

Effects of Banks' Free Capital on Performance in Light of the 2008 Financial Crisis: Evidence from the GCC Region

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Abstract

The purpose of this paper is to investigate the validity of the free cash to risk assets ratio (FCRAR) to predict some bank performance indicators, including, but not limited to, risk and return. This is a proposed alternative to the Basel accords' capital adequacy measure which failed to predict bank insolvency, especially at times of economic downturn. Data were collected for the banking industry in the Gulf Cooperation Council of Arab Countries (GCC) region for the period from 2004-2013 to study the effect before and after the 2008 global financial crisis. Nonparametric mean rank tests and general linear model (GLM) with panel regression were used to investigate the predictability power of the proposed capital adequacy ratio. Our results provided evidence of FCRAR ability to predict changes, with the expected signs, for all bank performance indicators, before and after the crisis, except for the overall bank risk. As a result, we call upon scholars to keep the quest for a better capital adequacy measure that can monitor and predict bank insolvency. Bankers are advised to strive to strengthen their capital positions and not to depend totally on regulators-proposed measures to be able to prevent financial distress. The originality of this paper is drawn from the wider data covering a whole region of countries and the newly proposed alternative of capital adequacy measure.

Keywords: Capital adequacy; Basel accords; Financial solvency; Financial crisis; GCC banks

Introduction

International and national regulators consider bank capital as the first defensive shelter against insolvency in case of financial downturns. Since the Basel I accord in 1988, capital adequacy ratio (CAR), defined, as the percentage of capital to risky assets, has been a subject of utmost concern to practitioners and researchers. Ever since that time, regulators were concerned that CAR may not be enough to provide the proper protection against credit risk, hence, the propositions of Basel II accord in 2004 and Basel III accord introduced in 2013-2105. Major financial downturns (i.e., the Asia financial crisis in 1997 and the latest global financial crisis in 2008) have proved the seriousness of that concern.

Acknowledging the importance of capital, researchers have strived to investigate the validity of CAR as a measure to guard against bank insolvency. Different causal models were proposed. Some, used CAR as a dependent variable affected by various explanatory variables. Others, albeit more, have used it as the explanatory variable explaining the variability in some independent variables representing riskiness, profitability, etc. Some research attempts questioned the validity of the ratio to serve its purpose. The research outcome has been inconclusive. Fitch Ratings [1] argued that although banks may meet the minimum required CAR, they may well be undercapitalized due to many reasons not considered by that measure. Some studies have suggested different approaches to measure capital adequacy. One interesting measure is the bank free capital to risk assets ratio (FCRAR). Many researchers believe it is a more appropriate measure of bank capital adequacy.

In this paper, we focus on FCRAR, defined as the level of equity less fixed assets divided by the sum of investment, deposits, loans and off-balance sheet items, to investigate its effect on some performance indicators. We target the conventional banks operating in the six countries of the Gulf Cooperation Council of Arab Countries (GCC) region. We believe this is the first attempt to investigate the effect of FCRAR on bank performance in this region. We also believe it is important to understand how bank free capital, in this region, has changed in response to the 2008 financial crisis. A deeper analysis of

how it affected the various performance indicators before and after the crisis should add an important contribution to the existing body of knowledge, especially for this region.

In the next section, we review the relevant literature on capital adequacy with the objectives of identifying the proper variables to be investigated and developing the research hypotheses. This should be the proper end of the literature discussion before moving forward to the methodology section where we discuss the scope of the research, the nature of the data selected and methodology. That is followed by a section on the results discussion where we present and discuss the outcomes of our tests and model estimations. The paper ends with the conclusion section where we summarize the study and findings then discuss the possible implications and recommendations.

Literature Review

Ever since the introduction of Basel I accord in 1988, consultants and researchers have been busy investigating the validity of CAR as an indicator of bank solvency. Like any business organization, banks exist to maximize the value of their shareholders. This goal is always related to two main elements; profit which is the driver of value maximization and risk which is a driver of solvency when low and a driver of higher returns when high. The main concern of the capital adequacy regulation is to monitor the level of risk which should not exceed a certain limit. This regulation suggests that banks face credit solvency risk when they fail to satisfy the capital adequacy ratio. Given the risk

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Received September 25, 2017; Accepted September 28, 2017; Published September 30, 2017

Citation: Aldeehani TM, Alghanem TT (2017) Effects of Banks' Free Capital on Performance in Light of the 2008 Financial Crisis: Evidence from the GCC Region. J Bus Fin Aff 6: 288. doi: [10.4172/2167-0234.1000288](https://doi.org/10.4172/2167-0234.1000288)

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and return rule, lowering bank risks limits their ability to generate enough profit to achieve the goal of value maximization. The amount of research that investigated the various elements associated with CAR is vast. However, based on the cause and effect modeling, one can identify two main strands of research.

The first strand deals with the proposed CAR as an explanatory variable and investigates its effect on various performance indicators including, but not limited to, risk and return. Calem and Rob [2], for example, were the first to study the impact of Basel I regulation on risk taking and found that the higher the capital of the bank the more risk it will take. Gomez-Gonzalez and Kiefer [3] provided evidence of the validity of CAR to explain bank failure. The effect of capital adequacy requirement on bank risk was also studied by Blum [4]. He argued that "the only possibility to increase equity tomorrow is to increase risk today." Zhang et al. [5] found evidence of a reduced bank portfolio risk resulting from the increase of capital ratio. This result was supported by Bouheni and Rachdi [6] for Tunisian banks. However, an investigation, done by Basher et al. [7], of the same relationship for Islamic banks provided a disputing result. In their study of Islamic banking industry in the GCC region, they provided evidence of increased levels of asset risk as a consequence of the increased capital. Ajlouni et al. [8] investigated the effect of CAR on the overall efficiency of Jordanian banks. They concluded that higher capital adequacy ratio tends to cause less efficiency and less profit. Demirgus-Kunt et al. [9] of the IMF investigated the effect of capital position on stock returns during the 2008 financial crisis. Their results indicate that better stock market returns of banks were associated with stronger capital positions. The effect of this financial crisis on the relationship between bank capital and performance was also explored by Berger and Bouwman [10]. They found that capital does help small banks to improve profitability and chances of survival. The impact of capital on profitability and risk in Asian banking industry was explored by Lee and Hsieh [11]. They found a significant association (albeit variable) between capital and profitability/risk in countries with different levels of income. These findings were supported by Kapan and Minoiu [12] who found that banks with ex-ante higher levels of equity were more resilient during the crisis.

Despite the little inconsistency of the results, the main conclusion of this strand of research is that the capital adequacy ratio (as an explanatory variable) does help in reducing the overall risk of banks but does little help in improving profitability and overall efficiency.

The second strand of research deals with CAR as a dependent variable investigating the effects of various determining variables. One example is the work of Raharjo et al. [13]. In their study of the determinants of the capital ratio in the Indonesian banking industry, they identified several significant determinants of the capital ratio including bank size, the level of equity to liabilities, non-performing loans, interest rate risk and operating cost to operating revenue. Gharbi and Halioui [14] explored the effect of fair value on capital adequacy ratio for Islamic and conventional banks in the GCC region. They concluded that CAR of Islamic banks was less affected by fair value than conventional banks. The value was found to be a determinant of capital adequacy. Ownership structure was examined by Zheng et al. [15] and found to be a determinant of capital. Lotto [16] investigated the effect of the increased risk on capital requirements variability for the Tanzanian banking industry and found a positive causal relationship. The effect of regulatory pressures representing banks size, profit, bad loans and ownership structure, during the 2008 crisis, on the capital level was examined by Wang et al. [17]. They concluded that regulatory

pressures had a significant negative effect on the level of bank capital in China.

The conclusion of this strand of research is that, although statistical evidence was provided to establish a causal model of capital adequacy being a dependent variable, we believe it is missing the point. The capital adequacy regulation was established as a stabilizing measure of, mainly, bank risk and return. Technically, we know how it should be calculated, and it must be calculated as proposed, regardless of the how it is affected. What is more important is to investigate its impact on the elements it was set to stabilize, that is risk and return. We strongly believe that modeling the cause and effect of this topic should consider capital adequacy as the main explanatory variable.

Another strand of research has questioned the validity of CAR and suggested alternative measures of bank capital adequacy. Furlong and Keeley [18] were the first to question the validity of the Basel I proposed CAR. In their theoretical examination, they argued that for "a value maximizing bank, the incentive to increase asset risk decline as its capital increases" and cautioned against the reduction of liability of "the deposit insurance system." In their analysis of the effect of bank capital regulation on risk taking, Milne and Whalley [19] argue that the Basel proposed CAR has no long term effect on bank risk taking. They further argued that incentives of banks to take risk depend on the free capital rather than the total level of capital. The free capital was also suggested, as a capital adequacy measure by banking consultants like Thompson et al. of Fitch Ratings and Invictus [1,20,21].

Demirgus-Kunt et al. [9], cited earlier, suggested that the risk-adjusted capital ratio may be irrelevant in measuring the relationship between stock returns and capital positions. They suggested the use of leverage ratio.

The GCC region, known for a mixed concentration of Islamic and conventional banking, has attracted research attempts to investigate capital adequacy. The cause and effect modeling provided by this strand of research is also mixed. Zhang et al [5] used CAR as an explanatory variable and examined its impact on risk-taking behavior. The ratio was found to be a determinant of risk-taking behavior. Sairi [22] has examined the relationship between efficiency and bank capitalization of conventional and Islamic banks in the GCC region. Among other results, they provided evidence of a positive association between cost/profit efficiency and bank capitalization. Gharbi and Halioui [14] on the other hand, used CAR as a dependent variable. They explored the effect of fair value on capital adequacy ratio for Islamic and conventional banks in the GCC region and concluded that the capital adequacy of Islamic banks was less affected by fair value than conventional banks. Zheng et al. [15] investigated the effect of ownership structure on capital and risk and found a positive association. Basher et al. [7] studied the effect of increased capital of Islamic banks in the GCC region on risk and stability. They found some evidence of the effect of the increased capital on the level of assets risks. The ability of the GCC banks to comply with Basel III capital requirement accord was examined by Al-Hares et al. [23]. The general conclusion of this study is that the banking industry of this region appears in a strong position to comply with the accord that will implement in 2019. Altaee et al. [24] came up with a similar conclusion for the banking industry for the same region.

From the above discussion on the relevant literature, we conclude that

1. A causal model with capital adequacy being the main explanatory variable is more appropriate.

- The effects of the Basel-proposed CAR on the various performance indicators including, but not limited to, risk and return, are mixed.
- Proposed alternatives of Basel-CAR, such as the free capital to risky assets, deserve further investigation.
- The theoretical effect of any measure of capital adequacy on bank performance reflects a trade-off between risk and return.

Methodology

Following our conclusion of the literature on bank capital adequacy measure, we intend to investigate the effect of the FCRAR on some performance indicators of the conventional banking industry in GCC region. We selected FCRAR as our main explanatory variable of the causal model. In the year 2002, and before the introduction of Basel III accord, Fitch Ratings has suggested that “free capital is one of the most important analytical tools in determining capital adequacy”. This was reaffirmed by Invictus [21] who describes FCRAR as a “key metric fundamental to the new regulatory philosophy”. For this research, we adopt the FCRAR proposed by the Institute of Banking Studies in Kuwait as the main explanatory variable calculated as

$$FCRAR = \frac{E - FA}{Inv + dep + loans + OBI} \quad (1)$$

Where FCRAR is the free capital to risk assets, E is equity funds, FA is fixed assets, Ins is investments, dep is deposits and OBI is the off-balance sheet items.

Based on the discussed literature, we elected four performance indicators representing, bank size, operations, the level of deposits, and risks. Variables representing these variables are the natural logarithm of assets, deposits to total assets, return on assets and risk index. The latter is calculated as

$$RI = \left(\frac{ROA + E / A}{\sigma_{ROA}} \right) \quad (2)$$

Following earlier research, we adopt equation (2) which was used by Aldeehani [25]. RI in equation (2) is the risk index, ROA is the percentage rate of return on total assets, E/A is the percentage of total equity to total assets and σ_{ROA} is the standard deviation of the rate of return on total assets. The higher the score of RI the lower the overall level of bank risk.

Building on the conclusion of the reviewed literature and the above-identified variables, the following research hypotheses are developed:

H_a 1: The means (mean ranks) of all performance indicators before and after the 2008 financial crisis are different.

H_a 2: Based on the whole period, the FCRAR has a significant effect on all performance indicators.

H_a 3: Based on the whole period, the status of the economy has a significant effect on all performance indicators.

H_a 4: Based on the pre-crisis data, the FCRAR has a significant effect on all performance indicators.

H_a 5: Based on the post-crisis data, the FCRAR has a significant effect on all performance indicators.

To test these hypotheses, fundamental data, for 32 conventional banks in the GCC region, was collected through IBS Bayanati system for ten years covering the period from 2004 to 2013. We selected the

years from 2004-2008 as the before crisis period (representing times of economic stability) and the years 2009-2013 as the after crisis period (representing times of financial downturn). Data are organized as a strongly balanced panel data.

We adopt two main methods. First, we test the significance of differences in all the variables. The outcome of this test is important for the decision to establish our causal models which represent our second method. If differences exist, then it would be more appropriate to take our investigation further covering the periods before and after the 2008 financial crisis. To decide on which method to use for mean differences testing, we start with the normality test. If normality is accepted then the t-test is used. Otherwise, the nonparametric Kruskal-Wallis is the more appropriate test. For our causal model, the data collected for this paper dictate a linear panel regression method. However, for this type of methodology, we should be concerned with five potential problems. These problems are normality assumption, stationarity of data, the autocorrelation of error, constant error variance and multi-co-linearity of explanatory variables. To overcome the violation of normality assumption, we apply the generalized linear model (GLM) for its flexible generalization to allow for variables that have error distribution models other than a normal distribution. To check for data stationarity, the unit root test will be used. To take care of the problems of autocorrelation and constant variance of errors, the robust standard error is used instead of the regular standard error. Multi-co-linearity should not be of a concern as we will be using only FCRAR as the only explanatory variable for all our causal models.

Test for mean differences in the variables

To decide on which method to use, we start with the normality test. Table 1 exhibits the outcome of this test.

The results in Table 1 reject the null hypothesis of normality as indicated by significant values of Kolmogorov-Smirnov test and Shapiro-Wilk test. These results command the use of the nonparametric mean-rank test of Kruskal-Wallis. The results of the mean ranking tests based on the status of the economy (before crisis versus after the crisis) are illustrated in Tables 2 and 3.

Table 3 indicates that the only variable found to have insignificant mean rank is deposits to total assets which represent the main operation of banks. The mean rank of the other four variables before and after the crisis was found to be significantly different. From Table 2, we notice that the free cash to risk asset ratio is higher after the crisis which may explain the effort made by local regulators resulting from the crisis pressures to assure bank solvency. This is supported by the significant increase in banks assets after the crisis to assure bank safety after the crisis. A clear consequence of the increase of capital is the decrease (albeit insignificant) in the rate of return on total assets. The risk index was found to be significantly lower after the crisis indicating higher overall banks' risks. This is also a logical result of the significant increase in banks assets.

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
FCRAR	.204	320	.000	.745	320	.000***
lnA	.084	320	.000	.973	320	.000***
DPtoA	.209	320	.000	.704	320	.000***
RtoA	.138	320	.000	.788	320	.000***
RI	.122	320	.000	.834	320	.000***

***Significant at the 1% level.

Table 1: Normality tests.

	Status	N	Mean Rank
FCRAR	Before Crisis	160	141.66
	After Crisis	160	179.34
	Total	320	
InA	Before Crisis	160	136.52
	After Crisis	160	184.48
	Total	320	
DPtoA	Before Crisis	160	165.04
	After Crisis	160	155.96
	Total	320	
RtoA	Before Crisis	160	204.24
	After Crisis	160	116.76
	Total	320	
RI	Before Crisis	160	173.43
	After Crisis	160	147.57
	Total	320	

Table 2: Mean ranks of all variables.

	FCRAR	InA	DPtoA	RtoA	RI
Chi-Square	13.265	21.499	.770	71.533	6.251
df	1	1	1	1	1
Asymp. Sig.	.000	.000	.380	.000	.012

Table 3: Kruskal-Wallis tests of mean ranks.

The levels of the four performance indicator before and after the 2008 financial crisis are illustrated by the charts included in Figure 1.

The four charts included in Figure 1 provide a visual illustration of the estimated marginal means of the selected variables before and after the crisis. Clear gaps between the two curves in all the charts except for Chart b. For bank size illustrated in Chart a, all six countries of the GCC have witnessed an increase of bank size, Qatar being the highest and Bahrain being the lowest. Although insignificant, the level of deposits to assets, illustrated by Chart b, has decreased for all GCC countries except for Kuwait. Chart c shows a decrease in the return on assets which appears evident for all countries of the region. Little, but may be a significant change, in the overall level of bank risk for the region can be detected in Chart d.

Before developing our causal model, we have to take care of the potential problems we discussed earlier. The first is the stationarity of data. For this purpose, we apply the Levin-Lin-Chu unit root. Based on this test, panels are stationary if we can reject the null hypothesis that they contain unit roots. Table 4 exhibits the results of this test.

The outcome of the Levin-Lin-Chu unit root appears to reject the existence of unit roots in our panel indicating data stationery. The results of the mean rank test, unit root tests and the way our data are

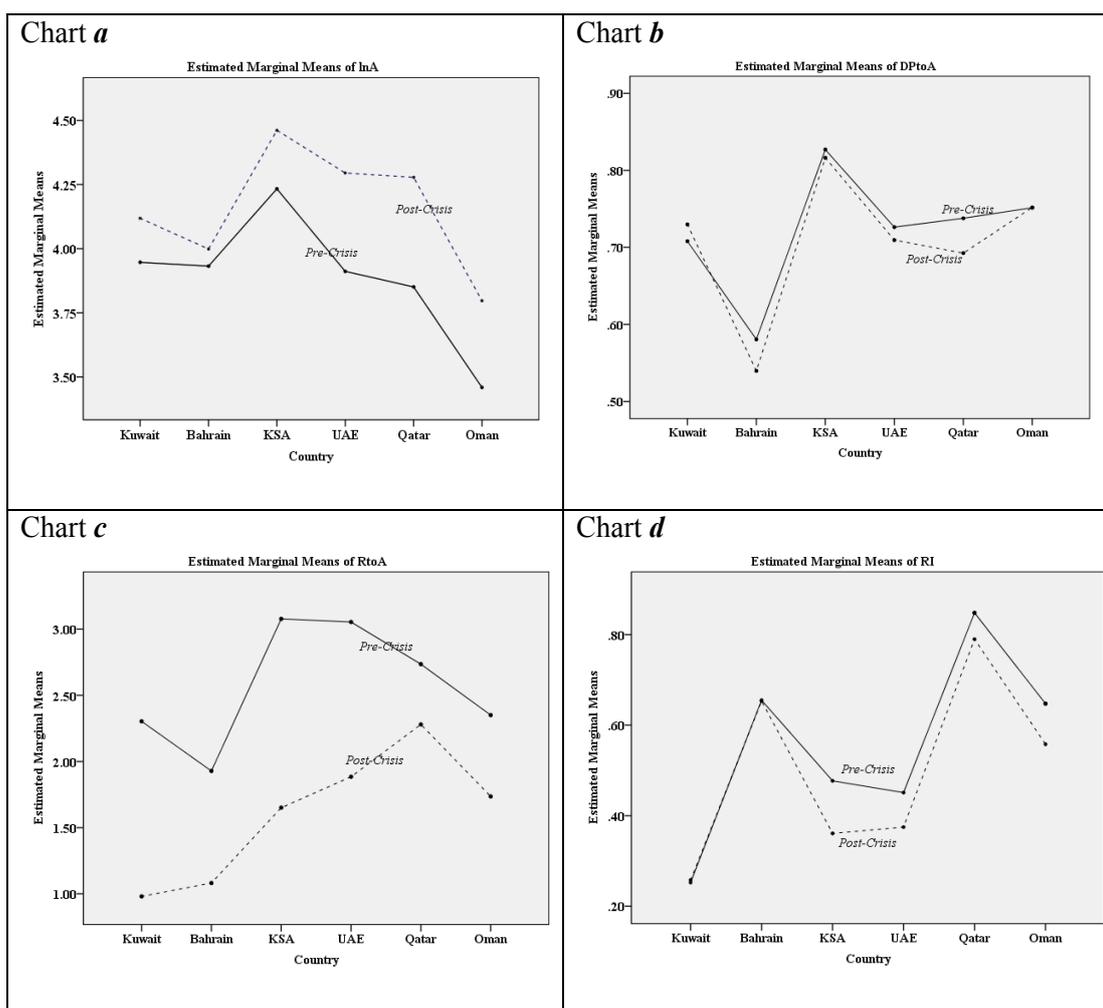


Figure 1: Estimated marginal means of performance indicators before and after crisis by country.

organized command an estimation of a GLS panel regression models to test the effect of FCRAR on lnA, DPtoA, RtoA, and RI. The model takes the form.

$$Y_{it} = \beta_{it}FCRAR_{it} + \alpha + u_{it} + \epsilon_{it} \quad (3)$$

Where Y_{it} is the individual performance indicator. i is the entity and t is time. $FCRAR_{it}$ represents the free cash to risk asset ratio. β_{it} and α are coefficients. u_{it} is the between-entity error and ϵ_{it} is the within-entity error. The model will be run to estimate the effect of FCRAR on the four performance indicators for three different sets of data. The first set of data covers the whole period of the study from 2004 to 2013. The second set of data covers the pre-crisis period from 2004 to 2008. The third set of data covers the post-crisis period from 2009 to 2013.

To test the effect of economic status in addition to FCRAR on the selected performance indicators, we rewrite equation (3) to takes the form

$$Y_{it} = \beta_{it}FCRAR_{it} + \beta_{it}status_{it} + \alpha + u_{it} + \epsilon_{it} \quad (4)$$

Where status is assigned 0 for the pre-crisis period and 1 otherwise. The results of estimating this model are presented in Table 5.

The outcome of the estimation process of equation (4) related to the effect of the free capital to risk assets ratio indicates a negative impact of FCRAR on bank size and deposits to total assets, a positive effect on profitability and no effect on the overall level of bank risks. The interpretations of these results are 1. The higher the free capital to risk assets ratio the lower the size of the bank. The logic of this result is that the increase of FCRAR dictates an increase of the numerator element of equation (1) which, mainly, represents equity or a decrease in the denominator, which represent the assets element. Therefore, the result is not unexpected. 2. The higher the free capital to risk assets ratio the lower the ratio of deposits to total assets. This is also a logical result if we remember that deposits have to be lowered for the FCRAR to increase. 3. The higher the free capital to risk assets ratio the higher the profit of the bank. The interpretation of this result is related to 1 above, exhibiting the decrease of bank size caused by the increase of FCRAR. Assuming a constant level of bank profit, a decrease in size represented by assets would lead to a decrease in the return on asset ratio. Again, this interpretation seems logical.

The outcome of the estimation process of equation (4) related to

Variable	Statistic	p-value	Status
FCRAR	-10.9809	0.0000	Stationary
lnA	-9.9384	0.0000	Stationary
Dp/A	-8.8932	0.0000	Stationary
ROA	-14.8794	0.0000	Stationary
RI	-10.7640	0.0000	Stationary

Table 4: Results of the unit root test.

Explanatory variables	Dependent variables				
	lnA	Dep/A	ROA	RI	
FCRAR	Coef.	-1.9761	-.6306	12.6438	1.1834
	Robust Std. Err.	.3650	.1149	5.5951	.9739
	Z	-5.41	-5.49	2.26	1.22
	P>Z	0.000***	0.000***	0.024**	0.224
Status	Coef.	.2705	-.0094	-1.1325	-.0636
	Robust Std. Err.	.0273	.0077	.2267	.0175
	Z	9.90	-1.23	-5.00	-3.64
	P>Z	0.000***	0.219	0.000***	0.000***

***Significant at 1% level, **significant at 5% level.

Table 5: Estimating the panel regression model for the whole period.

the effect of economic status indicates a positive effect on bank size which can be interpreted by the fact that banks had to strengthen their equity positions, hence, the size of assets following the 2008 financial crisis. However, the crisis had negative effects on profitability and risk indices. This translates to a decrease in profitability following the 2008 crisis as well as a decrease in risk index indicating higher levels of overall risks. For the later results, we would conclude that although the FCRAR had no effect on bank risk, the level of bank risk has increased as a direct result of the 2008 financial crisis. These results command further analysis and estimations by dividing the data into two groups representing the pre-crisis period and post-crisis period.

The results of estimating the GLS panel regression model for the pre-crisis period are presented in Table 6.

The cause and effect results illustrated in Table 6 are similar to those discussed in Table 5 when considering the whole period. The table indicates a negative effect of FCRAR on bank size and deposits size to total assets, a positive effect on profitability and no effect on bank overall risk level. Our arguments remain unchanged.

The results of estimating our model for the post-crisis period are presented in Table 7.

Table 7 indicates, again, a negative effect of FCRAR on bank size and deposits to total assets and no effect on bank profitability and bank risk index. Our earlier arguments still hold.

Summary of the Results

1. Based on the nonparametric test, the mean ranks of all five variables before the 2008 financial crisis were found to be significantly different from those after the crisis. This result confirms our 1st hypothesis.
2. Based on the data for the whole period, FCRAR was found to affect, negatively, bank size and deposits to assets ratio. It was found to affect, positively, bank profitability. It had no effect on overall risk of the bank. The 2nd hypothesis was confirmed for all the variables except risk.
3. Based on the data for the whole period, the status of the economy was found to have a positive effect on bank size and a negative effect on profitability and risks. It had no effect on the size of deposits to assets ratio. The results confirm the 3rd hypothesis for all the variables except the size of deposits.

Explanatory variable	Coef.	Dependent variables			
		lnA	Dep/A	ROA	RI
FCRAR	Coef.	-2.7111	-0.7353	22.5188	2.2044
	Robust Std. Err.	0.5433	0.2201	8.8388	2.0555
	Z	-4.99	-3.34	2.55	1.07
	P>Z	0.000***	0.001***	0.011**	0.284

***Significant at 1% level, **significant at 5% level.

Table 6: Results of model estimation for the pre-crisis period.

Explanatory variable	Coef.	Dependent variables			
		lnA	Dep/A	ROA	RI
FCRAR	Coef.	-1.0768	-.2767	.6282	.3807
	Robust Std. Err.	.2577	.1013	2.3201	.2745
	Z	-4.18	-2.73	0.27	1.39
	P>Z	0.000***	.006***	0.787	0.165

***Significant at 1% level.

Table 7: Results of model estimation for the post-crisis period.

Research hypotheses	FCRAR	InA Sign	Dep/A Sign	ROA Sign	RI Sign
Ha 1: The mean ranks of performance indicators before and after the crisis are different.	Supported	Supported	Supported	Supported	Supported
Ha 2: Based on the whole period, FCRAR has a significant effect on all performance indicators.	NA	Supported -	Supported -	Supported +	Not Supported
Ha 3: Based on the whole period, the status of the economy has a significant effect on all performance indicators.	NA	Supported +	Not Supported	Supported -	Supported -
Ha 4: Based on the pre-crisis data, the FCRAR has a significant effect on all performance indicators.	NA	Supported -	Supported -	Supported +	Not Supported
Ha 5: Based on the post-crisis data, the FCRAR has a significant effect on all performance indicators.	NA	Supported -	Supported -	Not Supported	Not Supported

Table 8: Summary results of hypotheses testing.

- Based on pre-crisis data, FCRAR was found to have a negative effect on bank size and deposits and a positive effect on bank profitability. The 4th hypothesis is confirmed for all the variables except for the level of overall bank risk.
- Based on the post-crisis data, FCRAR was found to have negative effects on bank size and deposits but has no effect on profitability and risk.

These summary results are illustrated in Table 8.

Conclusion, Implications and Recommendations

For almost four decades now, capital adequacy ratio, as proposed by Basel I, II, and lately III has been the primary concern of international and local bank regulators. It is considered the core measure of bank financial solvency. During this period, the world witnessed two major financial downturns. The first was in 1997 which hit the south Asian economies and the second was in 2008 which was more severe, global and still persists. In both cases, the blame was mainly on the banking industry and its regulatory system.

Researchers have strived to investigate the validity of the capital adequacy in the light of these financial crises as well as at times of economic stability. They examined CAR predictability of financial failure, its effect on bank performance and how it is affected by certain financial factors. Based on the cause-effect relationship, we classified the vast literature on CAR into two main strands of research. The first considers CAR as the cause while the second (albeit less) considers it as the effect variable. We argued that the first is the more appropriate. Some researchers argued against the validity of CAR as suggested by Basel accords. Based on its weak effectiveness in preventing bank insolvency during financial crises, we were tempted to support this argument. As such, we considered investigating the effect of free capital to risk assets ratio as proposed by some scholars for representation. We examined its impact on certain bank performance indicators before and during the 2008 global financial crisis in the GCC region.

Our method started with testing the mean differences of all the variables based on the status of the economy. Mean ranks of all the variables before and during the 2008 crisis were found to be significantly different. We then estimated our causal model in which FCRAR was the explanatory variable for three sets of data covering the whole period of the study, the pre-crisis period and the post-crisis period. The results show that, as a predictor, FCRAR was consistent in predicting the variability of bank size and deposits before and during the crisis with the same negative sign. It was also found to predict, positively, profitability during a time of stability only. The more interesting result

is that it had no predictability power towards the overall risk of the bank at all times. This particular result may undermine the argument that FCRAR is a better predictor of financial solvency of banks.

The conclusion is that, although CRA as suggested by Basel accords, is important for monitoring bank financial solvency, this paper has does not provide a better alternative to it. Therefore, we call for a continuation of research quest to find a better measure of bank financial solvency. As for practical implications, we advise banker to continue their efforts to strengthen their capital positions and not to depend totally on regulators-proposed measures to be able to prevent financial insolvency.

References

- Fitch Rating (2002) Turkish bank capital adequacy - Too little, Too late, Special report.
- Calem P, Rob R (1999) The impact of capital-based regulation on bank risk-taking. *Journal of Financial Intermediation* 8: 317-352.
- Gomez-Gonzalez J, Kiefer N (2009) Bank failure: Evidence from the Colombian, financial crisis. *The International Journal of Business and Finance Research* 3: 15-31.
- Blum J (1999) Do capital adequacy requirements reduce risks in banking? *Journal of Banking & Finance* 23: 755-771.
- Zhang Z, Jun W, Qiong-fang L (2008) Impacts of capital adequacy regulation on risk-taking behaviors of banking. *Systems Engineering-Theory and Practice* 28: 183-189.
- Bouheni FB, Rachdi H (2015) Bank capital adequacy requirements and risk-taking behavior in Tunisia: a simultaneous equations framework. *Journal of Applied Business Research* 31: 231.
- Basher SA, Kessler LM, Munkin MK (2017) Bank capital and portfolio risk among Islamic banks. *Review of Financial Economics*.
- Ajlouni M, Hmedat M, Hmedat W (2011) The relative efficiency of Jordanian banks and its determinants using data envelopment analysis. *Journal of Applied Finance & Banking* 1: 33-58.
- Demircuc-Kunt A, Detragiache E, Merrouche O (2013) Bank capital: Lessons from the financial crisis. *Journal of Money, Credit and Banking* 45: 1147-1164.
- Berger A, Bouwman C (2013) How does capital affect bank performance during financial crises? *Journal of Financial Economics* 109: 146-176.
- Lee C, Hsieh M (2013) The impact of bank capital on profitability and risk in Asian banking. *Journal of International Money and Finance* 32: 251-281.
- Kapan T, Minoiu C (2016) Balance sheet strength and bank lending: Evidence from the Global Financial Crisis. *IMF working paper*, pp: 1-37.
- Raharjo P, Hakim D, Manurung A, Maulana T (2014) Determinant of capital ratio: A panel data analysis on state-owned banks in Indonesia. *Buletin Ekonomi Moneter dan Perbankan* 16: 395-414.
- Gharbi L, Halioui KH (2014) Fair Value and Financial Instability: Comparative

-
- Study between Islamic and Conventional Banks. *International Journal of Behavioral Accounting and Finance* 4: 221-244.
15. Zheng C, Moudud-Ui-Huq S, Rahman MM, Ashraf BN (2017) The effects of ownership structure on banks' capital and risk-taking behavior: Empirical evidence from developing country. *Research in International Business and Finance*.
 16. Lotto J (2016) Efficiency of capital adequacy requirements in reducing risk-taking behavior of Tanzanian commercial banks. *Research Journal of Finance and Accounting* 7: 110-118.
 17. Wang W, Zhang D, Liu X (2015) The effect of regulatory pressure on the capital level and risk level in Chinese banks. In *Logistics, Informatics and Service Sciences (LISS), International Conference*, pp: 1-5.
 18. Furlong F, Keeley M (1989) Capital regulation and bank risk-taking: A note. *Journal of Banking & Finance* 13: 883-891.
 19. Milne A, Whalley A (2001) Bank capital regulation and incentives for risk-taking. *Cass Business School Research Paper*, pp: 1-52.
 20. Thompson E, Berker B, Scott G (2002) Turkish Bank Capital Adequacy - Too Little, Too Late. *Fitch Ratings Special Report*, pp: 1-8.
 21. Invictus (2013) *FreeCapital™: The new bank metric you should know and use*, Invictus Newsletter- Bank Insights.
 22. Srairi S (2010) Cost and profit efficiency of conventional and Islamic banks in GCC countries. *Journal of Productivity Analysis* 34: 45-62.
 23. Al-Hares OM, AbuGhazaleh NM, El-Galfy AM (2013) Financial performance and compliance with Basel III capital standards: conventional vs. Islamic banks. *Journal of Applied Business Research* 29: 1031-1048.
 24. Altaee HH A, Talo IMA, Adam MHM (2013) Testing the financial stability of banks in GCC countries: pre and post financial crisis. *International Journal of Business and Social Research* 3: 93-105.
 25. Aldeehani TM (2016) Has the risk index of Islamic banks and conventional banks in GCC countries changed in response to the 2008 Economic Crisis? *Journal of Economic and Financial Studies* 4: 20-33.