

## Impact of Basel II & III Implementation to Mitigate Bank Risk: A Study on Al-Arafah Islami Bank Limited

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### Abstract

This study has examined the implementation process, effects, outcomes, of Basel II & reforms of Basel III within the Al-Arafah Islami Bank Limited. The purpose of Basel II is to create regulation about how many capital banks need to put away to guard against the financial and operational risk. Basel III newly introduced accord provides stricter approach toward managing risk with capital in order to strengthen capital & liquidity structure of international banking system. The purpose & aim of this study is to analyze capital adequacy framework whether it is complied with the regulatory supervisions under the prescription of Bangladesh bank as well as its capability to absorb shocks arising from financial and economic stress. Published disclosures & financial statements of last five years are used to collect data. OLS regression model is used to find out the relationship between profitability and capital adequacy requirement in terms of relevant influencing variables (e.g. asset turnover, size of the firm, capital adequacy ratios). capital adequacy ratio of this bank is higher than minimum standard level. The average capital adequacy ratio (CAR) is about 13.78%. The result of regression analysis is statistically significant and there is a positive relationship between capital and return on asset (ROA). If the capital adequacy requirement is increased the return on asset (ROA) will be increased. Islamic Banking sector has some uniqueness compared to the conventional Banking sector. Products are linked with real economic activities that are why financial crisis of 2008 did not create any extreme pressure on this sector.

**Keywords:** Basel II, Credit Risk, Market Risk, Operation Risk, Basel III, Capital Conservation Buffer, Leverage Ratio, Countercyclical Buffer.

### 1. Introduction

In 2004 The Basel Committee on Banking Supervision presented a revised Framework which is commonly known as Basel II Accord due to some difficulties which are not covered by Basel I. Basel 2 rests on three pillars. Pillar 1 represents capital adequacy. The core objective of pillar 1 is that credits institutions are well capitalized. Banks have to maintain Minimum capital requirement (MCR) 10% of total Risk-weighted assets.

Banks with capital more than 10% are considered as well capitalized banks. 8 percent indicates undercapitalized and & 5% means significantly undercapitalized. Pillar 2 is the firm review of capital adequacy as well as prudential supervision by national authorities. And pillar 3 is an active use of market discipline to support reliable financial disclosure. Basel 2 addresses credit risk, market risk, and operational risk. The bank must reassure the capital adequacy for every one of their exposures along these three lines of risk.

Credit risk: credit risk arises when the counterparty will fail to meet the obligations on the agreed terms. Credit risk basically deals with transaction risk and portfolio risk. There are two types of approaches for evaluating credit risk say, standardized approach and internal rating based approach.

Market risk: Market risk is the risk arising from the adverse movements in market price. For instance: interest rate risk, foreign exchange risk. Standardized approach & internal models approach are used for assessing market risk.

Operational risk: Failure of the operating system in the bank due to certain reasons say fraudulent activities, natural disaster, human error, sabotage etc. there are three types of approaches (basic indicator, standardized and advanced measurement approach) are used for assessing operational risk.

## 2. Literature Review

As said by Van Roy (2005) Banks hold better knowledge, measure & control of sophisticated risks they face with the inception of Basel II. Basic risks that fall under these are credit risks, operational risks, and market risks. There are various levels of complexity in the calculation because of defined. Operation risks use basic indicator approach while market risk adopts value at risk (VAR). Managing minimum capital requirement most Banks have adopted the standardized approach to credit risks. A Survey conducted by (KPMZ 2003) found that 38% of banks of 294 were restoring to the standardized approach. Some banks have their own internal rating based approach for assessing risks. He further clarifies that different credit agencies provide different rating none of the percentages has gone beyond 10%.

Stigler (1971) and Beck et al. (2006) provided the view that supervisors vested with stronger powers to supervise banking activity can improve the corporate governance of banking institutions reduce corruption in bank lending activity. However, Becker et al, (1983) argued that supervisors are more concern for their own welfare rather than social welfare. DjanKov et al. (2006) found that politicians negatively influence the bank's lending system. Fernandez Gonzalez (2005) found that countries that have low or weaker accounting & auditing system tend to have productive banking supervision & sound banking system.

Abijit Sarkar and L H Bhole (2008) found that in developing countries it is used as a yardstick to upholding better banking regulations that ensure the financial & operational soundness of the banking system. He further clarified that effective market discipline has the potential to reinforce minimum capital standards. David Vanasse (2007) examines that disclosure and market discipline pillar is only useful for developing countries. It does not meet complex issues of advanced countries.

Chabanel (2011) observes that implementation of Basel III creates challenges & opportunities for the Banking industry. According to his conclusion, it builds a strong basis for further development within the banking industry and it provides assurance to overcome difficulties of past. According to research conducted by Aliaga-Diaz, Olivero and (2011) analyzed macroeconomic effects of anti-cyclical bank capital requirements such as the countercyclical buffer of Basel III & it is expected to reduce consumption volatility by some 4% to 5%.

Gauthier et al. (2010) explained a stress testing model to engender loss distributions under severe but plausible scenarios. Losses arise from systematic spillover effects, either from counter-party exposures in the interbank

markets or market to the market value of bank's portfolios. Meanwhile, Miles et al. (2011) described an assumed probability distribution for changes in annual GDP to calculate the probability of banking crisis.

Ahmed et al. (2015) found that there is a significant relationship between capital adequacy ratio and the profitability of commercial banks of Bangladesh & higher capital adequacy rate ensures higher profitability.

### 3. Objectives of the Research

This paper examines both Basel II & III accords, reviews the implications of the accords for the banking system in Bangladesh particularly (Al-Arafah Islami bank limited). Some other objectives:

- To review both Basel II & III accords and identify the three basic pillars.
- To enumerate the key proposals of Basel III and its impact on financial performance of Al-Arafah Islami bank limited.
- To identify the changes brought in Basel III and to assess the impact of improved capital requirement.
- Is there any relationship between capital adequacy requirement and banks profitability?

### 4. Research Methodology

This paper has adopted secondary data from website, and publications of Bangladesh bank and different types of journals and articles. Data for this study also collected from the financial statements of Al-Arafah Islami Bank limited. For quantitative analysis, EViews 9 version is used with 95 percent confidence level is taken into consideration.

### 5. Data Analysis and Interpretation

#### 5.1 Capital Base

Basel- II accord represents three-Tier capital concept with a view to complying with the requirements which are set to encourage the banks to support their capital positions considering their risk. Tier-1 capital is reliable than tier-2. Tier –III (additional supplementary capital) is considered only for market risk.

##### 5.1.1 New features in BaselIII

###### ▪ Supplementing the Risk-Based Capital Requirement with a Leverage Ratio

One of the core features of the crisis was the build-up of excessive on and off-balance sheet leverage in the banking industry. In many cases bank made excessive leverage while still showing strong risk-based capital ratios. Thus there were a downward pressure on asset prices, a decline in bank capital and contraction in credit availability. Under Basel, 3 leverage ratios have been introduced to constrain leverage & additional safeguard against model risk and measurement error by supplementing the risk-based measure.

###### ▪ Reduction Procyclicality and Promoting Countercyclical Buffers

The propensity of market participants to act in a procyclical manner has been amplified through a variety of channels, as well as accounting standards for both market to market assets and held to maturity loans. A number of measures have been taken to address reducing cyclicality of the minimum capital requirement, forward-looking provisions, conserving capital to build buffers.

###### ▪ Addressing Systematic Risk and Interconnectedness

The recent global crisis has added the magnitude of interconnectedness as a key dimension of systemic risk. The Basel committee designed a scheme comprising both qualitative and quantitative indicators to assess the systematic importance of financial institutions at a global and domestic level. Some effective points say capital incentives, a higher capital requirement for trading and derivative activities, higher capital requirements for inter-financial exposures, liquidity requirement that penalize excessive reliance on short-term interbank funding to support longer-dated assets.

### 5.2 Global Liquidity Standard

A strong liquidity standard has been designed by Basel committee to ensure a sound competitiveness & stability in the banking sector. The committee in 2008 published principles for sound liquidity risk management and supervision. The committee developed two minimum standards named liquidity coverage ratio (LCR) & the net stable funding ratio (NSFR). The liquidity coverage ratio indicates that bank should hold highly liquid assets to meet a short-term obligation. High quality liquid assets can be converted into cash within 30 calendar days. The main objective of NSFR is to limit over-reliance on short-term wholesale funding assessment of liquidity risk across all on and off-balance sheet items.

### 5.3 Capital Conservation Buffer

Banks are required to maintain a capital conservation buffer of 2.5% above the regulatory minimum capital requirement of 10%, comprised of common equity tier 1 capital. Banks should not distribute dividends or bonuses in case capital levels falls within the range.

Table 1: phase-in arrangements for Basel 3 implementation in Bangladesh

	2015	2016	2017	2018	2019
Minimum common Equity Tier 1 (CET1) capital Ratio	4.50%	4.50%	4.50%	4.50%	4.50%
Capital conservation Buffer	-	.625%	1.25%	1.875%	2.50%
Minimum CET1 plus capital conservation buffer	4.50%	5.125%	5.75%	6.375%	7.00%
Minimum total capital ratio	5.50%	5.50%	6.00%	6.00%	6.00%
Minimum capital plus capital conservation buffer	10.00%	10.00%	10.00%	10.00%	10.00%
Phase-in of deductions from CET1					
Excess investment over 10% of a bank's equity in the equity of banking financial and insurance entities	20%	40%	60%	80%	100%
Phase-in of deductions from tier 2 revaluation reserves (RR)					
RR for fixed Assets, securities, and Equity Securities	20%	40%	60%	80%	100%
Leverage ratio	3%	3%	3% readjustment	Migration to pillar 1	3%
Liquidity Coverage Ratio	≥100% (from Sep.)	≥100%	≥100%	≥100%	≥100%
Net stable funding Ratio	≥100% (from Sep.)	≥100%	≥100%	≥100%	≥100%

### 5.4 The implication of Basel II & III in AIBL

To become more risk-sensitive to credit, market & operation risk banking institutions have to follow & maintain minimum capital prescribed by Bangladesh bank. The regulatory capital is composed of:

- Core capital (Tier- 1)

- Supplementary capital (Tier-2)
- Additional supplementary capital (Tier-3) [only for market risk]

Tier-1 capital consists of highest quality capital items it helps a bank to absorb losses on an ongoing basis. It includes paid-up capital, statutory reserve, retained earnings, minority interest in subsidiaries. In 2012 54.55% of Tier-1 is from paid-up capital & 23.75% is statutory reserve. The major portion of Tier-2 capital is general provision & revaluation. In 2010 the bank increased its Tier-1 capital by issuing right shares worth 2338.6 million. Policies and processes for mitigating credit risk, market risk & operation risk. The bank has established a framework that defines structure, role, responsibilities, and the processes to identify, quantify and manage risk within the framework. This policy and procedures are being updated from time to time with the adoption of new techniques for managing risk in the line with the socio-economic scenario and investment environment in Bangladesh. Duration, PV, Exposure and Gap limits, VaR are used for mitigating market risk. The bank offers attractive pay package to its employees based on performance and merit. Basic indicator approach is used to compute charge against operational risk.

Table 2 Capital ratios of AIBL

Year	2011	2012	2013	2014	2015
Total amount of capital under tier 1	11924.5	13073.14	13500.51	15620.57	18244.48
The total amount of tier 2 and tier 3	1123.4	1731.59	1511.75	1732.06	4828.03
Total eligible capital	13047.9	14804.73	15012.26	17352.63	23072.51
Total risk-weighted Asset	96866.37	125998	111037	128253	138573.63
Capital adequacy ratio	13.47%	11.75%	13.52%	13.53%	16.65%
Core capital to RWA	12.31%	10.37%	12.16%	12.18%	13.17%

### 5.5 Capital & Profitability (Risk): Relationship and Relevant Issues

It is no surprise that higher capital requirement would influence the profitability of a bank (Christian et al., 2008). Capital adequacy has a great influence on Banks profitability. It is not only a regulatory component but also a weapon for ensuring profitability.

Dependent Variables:

In case of profitability, “return on asset” (ROA) is considered as appropriate variable because bank regulator and analysts believe that ROA gives appropriate proxy for profitability (Gilbert and Wheelock, 2007)

Independent variables:

- Capital adequacy ratio
- Asset turnover ratio
- Leverage
- Operating efficiency
- Firm size

Capital Adequacy Ratios: considering two types of capitals and non-risk weighted and risk-weighted assets, capital adequacy ratios that are considered in our models are:

- ❖ Core capital (Tier 1) to Total Assets
- ❖ Total Capital (Tier 1+2) to Total Assets
- ❖ Core capital (Tier 1) to Total RWA

## ❖ Total Capital (Tier 1+2) to Total RWA

Four different versions of capital adequacy ratios further lead to individual tests of following sub-hypothesis: Identification of four different versions of capital adequacy ratios further lead to individual tests of following sub-hypothesis:

H1A : Core capital to total Asset ratio has significant relationship with bank capital

H1B: total capital to total asset ratio has significant relationship with bank capital

H1C : Core Capital to total RWA ratio has significant relationship with bank capital

H1D: total capital to total RWA ratio has significant relationship with bank capital

Table3: Variables and Respective Formulas

Variables	Formula	Symbol	Source
Return on Assets (Asset)	Net income after taxes/total assets	ROA	Gilbert and Wheelock (2007)
Core capital/Total Assets	Tier 1 capital/total assets	CCTA	Hutchison and cox (2006)
Total Capital/Total Asset	Total risk-based capital/Total Assets	TCTA	Hutchison and cox (2006)
Core capital/total risk-weighted Assets	Tier 1 capital/Total Risk-Weighted Assets	CCRWA	Hutchison and cox (2006)
Total Capital/Total Risk-Weighted Assets	Total risk-based capital/total Risk-Weighted Assets	TCRWA	Hutchison and cox (2006)
Asset Turnover	Sales/Total Asset	AT	Cristian et al (2008)
Leverage	Debt/total Asset	DTA	Cristian et al (2008)
Firm Size	Natural Logarithm of total Asset	LN	Ghosh et al.(2003)
Operating Efficiency Ratio(cost income ratio)	Operating expenses/operating incomes	CIR	Christian et al. (2008)

### 5.6 Model

The model and approach used in this study were found in the established literature (Lazaridis and tryfonidis 2006 gilbert and Wheelock 2007).

$ROA = f(\text{capital Adequacy, AT, DTA, CIR, Ln})$

The core panel OLS regression equation for ROA:

$$ROA_{it} = \alpha_0 + \alpha_1 CCA_{it} + \alpha_2 TCA_{it} + \alpha_3 CCRWA_{it} + \alpha_4 TCRWA_{it} + \alpha_5 CIR_{it} + \alpha_6 SIZE_{it} + \alpha_7 AT_{it} + \alpha_8 DTA_{it} + \epsilon_i$$

Descriptive Statistics of the Variables: Table 02 represents the summary statistics of the variables of this study. Total observations of this study were 13. The bank had a mean (average) return on asset of 1% with a standard deviation of approximately 0.53 percent. It indicates that Al-Arafah Islami Bank is not highly levered. The mean of this Bank is 6.23 percent with a standard deviation of 2.23 percent. Core capital to risk-weighted asset is lower than total capital to risk-weighted asset.

Table 4: Descriptive statistics of the Variables

Variables	No. of observations	Mean	Median	Maximum	Minimum	Standard deviation
Return on Asset	13	1.37	1.10	2.65	.8792	.53977
Asset Turnover(AT)	13	9.822	10.38	11.81	7.77	1.39
Operating Efficiency(cost Income Ratio) CIR	13	37.47	33.25	67.40	26.25	13.07
Size (natural logarithm of total assets) LN	13	12.22	12.22	13.83	10.52	1.017
Core capital to risk-weighted asset (CCRWA)	13	13.50	13.60	17.77	9.68	2.50
Total Capital to Risk Weighted Asset(TCRWA)	13	16.31	15.36	17.77	9.68	2.50
Core Capital to Total Asset(CCTA)	13	9.12	8.75	12.94	7.09	1.62
Leverage (debt to total Asset)/DTA	13	6.23	5.58	10.70	1.96	2.37
Total Capital to Total Asset(TCTA)	13	10.89	10.65	14.21	8.20	.1959

### 5.7 Regression

Under the panel regression model, ROA is regressed against CCRWA, TCRWA, CCTA, TCTA and operating efficiency (CIR) in four different models. Regression estimates of the various capital adequacy determinants on asset (ROA).

Table 5: Regression Analysis

Independent Variables	Model 1	Model 2	Model 3	Model 4
Intercept	5.34	5.416	10.62	10.83
Core capital to total Asset(CCTA)	.2469	-	-	-
Total capital to total Asset(CCTA)	-	.2219	-	-
Core capital to Risk-Weighted Asset(CCRWA)	-	-	0.1125	-
Total capital to Risk Weighted Asset(TCRWA)	-	-	-	0.1027
Cost Income Ratio(CIR)	.017046	0.002175	-0.01948	-.02424
Natural Logarithm of Total Asset (SIZE)	-1.5222	-0.5487	-0.918	-.9913
Asset Turnover (AT)	-0.073	0.02989	0.05478	0.1285
Debt to total Asset(DTA)	-0.24	-0.021233	0.1022	0.0988
F-Statistics	3531.46	157.91	82.11	64.82

P-Value	.0000	0.0006	.0065	0.0154
R2	0.9996	0.9912	.9832	0.978
Adjusted R2	0.9993	0.9849	.9712	0.963

The first model regresses the Core Capital Ratio (CCTA) with bank profitability (ROA). This result shows core capital ratio is statistically significant and it has a positive relationship with ROA. The equation also had R2 and Adjusted R2 values of 99.96% and 99.93% respectively meaning that about 99.96% of the variations of ROA can be explained by CCTA and the other independent variables of this model.

The second model regresses the Core Capital to Total Asset Ratio (TCTA) with bank profitability (ROA). This result shows Core Capital to Total Asset Ratio is statistically significant and it has a positive relationship with ROA. The equation also had R2 and Adjusted R2 values of 99.12% and 98.49% respectively meaning that about 99.12% of the variations of ROA can be explained by TCTA and the other independent variables of this model.

The third model regresses the Core Capital to Risk Weighted Asset Ratio (CCRWA) with bank profitability (ROA). This result shows Core Capital to Risk Weighted Asset Ratio is statistically significant and it has a positive relationship with ROA. The equation also had R2 and Adjusted R2 values of 98.32% and 97.12% respectively meaning that about 98.32% of the variations of ROA can be explained by CCRWA and the other independent variables of this model.

The fourth model regresses the Total Capital to Risk Weighted Asset Ratio (TCRWA) with bank profitability (ROA). This result shows Total Capital to Risk Weighted Asset Ratio is statistically significant and it has a positive relationship with ROA. The equation also had R2 and Adjusted R2 values of 97.80% and 96.30% respectively meaning that about 97.80% of the variations of ROA can be explained by TCRWA and the other independent variables of this model.

## 6. Conclusion

The Islamic financial system has some distinctiveness that should be properly addressed while formulating capital guidelines for Islamic financial organizations. Leverage, which played a major role in the recent financial crisis, cannot be produced greatly in this system. Islamic financial products should be linked with real economic activities like trading, production etc. These items cannot be based on another financial contract since Shariah restricts trading of debt and undue speculation. As the Islamic financial products are asset-based, they often bear market risk (probability of loss from reduction in market price) to some larger extent. They also have some other unique risks like displaced commercial risk (commercial force to pay returns that exceed the rate that has been earned on its assets financed by mudaraba depositors). Capital adequacy ratio of Al-Arafah Islami Bank Limited is higher than the standard level. Based on regression analysis it is found that there is a significant relationship between capital adequacies with the profitability of AIBL.

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## Appendix

Dependent Variable: ROA  
 Method: Least Squares  
 Date: 06/07/16 Time: 15:54  
 Sample: 2008 2020  
 Included observations: 13

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.342994	0.304981	17.51908	0.0000
CCTA	0.246950	0.008197	30.12819	0.0000
AT	-0.073904	0.011670	-6.332763	0.0004
DTA	-0.024199	0.006688	-3.618086	0.0085
CIR	0.008939	0.001213	7.366465	0.0002
LN	-0.464984	0.015543	-29.91643	0.0000
R-squared	0.999604	Mean dependent var		1.373167
Adjusted R-squared	0.999321	S.D. dependent var		0.539771
S.E. of regression	0.014069	Akaike info criterion		-5.385701
Sum squared resid	0.001385	Schwarz criterion		-5.124955
Log likelihood	41.00706	Hannan-Quinn criter.		-5.439296
F-statistic	3531.465	Durbin-Watson stat		2.773704
Prob(F-statistic)	0.000000			

Dependent Variable: ROA  
 Method: Least Squares  
 Date: 06/07/16 Time: 15:56  
 Sample: 2008 2020  
 Included observations: 13

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.416119	1.467926	3.689640	0.0078
TCTA	0.221904	0.037918	5.852256	0.0006
AT	0.029898	0.050861	0.587846	0.5751
DTA	-0.021233	0.033151	-0.640501	0.5422
CIR	0.002175	0.005105	0.425943	0.6829
LN	-0.548708	0.067160	-8.170168	0.0001
R-squared	0.991212	Mean dependent var	1.373167	
Adjusted R-squared	0.984936	S.D. dependent var	0.539771	
S.E. of regression	0.066250	Akaike info criterion	-2.286721	
Sum squared resid	0.030724	Schwarz criterion	-2.025975	
Log likelihood	20.86368	Hannan-Quinn criter.	-2.340316	
F-statistic	157.9151	Durbin-Watson stat	2.310689	
Prob(F-statistic)	0.000000			

Dependent Variable: ROA  
 Method: Least Squares  
 Date: 06/07/16 Time: 15:57  
 Sample: 2008 2020  
 Included observations: 13

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.62601	1.686454	6.300799	0.0004
CCRWA	0.112537	0.029430	3.823912	0.0065
AT	0.054783	0.069818	0.784648	0.4584
DTA	0.102265	0.026200	3.903260	0.0059
CIR	-0.019487	0.003221	-6.049611	0.0005
LN	-0.918310	0.085435	-10.74861	0.0000
R-squared	0.983236	Mean dependent var	1.373167	
Adjusted R-squared	0.971261	S.D. dependent var	0.539771	
S.E. of regression	0.091504	Akaike info criterion	-1.640822	
Sum squared resid	0.058611	Schwarz criterion	-1.380076	
Log likelihood	16.66534	Hannan-Quinn criter.	-1.694417	
F-statistic	82.11155	Durbin-Watson stat	2.205877	
Prob(F-statistic)	0.000005			

Dependent Variable: ROA  
 Method: Least Squares  
 Date: 06/07/16 Time: 16:00  
 Sample: 2008 2020  
 Included observations: 13

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.83587	1.900031	5.702997	0.0007
TCRWA	0.102764	0.032260	3.185539	0.0154
AT	0.128529	0.080881	1.589123	0.1561
DTA	0.098801	0.030296	3.261248	0.0138
CIR	-0.024240	0.003228	-7.509853	0.0001
LN	-0.991314	0.110004	-9.011614	0.0000
R-squared	0.978861	Mean dependent var	1.373167	
Adjusted R-squared	0.963762	S.D. dependent var	0.539771	
S.E. of regression	0.102752	Akaike info criterion	-1.408958	
Sum squared resid	0.073906	Schwarz criterion	-1.148212	
Log likelihood	15.15823	Hannan-Quinn criter.	-1.462553	
F-statistic	64.82916	Durbin-Watson stat	2.194520	
Prob(F-statistic)	0.000010			

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