# EFFECT OF RISK AND RETURNS ON CAPITAL ADEQUACY RATIO WITH REFERENCE TO SELECTED COMMERCIAL BANKS IN INDIA

## Konyn Tuba Lappay*; Soumya K Shetty**; Nagesha C S***

[1, 2, 3] Assistant Professor,
School of Commerce,
REVA University, Bangalore, INDIA

## ABSTRACT

*The Study attempts to examine the effect of risk and returns on Capital Adequacy Ratio of Commercial Banks in India. The Study is based on Secondary data. The data was collected from 20 commercial banks for the period of 2016-2020 leading to 100 observations. The stratified random sampling technique is used to selection of sample of study as the population of the study was known to Researcher. The descriptive statistics, correlation and regression Analysis is used for data analysis. The study assumes that capital adequacy ratio of banks depends on specific variables: Risk (NPA and NPA to Advances), Returns (ROE, ROA, Net Profit, ROCE).The findings of the study reveal that there exist a negative correlation between risk and capital adequacy ratio of banks and there exist a positive correlation between returns and capital adequacy ratio.The study conclude that two variables that is Return on Asset and Return on Capital Employed will have major impact on capital adequacy ratio of banks.*

**KEYWORDS:** *Capital Adequacy Ratio, Risk (NPA and NPA to Advances), Returns (ROE, ROA, Net Profit, ROCE).*

## 1. INTRODUCTION

Banks should have sufficient capital in proportion of their Risk weighted assets. When a bank accepts deposits it becomes liabilities of banks and when bank lend loans it becomes an asset for a bank. So whenever banks lend loans. The risk associated with such loans should be kept as buffer capital to avoid insolvency of banks. Adrian & Shin (2010) expressed that in order to use excess capacity, financial intermediaries lend even to borrowers who are not able to pay which increases risk. The capital adequacy ratio (CAR) is a measure of how much capital a bank has available, reported as a percentage of a bank's risk-weighted credit exposures. The purpose is to establish that banks have enough capital on reserve to handle a certain amount of losses, before being at risk for becoming insolvent. RK: Vyas et al., (2008), interpreted

that there is no significant difference in the performance (ROA) of Public Sector Banks and Indian private banks with foreign banks operating in India. The study concluded that banks menhances the confidence of the customer by increasing and maintaining the level of CRAR because a suitable level reduces the risk of depositors. Capital is broken down as Tier-1, core capital, such as equity and disclosed reserves, and Tier-2, supplemental capital held as part of a bank's required reserves. A bank with a high capital adequacy ratio is considered to be above the minimum requirements needed to suggest solvency. Therefore, the higher a bank's CAR, the more likely it is to be able to withstand a financial downturn or other unforeseen losses. The Dependent Variable in the study is Capital Adequacy Ratio of banks where as Independent Variables of the study are risk weighted assets measured in term of Non-performing Assets and another independent variable of the study is Returns of banks measured in terms of Net profit, Return on equity, Return on Asset and capital employed.

## 2. LITERATURE REVIEW

A significant amount of research has been carried out in and around India covering various aspects of Capital adequacy ratio of Banks such as Bishnu Prasad (2020) observed that liquidity has positive and statistically significant effects on Capital Adequacy ratio. The results were not consistent with the study of Abusharba ET. al. (2015) and batenien et.al.(2014) which states size of the banks has negatively and statistically associated with capital adequacy ratio. Whereas, inflation has negatively associated with capital adequacy ratio.RK.Vyas, et al., (2008) stated suitable level of CRAR reduces risk of depositors and Non-Interest income increases the profitability of banks without taking additional risk. Kumar basu, U (2005), stated impact of possible changes in CRR and SLR on a banks cut-off risk. Maximum permissible risk without any default as well as its dependence on interest rates and capital adequacy ratio Rubi at el., (2019) stated bank capital decisions are significantly driven by management quality, liquidity, leverage and bank size as well as bank regulations. results showing bank mangers generally react negatively to capital requirements, capital regulations should be followed with more rigorous supervisory oversight to reduce the adverse effects of high capital requirements on banks safety.

Although a number of research is carried on capital requirement of banks the researcher is interested to study the impact of two specific variables that is risk and return on capital requirement of commercial banks in India.

### Objectives of the study

1. To establish the relationship between Capital Adequacy Ratio and Risk & Returns of banks.

2. To examine the effect of Risk & Returns on Capital Adequacy Ratio of banks.

### Hypothesis 1

H0: There is no Significant Relationship between capital Adequacy Ratio and Risk of Banks.

H1: There is a Significant Relationship between capital Adequacy Ratio and Risk of Banks.

### Hypothesis 2

H0: There is no significant Relationship between Capital Adequacy Ratio and Returns of Banks.

H1: There is a significant Relationship between Capital Adequacy Ratio and Returns of Banks.

### 3. Research methodology:

The Study is Empirical in nature as it aims to measure the cause and effect relationships between two Independent variables (Risk & Returns of banks) and Dependent variable (Capital Adequacy ratio of banks). The Population of the Study is 12 Public Sector banks and 22 Private sector banks in India. The Sampling technique used to collect the data from both Private and public sector banks is Stratified Random Sampling Method, Where in, Top 10 banks are selected from each strata (i.e Public and Private Sector) and past 5 years financial data i.e, from 2016-2020 is collected from 20 banks, therefore the sample size is 100. The Method of Data Collection is Secondary data source obtained from the financial statements of banks published in moneycontrol.com. The statistical tools used for analysis will be Correlation and Multiple linear regression Analysis using IBM SPSS Software 20.

## 3. Results and Discussion

### 4.1 DESCRIPTIVE STATISTICS

**TABLE NO. 1**

**Descriptive Statistics**

| | N | Minimum | Maximum | Mean | Std. Deviation | Skewness | | Kurtosis | |
|---|---|---|---|---|---|---|---|---|---|
| | Statistic | Statistic | Statistic | Statistic | Statistic | Statistic | Std. Error | Statistic | Std. Error |
| CAR (%) | 100 | 9.0 | 19.0 | 13.660 | 2.3665 | .272 | .241 | -.623 | .478 |
| NPA (%) | 100 | .0 | 15.0 | 4.272 | 3.3862 | .964 | .241 | .642 | .478 |
| NPA TO ADVANCES (%) | 100 | .0 | 15.0 | 4.270 | 3.3930 | .962 | .241 | .618 | .478 |
| NET PROFIT (%) | 100 | -63.0 | 23.0 | 1.224 | 15.9876 | -1.286 | .241 | 2.603 | .478 |
| ROE (%) | 100 | -110.0 | 18.0 | -2.243 | 19.6698 | -2.614 | .241 | 9.900 | .478 |
| ROCE (%) | 100 | .0 | 5.0 | 2.042 | .8200 | .563 | .241 | .874 | .478 |
| ROA (%) | 100 | -6.0 | 2.0 | .155 | 1.3349 | -1.212 | .241 | 3.742 | .478 |
| Valid N (listwise) | 100 | | | | | | | | |

**Inference**

The above table 1.6 1 explains that the data is consistent for CAR, NPA, NPA to advances and ROCE as the Mean value is greater than the standard deviation, whereas the data is not Consistent for Net Profit, ROE and ROA as the Mean value is lesser than the Standard Deviation and the co-efficient of skewness is a negative value which means the data is less negatively skewed. The co- efficient of skewness is low positive skewness for CAR, NPA, NPA to advances and ROCE which means majority of the banks CAR,NPA, NPA to advances and ROCE ratio is less than the average (13.660).

The kurtosis measures the degree of flatness or peakedness. The data collected indicates that the curve of distribution is less peaked than a normal curve for CAR, NPA, NPA to Advances, and ROA. Whereas, The curve of distribution is normal for ROA and Net Profit and curve of distribution is more peaked for ROE.

### 4.2 CORRELATION ANALYSIS

**Hypothesis 1: Significant Correlation between CAR and Risk of banks**

**Hypothesis 2: Significant Correlation between CAR and Returns of banks.**

**TABLE NO.2**

| Correlations | | CAR (%) | NPA (%) | NPA TO ADVANCES (%) | NET PROFIT (%) | ROE (%) | ROCE (%) | ROA (%) |
|---|---|---|---|---|---|---|---|---|
| CAR (%) | Pearson Correlation | 1 | -.614** | -.611** | .649** | .529** | .565** | .652** |
| | Sig. (2-tailed) | | .000 | .000 | .000 | .000 | .000 | .000 |
| | N | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| NPA (%) | Pearson Correlation | -.614** | 1 | 1.000** | -.709** | -.632** | -.497** | -.703** |
| | Sig. (2-tailed) | .000 | | .000 | .000 | .000 | .000 | .000 |
| | N | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| NPA TO ADVANCES (%) | Pearson Correlation | -.611** | 1.000** | 1 | -.709** | -.632** | -.495** | -.703** |
| | Sig. (2-tailed) | .000 | .000 | | .000 | .000 | .000 | .000 |
| | N | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| NET PROFIT (%) | Pearson Correlation | .649** | -.709** | -.709** | 1 | .937** | .418** | .970** |
| | Sig. (2-tailed) | .000 | .000 | .000 | | .000 | .000 | .000 |
| | N | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| ROE (%) | Pearson Correlation | .529** | -.632** | -.632** | .937** | 1 | .322** | .892** |
| | Sig. (2-tailed) | .000 | .000 | .000 | .000 | | .001 | .000 |
| | N | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| ROCE (%) | Pearson Correlation | .565** | -.497** | -.495** | .418** | .322** | 1 | .378** |
| | Sig. (2-tailed) | .000 | .000 | .000 | .000 | .001 | | .000 |
| | N | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| ROA (%) | Pearson Correlation | .652** | -.703** | -.703** | .970** | .892** | .378** | 1 |
| | Sig. (2-tailed) | .000 | .000 | .000 | .000 | .000 | .000 | |
| | N | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| **. Correlation is significant at the 0.01 level (2-tailed). | | | | | | | | |

**Inference**

**Hypothesis 1: Significant Correlation between CAR and Risk of banks**

**H0: There is no Significant Correlation between CAR and Risk of Banks.**

**H1: There is a Significant Correlation between CAR and Risk of Banks.**

The above table indicates that NPA and CAR are negatively correlated as given by Correlation co-efficient of -0.614 and NPA to advances and CAR are also negatively correlated as given by Correlation co-efficient of -0.611. Thus it can be concluded that Risk and Capital adequacy ratio are negatively correlated which implies that Risk and Capital adequacy ratio of banks are inversely correlated with the decrease in Risk the Capital adequacy ratio of banks will increase.

**Hypothesis 2: Significant Correlation between CAR and Returns of banks**

**H0: There is no Significant Correlation between CAR and Returns of Banks.**

**H1: There is a Significant Correlation between CAR and Returns of Banks.**

The above table indicates that Net Profit and CAR are positively correlated as given by Correlation co-efficient of 0.649 and

ROE and CAR are also positively correlated as given by Correlation co-efficient is 0.529,

There is also a positive correlation between ROCE and CAR as the correlation c-efficient is 0.565.

The ROA and CAR is also Positive Correlated with correlation co-efficient is 0.652.

Thus it can be concluded that Returns and Capital adequacy ratio of Banks are positively correlated which implies that with the increase in Returns of banks the Capital adequacy ratio of banks will also increase positively.

Since the correlation is statistically significant it is worth to perform regression analysis between these variables.

## 4.3 REGRESSION ANALYSIS

To estimate Multiple Linear Regression (MLR) Model to Predict Capital Adequacy ratio (CAR) of Commercial banks using 6 explanatory variables that is Non-Performing Assets (NPA), Non-Performing Assets to advances (NPA to Advances), Net Profit, Returns on Equity (ROE), Returns on Capital Employed (ROCE), and Returns on Asset (ROA).

**Hypothesis 3: The Regression Model is not significant**

Hypothesis Model:

CAR= B1* ROA+B2* ROCE+B3* NPA TO ADVANCES+B4* ROE+B5* NET PROFIT+B6* NPA

**TABLE NO. 3**

| Coefficients[a] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | Colinearity Statistics | |
| | | B | Std. Error | Beta | | | Tolerance | VIF |
| 1 | (Constant) | 12.233 | .661 | | 18.510 | .000 | | |
| | NPA (%) | -4.999 | 2.586 | -7.153 | -1.933 | .056 | .000 | 3085.013 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| NPA TO ADVANCES (%) | 4.880 | 2.579 | 6.997 | 1.892 | .062 | .000 | 3078.916 |
| NET PROFIT (%) | .071 | .057 | .483 | 1.259 | .211 | .030 | 33.089 |
| ROE (%) | -.047 | .024 | -.388 | -1.935 | .056 | .110 | 9.073 |
| ROCE (%) | .817 | .233 | .283 | 3.511 | .001 | .683 | 1.465 |
| ROA (%) | .551 | .506 | .311 | 1.089 | .279 | .054 | 18.377 |
| a. Dependent Variable: CAR (%) | | | | | | | |

**Inference**

The above table 3 explains that:

**Initial estimated model**

CAR= B1* ROA+B2* ROCE+B3* NPA TO ADVANCES+B4* ROE+B5* NET PROFIT+B6* NPA

This model cannot be accepted since regression coefficient are inferred as not significant by t test for regression co efficient, this could be attributed to the multi collineality between the independent variable since the Variance Inflation Factor(VIF) values of all the 6 variables are high(>5), hence the regression analysis is repeated using *forward method* in SPSS. And the result is presented below.

**TABLE NO. 1.6.4**

| Coefficients | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | Co linearity Statistics | |
| | | B | Std. Error | Beta | | | Tolerance | VIF |
| 1 | (Constant) | 11.330 | .459 | | 24.686 | .000 | | |
| | ROA (%) | .907 | .131 | .511 | 6.898 | .000 | .857 | 1.167 |
| | ROCE (%) | 1.072 | .214 | .372 | 5.012 | .000 | .857 | 1.167 |
| a. Dependent Variable: CAR (%) | | | | | | | | |

**Therefore the estimated model**

CAR= 11.330+0.907 ROA + 1.072 ROCE.

The two variables retain is Return on Asset and Return on Capital Employed. The impact of ROA is quantified as 0.907which implies unit change in Return on Assets banks can expect an average increase of 0.907 (90%) increase in Capital Adequacy ratio and the impact of ROCE is quantified as 1.072 which implies unit change in Return on Capital Employed, banks can expect 1.072 (100%) increase in Capital Adequacy ratio. The regression coefficient is statistically significant for ROA (t= 6.898 with significance value <0.05) and ROCE (t= 5.012 with significance value<0.05).

**MODEL ACCURACY AND ITS SIGNIFICANCE**

If $R^2$= 0.543 implies 54.3% variation in Y is explained by model. The model is considered to be ideal if R2 is at least 0.6 however ANOVA test significance of R2 is carried out.

Null Hypothesis= R2=0 /Model is not significant.

## TABLE NO. 5

| Model Summary | | | | | ANOVA | Sig. Value |
|---|---|---|---|---|---|---|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | | |
| 1 | .737[b] | .543 | .534 | 1.6158 | 57.677 | .000[c] |
| a. Predictors: (Constant), ROA (%), ROCE (%) | | | | | | |
| b. Dependent Variable: CAR (%) | | | | | | |

F value is 57.677 with p value <0.05 hence reject the null hypothesis, Model is significant. $R^2$ is statistically significant.
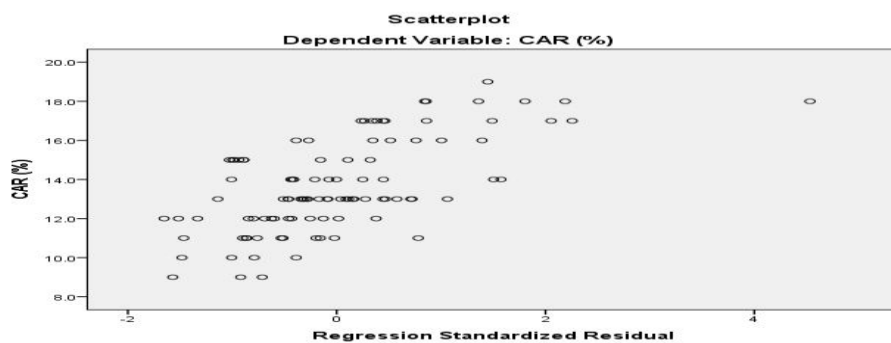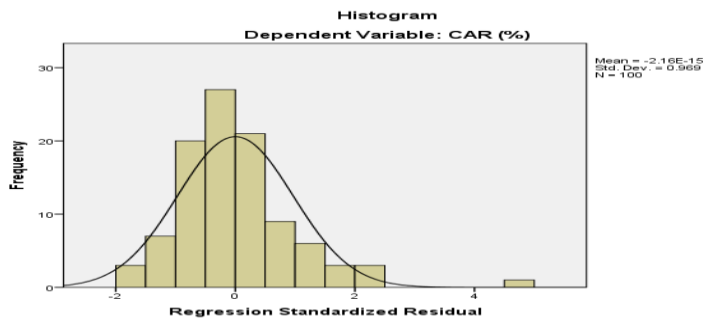
### Residual Analysis

Residual refers to difference between actuals and Predicted variable.

The residuals are supposed to be normally distributed with Mean= 0 and low standard deviation. It should not be correlated with dependent variable. The plots of residuals are provided below:

## TABLE NO. 6

| Residuals Statistics[a] | | | | | |
|---|---|---|---|---|---|
| | Minimum | Maximum | Mean | Std. Deviation | N |
| Predicted Value | 9.775 | 16.729 | 13.660 | 1.8133 | 100 |
| Residual | -2.5931 | 7.1134 | .0000 | 1.5207 | 100 |
| Std. Predicted Value | -2.143 | 1.693 | .000 | 1.000 | 100 |
| Std. Residual | -1.653 | 4.534 | .000 | .969 | 100 |
| a. Dependent Variable: CAR (%) | | | | | |



Histogram
Dependent Variable: CAR (%)

Mean = -2.16E-15
Std. Dev. = 0.969
N = 100



Scatterplot
Dependent Variable: CAR (%)

The Histogram indicates normality of the residuals even the mean is close =0 but the Scatter plot depicts a no correlation between residuals and dependent variable. This could be due to the reason that there are more variables to be considered for a better prediction model (with $R^2 > 0.6$).

## 4. Findings:

- There is a significant negative Correlation between capital Adequacy ratio and Risk of banks which is measured as Non-performing Assets and Non-performing Assets to Advances.

- There is a significant positive correlation between capital adequacy ratio and Returns of banks which is measured as Net Profit, Return on equity, Return on Assets, Return on Capital Employed.

- The prediction Model for Capital adequacy ratio is CAR= 11.330+0.907 ROA + 1.072 ROCE. The impact of ROA is quantified as 0.907 which implies unit change in Return on Assets banks can expect an average increase of 0.907 (90%) increase in Capital Adequacy ratio and the impact of ROCE is quantified as 1.072 which implies unit change in Return on Capital Employed, banks can expect 1.072 (100%) increase in Capital Adequacy ratio

## 5. Limitation and Scope of the Study:

- The Study is confined to selected banks of public and private; since the sample size is small the generalization of results cannot be very accurate.

- For the purpose of study only Public and Private Sector banks are chosen, thus it gives further scope for doing research on other Commercial banks like Foreign and Other Regional Rural banks and also other Non banking Financial Institution.

## CONCLUSION

Banks acts as a important financial intermediary facilitating and economy to grow by providing movement of funds from savers to lenders. Thus it is very important for banks to maintain sufficient capital in order to minimize loss and insolvency. Thus the study concludes that Banks with minimum risk weighted assets can maintain high capital adequacy ratio and banks with high return can also maintain maximum capital adequacy ratio.

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