of the studied banks declined when their Sizes grew in terms of total assets showing that larger Iranian banks enjoy lower supervisory restrictions than smaller ones and invest on riskier assets [32].

Asma & Khadidja (2015) investigated the influence of capital regulations on the financial performance of 17 Islamic banks in Malaysia and studied the impact of six bank-level variables extracted from 16 Islamic banks' financial reports for the period between 2006 and 2011. Using a panel data methodology, the authors realized that as the degree of credit risk (CR) and profitability (ROE) increased the banks raised their CAR. On the other hand, a positive association between CAR and ROA is observed indicating that the banks allocated additional capital to protect owners as the additional profits raised the owners' capital. Other variables like Liquidity Risk (LR), Operating Efficiency (OPR) and Bank Size (BS) have been found to have no significant effect of CAR of investigates Islamic banks [33].

In Egypt, Ansary & Hafez (2015) studied determinants of CAR on 36 commercial banks including 4 Islamic banks for the period 2004 – 2013. According to the findings, profitability, liquidity and management quality displayed a positive and significant correlation with risk-based capital while bank size and credit risk indicated a negatively significant correlation. However, as for pre-crisis period, asset quality, profitability and size are found to be negatively correlated with CAR whereas only profitability showed a negative association with CAR. In terms of post-crisis, the authors concluded that liquidity, management quality and asset quality are directly and significantly related to CAR, and SIZE is indirectly correlated with the capital ratios of the banks. However, it is worth mentioning that the effect of the variables on CAR are assumed to be similar on all types of banks as the authors did not provide any distinctive results for Islamic banks [34].

The study of Abusharba, Triyuwono, Ismail, & Rahman (2013) is probably the first one conducted to learn the determinants of CAR of entirely Islamic banks. The authors investigated the Islamic commercial banks in Indonesia from 2009 till 2011 applying multiple regression analysis model. The authors found a positive and significant relationship between CAR and profitability (ROA) and liquidity (FDR), and a negatively significant association between CAR and Nonperforming Financing (NPF) as a

measure for asset earning quality. However, Operating Expense to Operating Income (OEOI) and Total Deposits to Total Assets (DA) representing operating efficiency and deposit structure failed to show any strong effect on the banks' capitalization decisions. As per the authors' conclusion, the capital of the studied banks were experiencing depreciation due to the credit risk originating from the financing modes like Mudarabah, Musharaka and Murabahah, hence set their CAR at higher level [35].

IV. RESEARCH METHODOLOGY

A. Data Sampling

Given the numerical nature of the variables examined for the purpose of this research, a quantitative research methodology is used. A quantitative research is defined as a research method that gathers data in the form of numbers and analyzes it using mathematical techniques mainly statistics, in order to explain an issue or a phenomenon [36]. Since the focus of this study is on the Islamic banking division of the GCC, a population of all the full-fledged Islamic banks operating in the GCC from 2013 to 2018 is targeted, thus making it a census study. When the examined subjects are small in numbers, the outcome of a study is more reliable when all the subjects are included in the study as argued by Žmuk, Lutitsky, & Dragija [37].

Banking sector in the GCC houses a total of seventy nine (79) locally incorporated commercial banks, of which twenty eight (28) banks are full-fledged Islamic banks – Bahrain 6, Kuwait 5, Oman 2, UAE 7, Qatar 4, Saudi Arabia 4, - licensed as Sharia-complaint financial institutions by the central banks of each member country [38]–[43]. This study examines the 28 full-fledged Islamic banks in the GCC for a six year period from 2013 to 2018, giving us a total observation number or sample size of 168 observations gathered from different secondary sources. As for bank-level variables, the data are collected from the annual financial reports of the banks. Concerning the macro-economic variables, this study relied on World Bank and on United Nations Conference on Trade and Development (UNCTADSTAD) as its source.

B. Variable Measurements

This research examines the influence of specific independent variables on a single dependent variable as its main variable. In the context of a causality relationship, a variable whose variance is observed and recorded due to an influence by another independent variable is defined as dependent variable [44]. Independent variables, also known as explanatory variables or predictors, are variables that are not affected by the actions of the researcher and bear the capacity to stand on their own. Jupiter defined independent variables as the input and the covariate that makes up the model in a linear regression [45]. The

dependent variable of this study is Capital Adequacy Ratio (CAR) of the banks while Return on Asset (ROA), Return on Equity (ROE), Operating Efficiency (OEOI), Liquidity (FDR), Bank Size (SIZE), Asset Quality (NPF), Economic Growth (GDP), and Inflation (INF) represent the corresponding independent variables. Below the definitions and measurements of the variables are provided:

1) Dependent Variable:

Capitalization: Capital Adequacy Ratio (CAR)

CAR measures the sufficiency level of regulatory capital maintained by a bank to offset unforeseen losses. It is used as an indicator for financial stability. The minimum required CAR is 8% CAR under the Basel standard [46], however state banks normally exercise different ratios applicable to their situations. CAR is calculated by dividing tier 1 and tier 2 capital by the total risk-weighted assets (RWA) as presented by [32]. Tier 1 capital is the primary source of capital used on the going-concern while Tier 2 capital is the secondary source of capital used on the gone-concern. Risk-Weighted Assets are assets of the banks classified according to their inherent risks.

$$CAR = \frac{\text{Tier 1 Capital} + \text{Tier 2 Capital}}{\text{Total Risk Weighted Assets}} \quad (1)$$

2) Independent Variables:

Profitability: Return on Assets (ROA)

ROA is a ratio indicating the amount of profits a firm generates from its total assets in percentage form. It displays the fraction of profit earned from single dollar invested in assets. As stated by Saragih, a higher ROA ratio shows a more effective utilization of company assets to generate net profits and increased company performance [47]. ROA is derived by dividing after-tax net income by the total assets of an entity as shown by Paudel & Khanal [48]. After-tax net income are profits derived after all expenses are deducted including Zakat payables. Total Asset refers to all economic resources of an entity.

$$ROA = \frac{\text{Net Income after tax}}{\text{Total Assets}} \quad (2)$$

Profitability: Return on Equity (ROE)

ROE measures the rate of return earned utilizing shareholders' equity. ROE gives a picture on how effectually bank management utilize shareholders' money [49]. ROE expresses the amount of profits derived from each dollar of shareholders' equity invested in a bank. In terms of profitability and potential for growth, ROE acts as the most significant indicator for banks [50]. ROE is the ratio of after-tax net income to the total equity of an entity

[48]. After-tax net income are profits derived after all expenses are deducted including Zakat payables. Total Equity are the amount of assets remaining after all liabilities and share of investment accountholders are deducted as underlined by the Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI) [51].

$$\text{ROE} = \frac{\text{Net Income after tax}}{\text{Total Equity}} \quad (3)$$

Operating Efficiency: Operating Expenses to Operating Income (OEI)

OEI shows the amount of expenses incurred to generate revenue from a bank's operating activities. This ratio indicates how efficiently banks are handling their expenses to generate profits from their operations. Operating efficiency is a measurement of bank output relative to input utilized, where a higher ratio implies that expenses of the bank is rising leading to a decreasing bank profit [52]. OEI represents total operating expense of an entity to its total operating income as used in the work of Lotto [52]. Operating Expenses are the all expenses incurred for the normal operations of the banks excluding impairment provisions and income tax. Operating Income represents all profits generated from a bank's normal operations.

$$\text{OEI} = \frac{\text{Operating Expense}}{\text{Operating Income}} \quad (4)$$

Liquidity: Financing to Deposits (FDR)

FDR indicates the amount of depositor funds used for financing purposes. It shows the liquidity level of Islamic banks. As defined by Iqbal, liquidity is the ability of banks to meet their financial obligations towards deposit withdrawals, maturing loan demands, and overall liabilities without experiencing setbacks [53]. Generally an FDR ratio in the range of 80% to 90% is typically viewed as ideal. FDR is the ratio of total financing to total deposits [26]. Total Financing is total amount of assets financed by a bank. Total Deposits are the deposits from bank customers and unrestricted investment account holders.

$$\text{FDR} = \frac{\text{Total Financing}}{\text{Total Deposits}} \quad (5)$$

Bank Size: Log Total Assets (SIZE)

Bank size refers to the overall size of a bank indicated by the total amount of economic resources or assets owned by a bank. Given its robustness to research sensitivity and commonality in usage, Log total assets is used as a proxy for bank size [54]–[57]. Log Total asset refers to the total

assets of the banks converted into US Dollars and computed in terms of Logarithm to have comparability among banks

$$\text{SIZE} = \text{Log}(\text{Total Assets}) \quad (6)$$

Asset Quality: Nonperforming Financing (NPF)

NPF measures the amount of uncollectable funds or nonperforming financing from the total financing of a bank. Asset quality is measured by dividing nonperforming loans of a bank to its total outstanding loans where a rise of this ratio indicates a downgrading asset quality management of banks [28]. As stated by Indriastuti & M. Ifada, an NPF ratio that is below 5% is acceptable indicating healthy financing activities of banks [58]. The calculation of NPF is found with the division of nonperforming financing of a bank to its total financing volume as employed by Raniah, Khairunnisa, & Triyanto [59]. Nonperforming Financing: all impaired or highly unrecoverable funds granted to customers while Total Financing are all funds granted by banks to finance customer projects.

$$\text{NPF} = \frac{\text{Non-Performing Financing}}{\text{Total Financing}} \quad (7)$$

Economic Growth: Growth Domestic Product (GDP)

GDP is a macro-economic indicator that shows the yearly economic growth of a country. GDP growth often results in higher profitable activities and further investment opportunities for firms creating an increased demand for financing by firms [60]. The higher the GDP ratio the better for an economy. Economic growth a nation is calculated using the annual rate change of its GDP [61]. GDP: The entire goods and services produced within the boundaries of a specific country for specific duration.

$$\text{GDP} = \text{Annual GDP Growth Rate} \quad (8)$$

Inflation: Consumer Price Index (INF)

Inflation measures the percentage change in the prices of general goods and services represented by consumer price index (CPI). It refers to situations where the general price level in an economy increases continuously or, where the value of money undergoes continuous decline [62]. The inflationary situation of a nation is derived by measuring its annual CPI change as provided in the study of Alper & Anbar (2011) [61]. CPI represents the rational change in the yearly average prices for a basket of consumer goods and services.

$$\text{INF} = \text{Annual CPI Rate} \quad (9)$$

C. Data Validation

Before performing any statistical analysis, the validity and reliability of the collected data must be tested in order to ascertain the accuracy of the regression model to be applied and adherence to some underlying assumptions. As stressed on by Ghasemi & Zahediasl a researcher should seriously consider statistical assumptions since failure to uphold such assumptions might hinder the possibility to draw accurate and reliable conclusions about the facts [63]. To perform such tests and all the subsequent statistical measurements, the statistical package of STATA is used.

1) Normality Tests:

As a first step, normality test is performed and non-normality of the data due to outliers is observed. Nonetheless, such non-normality is unaccounted for as the number of observations or sample size (164 observations) of this study is sufficiently large to relax this assumption as stated by prior researchers involved in the field [63], [64]. On the other hand, Yang argued that regression analysis show resilience and robustness against non-normality of the error terms as conclusions drawn from such analysis remain valid despite non-normality [65]. Henceforth, the outcome of this study is presumed to be valid and reliable regardless of the normality assumption failure.

2) Multicollinearity Test:

One major test conducted before a regression analysis is performed is the Multicollinearity test which assesses the existence of linear relations among the explanatory variables of a research. Technically, the issue of multicollinearity emerges when two identical independent variables having similar purpose but with different measurements are included in a model. An example of such phenomenon is the presence of two variables representing height in a model where one variable is measured with inches and the other with feet. To test the issue of multicollinearity, the commonly used Variance Inflation Factor (VIF) is employed. A VIF value exceeding 10 indicates multicollinearity problem in a model. As a result of the test, return on assets (ROA) is found to have an 11.93 value which is greater than the required 10 (refer to Table 3 below). To fix this problem, dropping ROA is conceived as a viable option to avoid distortion in our data. To assume no multi-collinearity problem in a model, only variables that have no exact linear functions with one or multiple variables should be included in the model [64].

3) Heteroscedasticity Test:

Another validity test is the test of heteroscedasticity. Heteroscedasticity refers to situations where the variances witnessed in the residuals of the dependent variable is caused by the predictors in the model - which is not preferred. In classical linear regression, the residual or error term in the model is assumed to have equal variance or are homoscedastic across the observations. Thus, the violation of such assumption is referred to as heteroscedasticity [66]. The presence of heteroscedasticity leads to producing a p-value that is smaller than it should be in normal conditions. To detect heteroscedasticity, a numerical and graphical tests of Breusch-Pagan (BP) test and Residual-versus-Fitted (RVF) graph respectively are conducted. The BP test discovered a p-value of 0.2152, thus accepting the null hypothesis of homoscedasticity. Furthermore, the RVF graph confirmed the result of BP by illustrated equal spreading of the data points below and above the zero line.

TABLE 3: MULTICOLLINEARITY TEST (VIF)

Variables	VIF
ROA	11.93
ROE	5.27
OEOI	5.91
FDR	1.67
SIZE	1.38
NPF	1.10
GDP	1.10
INF	1.20

D. Model Specification

In order to examine the effect of bank-level and macroeconomic level factors on the determination of GCC Islamic banks capital adequacy ratios, this study employs a multiple linear regression model on a panel of data consisting of 28 cross-sections (the selected banks) and 6 time periods ranging from 2013 to 2018. Multiple linear regression refers to statistical models where the effect of multiple number of variables or independent variables on a single dependent variable is examined to test possible causal relationship.

As argued by Abusharba, Triyuwono, Ismail, and Rahman, regression models come in handy when the model is needed to explain the inter-relationship between the outcome variable and explanatory variables [35]. The regression model of this study is as follows:

$$\text{CAR}_{bit} = \alpha + \beta_1 \text{ROE}_{bit} + \beta_2 \text{OEOI}_{bit} + \beta_3 \text{FDR}_{bit} + \beta_4 \text{SIZE}_{bit} + \beta_5 \text{NPF}_{bit} + \beta_6 \text{GDP}_{bit} + \beta_7 \text{INF}_{bit} + \varepsilon_{bit}$$

In the above equation, α is the constant value while $\beta_1 \dots \beta_n$ represent the coefficients of the explanatory variables. t represents time period while i and b represent the 28 banks and 6 GCC member states respectively. The symbol ε is the

error term reflecting all other influencing factors absent in the model.

V. FINDINGS AND DISCUSSIONS

A. Descriptive Statistics.

As visible in Table 4, the total number of observations in this study is 168 giving us a fairly sufficient data-set to run our analysis. The descriptive analysis in the table has been summarized as follows:

Capital adequacy ratios (CAR) of the Islamic banks in the Gulf States displayed a mean of 20.29% indicating maintenance of capital ratios above the minimum international and domestic thresholds on the average. The standard deviation of CAR was 10.8 % signifying fluctuations among the banks in holding regulatory capital. The minimum and maximum CAR values were 1.7% and 97% respectively further supporting this variance. Some Islamic banks in the GCC failed to maintain the required minimum while some others followed a very extremely prudent approach holding regulatory capital almost equivalent to its risky assets.

ROE exhibited an average value of 8.2% and a standard deviation of 6.8% indicating that the returns earned from shareholder equity of the observed banks require improvements given the slight variance among their ratios. A minimum value of -20.4% shows that the least profitable bank lost almost as much as the most profitable one with a ROE of 21.2%.

In terms of operating efficiency OEOI, the mean value was 59.4% indicating that on the average the banks managed their operating expenses poorly. Yet, the banks differed highly with a standard deviation of 68.2% which is substantial. The minimum and maximum OEOI value were 3.18% and 558.9% respectively supporting the extreme deviation. The maximum value shows extremely over-spending of more than 5 folds the anticipated profit. An average FDR of 95.7% and a standard deviation of 39.4% are found indicating the large and varying liquidity positions of the banks respectively. A minimum and maximum FDR of 1.5% and 455.8% clearly shows how some banks kept customer deposits extremely idle (1.5%) while some others financed more than depositor funds (455.8%).

The average SIZE of the banks measured with logarithm of total assets was 7.182944. The standard deviation of SIZE was 0.668 with a minimum of 6.000757 and maximum of 9.355704 signifying the varying sizes of the examined banks. The mean asset quality (NPF) stood at 4.78% among the banks indicating a satisfactory asset quality management on the average. On the other hand, the standard deviation of

7.72% showed that the banks were quite consistent regarding this factor while a range between 0 and 0.83 point out that none of the banks faced unfavorable financing problems. The findings show banks succeeded in avoiding any financing impairment and recovered all its finances.

The average GDP of the region was 2.65% indicating healthy economic conditions in the region. This favorable condition is mutual among the stated given the variance of 1.91% which is smaller. The least and highest growth rate were -2.866% and 5.42% respectively showing a decline in the first case. Inflation (INF) rate of the region was 2.22% with a standard deviation of 1.04% exhibiting stable inflationary positions in the GCC. In addition to the highest inflation of 4.07% suffered by the region, the region experienced a deflation of -0.0237%.

TABLE 4: DESCRIPTIVE STATISTICS

Variables	Obs. No.	Mean	Standard deviation	Min	Max
CAR	168	0.202924	0.1084205	0.01732	0.9707
ROE	168	0.081892	0.0683937	-0.20376	0.21207
OEOI	168	0.594768	0.6822212	0.031882	5.899902
FDR	168	0.957305	0.3941127	0.015888	4.558445
SIZE	168	7.182944	0.6681826	6.000757	9.355704
NPF	168	0.047879	0.0771992	0	0.83
GDP	168	0.026489	0.0191467	-0.02866	0.054165
INF	168	0.022255	0.0104029	-0.00237	0.0407

B. Correlation Analysis

In Table 5, the analysis of the correlations among the variables is presented using the Spearman's rank correlation matrix. Spearman's correlation matrix is applicable to data sets that are not normally distributed due to outlier effects [67]. As evident in the table, the association between CAR and ROE is negative and significant at 5% level which means that bank capitalization level drops as the profit rate surges. Profitability (ROE) has a negative and strong relation with OEOI and FDR, but a positive and significant correlation with bank SIZE. FDR exhibits a significantly positive linear relation with CAR showing analogous direction of liquidity and risk-based capital levels. Liquidity (FDR) seems to drop when nonperforming financing (NPF) and inflation rate (INF) escalates. Apart from the inverse strong correlation with ROE, OEOI has no significant association with any variable. The relation of bank SIZE with CAR is inverse but insignificant, while the relation of the former with ROE is the only positively significant one. This implies that banks grow as they make more profits. The correlation between Asset quality (NPF) and CAR is inverse and significant at 5% level. This means that CAR increases when the rate of impaired financing assets declines. NPF has inversely strong relations with FDR and SIZE indicating that asset quality improves (NPF drops) when financing activity and bank size expands. The relationship of GDP and INF with CAR are negative but weak to account for. GDP

has zero strong relation with any variable while inflation (INF) rise reduces liquidity and sizes of banks.

TABLE 5: SPEARMAN'S RANK CORRELATION
Note: (*) symbolizes significance at 0.05 level

C. Regression Analysis

In a multiple regression analysis, there are a number of approaches including Fixed Effect Model (FEM) and Random Effect Model (REM) each having specific properties. The main element that differentiates REM from FEM is that the REM model assumes that the independent variables of the model have no correlation with the unobserved time-invariant effects in the model while the FEM assumes an association [68, p. 1061]. To determine the most suitable model for this study, the Hausman test is performed and indicated that the most fitting model for our regression is the REM since the generated P-value is greater than 5%, thus accepting the null hypothesis of random effect model.

In Table 6, the results of the regression analysis are presented. As shown in the table, the R-squared (R-sq.) and Akaike's Information Criterion (AIC) are 0.851 and -667.8 respectively ascertaining the overall fitness of the model. Generally, an optimal model is said to be one with the highest R-sq. and the least AIC values [69]. On the other hand, the probability significance of the model is less than 0.05 (Prob. (Wald Chi2) = 0.0000) rejecting the null hypothesis that explanatory variables of the study do not influence the corresponding dependent variable. The Adjusted R-square (Adj.R-sq.) is 0.813, implying that 81.3% of the variances on the dependent variables is explained by the independent variables after having adjusted by the number of cases and variables.

As visible in Table 6, only three variables namely; operating efficiency, liquidity and bank size have significant influence on capital adequacy ratio. Operating efficiency (OEOI) has a strong impact on CAR of the examined banks with a power of less than 0.01%. The coefficient of OEOI is 0.11 which means that capitalization level of the GCC Islamic banks increases by 11% when OEOI rises by 1% or operating efficiency drop by one percent. This ratio should be interpreted carefully as a higher OEOI ratio implies that banks incur more expenses to generate income in their normal operations leading to operating inefficiency. Hence, a lowering OEOI ratio is preferred. The results found contradict the findings of most prior researchers who found it to be an insignificant factor even though they anticipated a significant and positive impact [33], [35]. As far as our knowledge extends, no prior studies on entirely Islamic banking sector found similar results. Yet, studies on conventional banks revealed significant but negative influence of OEOI on the capital adequacy of banks [70],

[71]. The finding of this study reveals that Islamic banks with increased operating costs experience rising capital ratios. Rahman [72] states that rising bank costs or expenses leads to a diminishing level of bank stability.

Liquidity represented by financing to deposit ratio (FDR) is found to strongly influence CAR of the examined banks with a p-value below 0.01%. The coefficient of FDR is positive 0.0952 implying that these banks raise the regulatory capital level (CAR) by 9.52% as the level of financing activities intensifies by a single percentage. The result found supports the findings found in the studies of prior researcher that focused on Islamic banks as well [27], [35], [73]. However, the finding contradicts the observations of Mursal, Darwanis, and Ibrahim (2019) who found an inverse effect of FDR on the capital adequacy ratios of the Indonesian commercial Islamic banks indicating tendency to lower capital base when financing volume is expanded and greater returns are expected [26]. On the contrary, GCC Islamic banks tend to act prudently and support their financing endeavors with reserved capital in order to have contingent plan in case of unfavorable circumstances.

Bank size calculated in terms of Logarithm of total assets (SIZE) reveals an inverse and significant effect on the CAR of the Islamic banks in the GCC at less than 1% p-

Variables	CAR	ROE	OEOI	FDR	SIZE	NPF	GDP	INF
CAR	1							
ROE	-0.2174*	1						
OEOI	0.0297	-0.4345*	1					
FDR	0.1537*	-0.2768*	-0.0362	1				
SIZE	-0.0524	0.3283*	0.0934	0.0198	1			
NPF	0.3376*	-0.1	0.0121	0.2755*	0.3943*	1		
GDP	0.0908	0.0895	0.0693	0.1162	0.1213	0.1363	1	
INF	0.1187	0.1498	0.0696	0.2021*	0.1802*	0.0419	0.1454	1

value. Due to the Log transformation, the nature of the impact of transformed variable and its interpretation changes unlike the original variable [74]. The rule of thumb for log transformed variable is to divide 100 by its coefficient value. Hence, the coefficient of SIZE becomes

0.000307 (0.0307/100). The adjusted coefficient of SIZE of negative 0.000307 shows that the said banks tend to reduce their CAR by 0.03% because of a one percent expansion in terms of their sizes. Our observation supports almost all prior studies that was conducted on the Islamic banking sector of this nature [26], [28], [33]. Our result is inconsistency with the findings of Asma & Khadidja (2015) who revealed a weak and positive outcome when it comes to bank size [33].

The remaining factors including profitability (ROE), asset quality (NPF), economic growth (GDP) and inflation (INF) failed to exhibit any tangible influence on the capitalization level of the Islamic banking institutions in the Gulf States for the duration of this study at any significance level (5%, 1%, and 0.1%). This means that these variables pose no significant effect and can be neglected.

TABLE 6: RANDOM EFFECTS MODEL

Predictors	Coefficients (Beta)	P-values (Power)	T-values
Profitability (ROE)	0.00562	0.936	-0.08
Operating efficiency (OEOI)	0.11	0.000***	15.80
Liquidity (FDR)	0.0952	0.000***	8.77
Bank Size (SIZE)	-0.0307^	0.003**	-2.99
Asset Quality (NPF)	-0.066	0.121	-1.55
Economic Growth (GDP)	-0.0993	0.581	-0.55
Inflation rate (INF)	-0.406	0.181	-1.34
Constant	0.281	0.000***	3.65
Obs No			168
Bank No			28
R-sq.			0.851
Adj. R-sq.			0.813
AIC			-667.8
Prob. (Wald Chi2)			0.0000

Significance Level: * p<0.05, ** p<0.01, *** p<0.001.

NOTE: ^ Coefficient of SIZE is adjusted and justified above.

VI. CONCLUSIONS AND RECOMMENDATION

In this paper, six bank-level and two macroeconomic variables has been examined to determine the extent of their effect on the capital adequacy ratios of the GCC Islamic banks. The focus of this paper has been entirely on the commercial banks offering only sharia-compliant products in the region. Using a panel data for 28 banks in 6 GCC member states between 2013 and 2018, a regression model has been developed to carry out the analysis. According to

the findings of the regression model, return on equity (ROE), asset quality (NPF), economic growth (GDP) and inflation (INF) have no significant impact on the CAR of the said banks. The mild average fluctuation of the economic indicators (GDP and Inflation) can explain why such macro-level factors have no effect on the banks' capitalization decision as the region did not experience extremely changing economic conditions over the years.

As shown earlier, operating efficiency (OEOI) directly and strongly influences CAR, which means that the studied banks raise their CAR as their operating costs rise. In any financial year, increasing costs might result from aggressive banking activities including financing customer demands to gain larger revenues. Such behavior warrants practicing banks to rise their CAR to withstand the risk exposures from risky assets financed. In the GCC, the growth of Islamic banks is significant and driven by start-up banks who aggressively provide sharia-compliant financial products to its customer in order to achieve growth. Generally, Islamic banking institutions in the Gulf region experience increasing costs. To solve this issue these banks need to detect relevant cost drivers behind such increasing expenditures to achieve productive efficiency. Plus, establishing effective cost management policies should be of great importance for these banks.

Liquidity (FDR) of the banks revealed a significantly positive impact on the CAR of the GCC Islamic banks. This indicates that when these banks increasingly use their customer deposits to finance projects they increase their CAR to lower exposures from customer defaults to some extent. Unlike conventional banks who benefit from well-developed liquidity markets, Islamic banks still suffer from under-developed security markets as they lack wider options of sharia-compliant liquid instruments. Hence, the proportional change of FDR and CAR should not come as a surprise considering the absence of strong liquidity management instruments. Central banks in the GCC and Islamic banking industry in general should increase their efforts to develop Islamically applicable and effective liquid instruments to curb possible liquid-asset shortages.

In terms of bank size, the influence of SIZE on CAR is found to be negative and significant implying that GCC Islamic banks lower their CAR as their size in terms of total assets grows. This indicates that smaller GCC Islamic banks experience higher capital ratios as compared to bigger ones who enjoy higher asset diversifications leading to reduced risks and lower CAR. Bigger banks normally reap the benefits of bail-outs from central banks during financial downturns because of their important role in the financial system. In addition to that, large banks enjoy easy access to capital markets which further relaxes their capital regulation requirements. Small and medium banks tend to undertake riskier investments to achieve growth, thus raise their regulatory capital as a preventive measure which in turn enhances their financial stability. The banking regulators in the GCC should develop policies that can encourage smaller

and medium banks to pursue growth while enacting appropriate capital regulations.

As far as our knowledge extends, this is the only study that focused on the full-fledged Islamic banks in the Gulf region. This study is limited to the Islamic banks that offer only sharia-compliant financial products in the region excluding wholesale and investment Islamic banks that cater to only bigger projects; mixed banks where both Islamic and conventional financial products are offered, Islamic insurance (Takaful) banks and etc. Future studies of this nature may expand its scope by including the mentioned institutions operating in the GCC or by extending the study period or even by including other factors deemed influential. This study is expected to be useful for the GCC Islamic banks and influence the way they set their capitalization level. Additionally, future researchers can benefit from the revelations of this study.

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