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DETERMINANTS OF CAPITAL STRUCTURE: A COMPARATIVE STUDY BETWEEN ISLAMIC AND CONVENTIONAL BANKS IN GCC

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ABSTRACT:

This study explores the determinants of the regulatory capital and capital structure in baking sector operating in the Gulf Cooperation Council (GCC) countries. The sample includes banks in Saudi Arabia, Kuwait, Bahrain, Qatar, and United Arab Emirates. This study also examines the determinants of regulatory capital and capital structure in Islamic and conventional banks. And this is the first attempt to examine the regulatory capital align with the capital structure. Mainly, the study followed the capital structure field to study the impact of bank-specific factors such as size, profitability, liquidity, loan loss reserves and bank risk align with the macroeconomic factors GDP and financial crisis. This study used two models to test the capital structure on the selected panel data, Ordinary Least Square with applying the fixed effect model for the balanced data. A sample of 26 Islamic banks and 52 conventional banks were considered in this study. The findings demonstrate that regulatory capital for all banks negatively correlated with all determinants except the size, profitability and loan loss reserves. With respect to the regulatory capital, riskier and more liquid banks tend to have less regulatory capital in GCC banks. The capital structure for all banks are positively correlated with profitability, liquidity and loan loss reserves while negatively correlated with size and risk. The macroeconomic determinants have negative impact for the

conventional banks on the two models in this study; regulatory capital and capital structure. Meaning that at the time of high GDP, Islamic banks tend raise more equity. The study finds enough evidence to support that financial crisis negatively impact both Islamic and conventional banks, so during the global financial crisis years 2007/2008, Islamic and conventional banks lower their capital ratios.

INTRODUCTION:

The capital structure studies have been widely argued after Modigliani and Miller [1] research on capital structure and how it affects the firm value. The value of a firm is independent of its capital structure. Instead of that, the firm's value relies on the business risk whereas the firm will not have an optimal capital structure. The theory revised and introduced the tax shield in their second proposition [2]. Moreover, the trade-off theory entered to the capital structure literature as there is an optimal level of capital structure when the tax-benefit balanced the bankruptcy cost of debt to maximize the firm's value. Some studies found that trade-off theory predicts the size of the firm/bank can affect their debt ratio because of the default risk [3-5]. Ogden and Wu [6] conduct a study on US firms to find the corporate financing decisions and find their study support market timing. They conclude that larger and more profitable firms have a lower likelihood of retiring debt. Al-Zomaia [7] analysed a sample of Saudi firms to determine the major factors that affect the capital structure which found that it majorly supports the pecking order. The growth supports that due to the positive relationship with the capital structure, this indicates more growth accumulate more debt over time. The study also supported the agency theory expecting to use less risky debt. One of the empirical results that indicate the size of the Saudi firms has limited influence on the capital structure.Gropp and Heider [8] examined the capital structure of banks in US and Europe from the perspective of non-financial firms' capital structure. Their main findings indicated that the determinants of capital structure for nonfinancial firms are similar for the banking sector. Also, they conducted the examination of Tier 1 capital ratio which is the regulatory definition under Basel requirements. The results implied smaller, riskier and more profitable banks tend to have higher capital ratio with insignificance relation with dividends. Sorokina et al. [9] used a sample of US banks to answer the question of why banks choose equity financing. They found that 50% of the banks hold equity capital above the regulatory required minimum. Moreover, the determinants size, risk, collateral and dividends are significantly having positive impact on leverage. The profitability is significant and has negative impact on leverage. AL-Mutairi and Naser [10] studied 47 commercial banks in the GCC countries to identify the determinants of capital structure. The size, profitability and tangibility negatively are correlated to capital structure and positively significant with age and growth. These results showed to be supported with pecking order theory neglecting the tangibility and partially explain agency cost theory. Jouida and Hallara [11] used a sample of 172 French commercial banks to study the regulated and unregulated capital structure from the period of 2002 till 2012 using GMM. They indicate that size, risk and loan loss reserves have positive impact on regulatory capital while the profitability has negative impact.

Moreover, Sha'ban et al. [12] used a sample of 149 European commercial banks over the period 2005-2014 to extend Gropp and Heider [8] which approved also that firm' specific determinants can explain the bank capital structure decisions. They promoted financial crisis as well as euro sovereign debt crisis which tend to have negative impact on capital structure. However, their main determinants which perfectly explain the capital structure are size and risk. Therefore, this study investigates the determinants of the capital structure in Islamic and conventional banks in the Gulf Cooperation Council (GCC) countries and evaluates the regulatory capital for the Islamic and conventional banks with both models from the period of 2007-2017.

METHODOLOGY

In this study, the two main dependent variables used to measure the bank's capital structure are regulatory capital and capital structure. While the independent variables are classified into bank-specific factors such as size, profitability, liquidity, loan loss reserves and risk. The other factors relating to the impact of macroeconomic factors on capital structure such as GDP growth rate and financial crisis as dummy variable. To build the model, some criterion need to be met and econometrics issues to be solved to insure the validity of results.

Data and models examination

1.1.1 Stationarity

Stationarity relates to the time series and this can lead to inaccurate results after regress the OLS. To detect this, the model of Levin, Lin, and Chu [13] is used in this study for panel data to discover the time series whether contains a unit root or not. Based on the results, all variables are stationary at level by rejecting the null hypothesis which is the presence of unit root test. So, variables are stationary based on the LLC model as illustrated in Table 1.

Table 1. Coefficients of the variables from unit root test for the two models

Variables	**First model**			Variables	**Second model**		
	All bank	Islamic bank	Conv. bank		All bank	Islamic bank	Conv. bank
R_CAP	-0.97	-0.59	-0.99	CAP	-0.38	-0.34	-0.39
SIZ	-0.08	-0.11	-0.06	SIZ	-0.08	-0.09	-0.08
ROA	-0.52	-0.53	-0.48	ROA	-0.77	-0.54	-0.80
LIQ	-0.68	-	-	LI	-	-	-

		0.67	0.73	Q	0.73	0.76	0.70
LLR	-0.45	-0.59	0.40	LLR	-0.54	-0.66	-0.50
RISK	-0.69	-0.84	-0.51	RISK	-0.61	-0.77	-0.40

Autocorrelation

Autocorrelation should be considered to be aligning which states that all error terms should not be correlated. Autocorrelation may exist in time series dimension as this study used balanced panel data so the error in one period may affect in the next period. To check the autocorrelation, Breusch–Godfrey LM test used in this study and it resulted in rejecting the null hypothesis which stated that there is a correlation between the error terms.

Heteroskedasticity

One of the ordinary least square's assumptions is that all error terms should have the same variance. In case of heteroskedasticity, inconstant variance for the error terms will lead to incorrect estimations. Therefore, to detect this, heteroskedasticity test was conducted [14]. Based on the test, it implied rejecting the null hypothesis which states that residuals are homoscedastic. To control this problem and avoid inefficient estimators, White's heteroskedasticity-corrected standard error has been reported with the results.

Fixed effect regression

Fixed – random effect model suggested to be used in the panel data to analyse the impact of the variables differ over time. In other words, this model makes the intercept to be varying for each bank with constant coefficient for all banks. As stated by Lemmon et al. [15], OLS regression is inadequate and sufficient alone, thus, fixed effect should be implementing to have significantly higher estimations. Hausman [16] test has been used to decide whether fixed or random more appropriate for the model to explain the results. The obtained test results indicate rejecting the null hypothesis which states that that random effect is appropriate than fixed effect except for the Islamic banks panel data. However, Asteriou and Hall [14] generalized that fixed effect will work more efficient when the panel data is balanced as the case of this study. Thus, this study employed fixed effect.

Ordinary least square (OLS)

This study used ordinary least square model in analysing the determinants of regulatory capital and capital structure. Moreover, OLS applied align with fixed effect regressions to prevent the biasness of the regressions and white-

heteroskedasticity to solve the heteroscedastic issues in the model. This study follows the literature and use OLS and fixed effect model as Alzomaia [7], Sorokina et al. [9] and Al-Ajmi [17].

Regressions structure

This study used panel data to gather cross sectional data with time series. Baltagi [18], states that panel data has several advantages against such as it can control the heterogeneity, and unlike the time series data, they are less likely to face problems of autocorrelation and multicollinearity issues. The objective is to investigate the bank-specific determinants such as size, profitability, liquidity, loan loss reserves and risk. The GDP and financial crisis defined as macroeconomic determinants of the regulatory capital as well as on the capital structure. Both models implemented on Islamic and conventional banks in GCC countries.

First model – regulatory capital

$$R\_CAP_{i,t} = \beta 0 + \beta 1SIZ_{i,t} + \beta 2ROA_{i,t} + \beta 3LIQ_{i,t} + \beta 4LLR_{i,t} + \beta 5RISK_{i,t} + \beta 6GDP_{i,t} + \beta 7D\_CRISIS_{i,t+} \beta 8R\_CAP_{i,t-1} + \varepsilon i,t$$

Where $R\_CAP_{i,t}$= regulatory capital for the bank i at time t, $SIZ_{i,t}$ = the size of the bank i at time t, $LIQ_{i,t}$ = the liquidity for the bank i at time t, $LLR_{i,t}$ = loan loss reserves for the bank i at time t, $RISK_{i,t}$ = the bank' risk at time t, $GDP_{i,t}$ = GDP growth rate, D_CRISIS = financial crisis and $R\_CAP_{i,t-1}$ = lagged one year regulatory capital for the bank i.

Second model – capital structure

$$CAP_{i,t} = \beta 0 + \beta 1SIZ_{i,t} + \beta 2ROA_{i,t} + \beta 3LIQ_{i,t} + \beta 4LLR_{i,t} + \beta 5RISK_{i,t} + \beta 6GDP_{i,t} + \beta 7D\_CRISIS_{i,t+} \beta 8CAP_{i,t-1} + \varepsilon i,t$$

Where $CAP_{i,t}$= capital structure for the bank i at time t, $SIZ_{i,t}$ = the size of the bank i at time t, $LIQ_{i,t}$ = the liquidity for the bank i at time t, $LLR_{i,t}$ = loan loss reserves for the bank i at time t, $RISK_{i,t}$ = the bank' risk at time t, $GDP_{i,t}$ = GDP growth rate, D_CRISIS = financial crisis and $CAP_{i,t-1}$ = lagged one year capital structure for the bank i.

RESULT AND DISCUSSION

The ordinary least square OLS used align with fixed effect panel regression method. The obtained results indicate that fixed effect is better than random effect. The adjusted $R2$ in all banks for regulatory capital 19.56% and for capital structure is 81.6%. These values indicate that the selected independent variables in the models can explain the regulatory capital and capital structure in the GCC countries.

Regressions results

Bank – specific determinants

In regressing OLS with fixed effect, the results are summarized in Table 2 and Table 3. Table 2 shows the impact of size, profitability, liquidity, loan loss reserves, risk, GDP and financial crisis on regulatory Capital. While, Table 3 shows the second model of the study. Durbin–Watson statistics values close to 2 implying the absence of autocorrelation issue. Also, the R2 indicates that the selected independent variables can significantly explain the model.

Table 2. The summary of regression results for the determinants of regulatory capital for all banks, Islamic banks and conventional banks in GCC countries respectively

Variable	**Panel A**	**Panel B**	**Panel C**
	All banks	**Islamic Banks**	**Conventional banks**
Constant	7.4097	-5.4476	0.8173
	(0.2992)	(0.6123)	(0.9522)
SIZ	0.2481	1.4857	0.6624
	(0.6662)	(0.1657)	(0.5151)
ROA	0.4787	0.0676	0.9816
	(0.0105)**	(0.8052)	(0.0015)***
LIQ	-0.0116	0.0126	-0.0741
	(0.6417)	(0.4748)	(0.0065)***
LLR	0.0811	-0.0569	0.1825
	(0.3795)	(0.7048)	(0.0827)*
RISK	-0.0009	-0.0723	0.1433
	(0.9861)	(0.0935)*	(0.0231)**
GDP	-0.0337	0.1200	-0.0944
	(0.0355)**	(0.0301)**	(0.0573)**
D_CRISIS	-1.4316	-1.5722	-1.7183
	(0.0000)***	(0.0365)**	(0.0001)***
R_CAPt−1	0.3647	0.4841	0.2239
	(0.0000)***	(0.0000)***	(0.0260)**
R2	0.5842	0.6093	0.6271
Adjusted R2	0.5235	0.5178	0.5665
F statistics	9.6234	6.6547	10.3583
	(0.0000)	(0.0000)	(0.0000)
Durbin-Watson statistics	1.9034	2.0967	1.7787

P-value between brackets. ***, **, * represent significance level at 1%, 5% and 10%, respectively.

Table 3. The summary of the regression results of the determinants of capital structure for all banks, Islamic banks and conventional in GCC countries respectively

Variable	Panel A	Panel B	Panel C
	All banks	Islamic Banks	Conventional banks
Constant	20.4546	18.9889	16.1246
	(0.0000)***	(0.0345)**	(0.0001)***
SIZ	-1.5625	-1.2724	-1.3042
	(0.0000)***	(0.1524)	(0.0006)***
ROA	0.7084	0.6283	0.6859
	(0.0000)***	(0.0006)***	(0.0000)***
LIQ	0.0338	0.0334	0.0344
	(0.0000)***	(0.0535)*	(0.0002)***
LLR	0.1012	0.1162	0.1032
	(0.0052)**	(0.0383)**	(0.0352)**
RISK	-0.0316	-0.0543	0.0039
	(0.167)	(0.1375)	(0.8593)
GDP	-0.0106	-0.0179	-0.0147
	(0.1789)	(0.4779)	(0.1593)
D_CRISIS	-1.8885	-0.2591	-2.2834
	(0.0000)***	(0.6069)	(0.0000)***
CAP_{t-1}	0.5202	0.5205	0.4780
	(0.0000)***	(0.0000)***	(0.0000)***
R2	0.9042	0.8826	0.9023
Adjusted R2	0.8917	0.8603	0.8889
F statistics	72.3268	39.5866	67.1754
	(0.0000)	(0.0000)	(0.0000)
Durbin-Watson statistics	1.6938	1.8989	1.5980

P-value between brackets. ***, **, * represent significance level at 1%, 5% and 10%, respectively.

Size

In first model, the regulatory capital is correlated with positive direction with size in all panels which consistent with Jouida and Hallara [11] that larger banks tend to have higher tier 1, however the size seem to be insignificant. In the other hand, size is positively significant with the capital structure for all panels except for Islamic banks. And this demonstrates that banks tend to use more external funds in terms of the size of their total assets. Another explanation that smaller the banks, the more probability of growing because of their low risk. Moreover, AL-Mutairi and Naser [10] finding implied that the correlation is negative so that larger banks utilize more external funds.

Profitability

Profitability is positively correlated with regulatory capital and capital structure but with different degrees of significance. Bitar et al. [4] implied after testing regulated and unregulated capital that profitable Islamic and conventional banks tend to depend on the retained earnings irrespective to other factors. However, another argument which implies that profitable banks have more reputation and can issues higher equity capital [12]. This finding is inconsistent with AL-Mutairi and Naser [10] who observe the negative relationship where the banks in GCC accumulate the profit and less dependence on external funds.

Liquidity

With regulatory capital in banks operating in GCC countries, liquidity found to be insignificant with negative correlation except with Islamic banks. However, with capital structure, liquidity found to significantly correlates with positive relationship. According to the pecking order theory, the positive direction between the liquidity and capital implies that banks tend to raise equity easily and this finding consistent with Bitar et al. [4].

Loan loss reserves

Loan loss reserves are statistically significant with capital structure and insignificant with the regulatory capital. Moreover, it is positively correlated with all models except with regulatory capital for Islamic banks consistent with Jouida and Hallara [11]. And this implies that banks overcome their difficult situations by raising equity but for the Islamic banks they tend to not increase their capital due to the financial difficulty.

Risk

It found to be insignificant in all models but has negative impact on regulatory capital and capital structure for all banks and Islamic banks only. Hence, this means banks with higher risk have less probability of paying back their debt which can cause the lender to ask for compensation with higher return. This finding is consistent with Bradley et al. [19] that higher volatility can expect companies to have less leverage. Moreover, AL-Mutairi and Naser [10] prove the negative relationship between the leverage and risk in GCC banks where is the risky banks having less leverage ratio. On the other hand, risk has positively impact in conventional banks with regulatory capital as well as the capital structure. It can be explained that risker banks tend to reduce their leverage under the regulatory effect, thus they can increase their capital ratio Jouida and Hallara [11].

Macroeconomic determinants

GDP growth rate

Under the regulatory capital, GDP growth rate is significant and has negative impact for all panels except for Islamic banks. This means that banks tend to lower their capital at the time of higher GDP. However, the finding of Islamic banks was unexpected but it is consistent with Bitar et al. [4] where the Islamic banks raise their capital under the economic boom and GDP is high.

Financial crisis

In different of all determinants, financial crisis found to be significant in both models with negative correlation with regulatory capital and capital structure except for regulatory capital of Islamic banks. Hence, this finding confirms the impact of the financial crisis years 2007/2008 on the capital ratios and consistent with Sha'ban et al. [12].

Regulatory capital and capital structure: Islamic and conventional banks

This study investigates the determinants of capital structure of the banking sector in GCC countries from 2007 till 2017. It used two models, one is the regulatory capital and it found that **R2** for all banks is 52% which means that the selected bank-specific and macroeconomic determinants can describe the regulatory capital and found that profitability, GDP and financial crisis are the statistically significant with regulatory capital. On the other hand, the other model implied highly **R2** which means that 89% of the selected determinants can explain the capital structure, and all the variables found to statistically significant except the risk and GDP. Moreover, the lagged one-year regulatory capital and capital structure are significant in both models so it indicates that the previous years can explain and have an impact on the regulatory capital and capital structure. The independent variables explain the regulatory capital by 60.93% based on the **R2** for Islamic banks while the capital structure Islamic banks have higher **R2** indicating 88.26%. Moreover, the profitability and liquidity have positive correlation with both regulatory capital and capital structure. in meanwhile, the risk has negative correlation indicating that more risky banks tend to lower their capital ratios. For the conventional banks, the independent variables of regulatory capital managed to explain 62.71% as the result of **R2**. While the **R2** for capital structure has high **R2** of 90.23%. The findings of the conventional banks indicate that riskier and more profitable banks tend to have higher capital ratio consistent with Gropp and Heider [20].

CONCLUSION

This study employs two models to observe the decision mix of capital structure of the GCC's banking sector. It utilized a sample from the period 2007 till 2017 of 26 Islamic banks and 52 conventional banks. Accordingly, the study applied OLS with fixed effect regression to examine the impact of bank-specific and macroeconomic factors on both the regulatory capital and capital structure. In details, the bank-specific factors are size, profitability, liquidity, loan loss reserves and bank risk with macroeconomic factors GDP

and financial crisis. The findings align with the study of Bitar et al. [4] concludes that more profitable and liquid banks tend to raise more capital and have higher capital ratios. Also the findings of this study align with Jouida and Hallara [11] that larger banks have higher tier 1, and more risky banks reduce their capital ratio under the regulatory decisions. Moreover, the results show the impact of financial crisis on the regulatory capital as well as capital structure and it implies the significant impact on the both.

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