









coefficients then it rejects the null hypothesis. The technique that is used here is Durbin-Watson statistics. The Durbin Watson statistic is a number that tests for autocorrelation in the residuals from a statistical regression analysis. The Durbin-Watson statistic is always between 0 and 4. A value of 2 means that there is no autocorrelation in the sample.

**Unit root tests**

Unit root tests are commonly used to test the stationary property of a time series data. In this study two different unit root tests are employed to test the null hypothesis of a unit root. These tests are the Augmented Dickey-Fuller (ADF) test & the Phillips-Perron (PP) test. We subject each time series to a check for stationarity. The ADF test was employed to time series of pre- provision profit over total loans and advances, loan to asset ratio, capital adequacy ratio, advances over loan funds and credit upon deposit ratio, return of equity and return of asset series.

**The regression model**

The study uses a general linear model of regression to establish the relationship between the independent and the dependent variables. Here return of equity as a dependent variable and return of asset as a dependent variable will be separately regressed with the independent factors (**Table 1**).

**Table 1. Definition of Variables.**

Variable	Definition	Expected result
ROE	Profitability = Return on Equity = Net Income/ Total Equity	-
ROA	Profitability = Return on Assets = et Income/ Total Assets	-
PTLA	Credit Risk = Pre-Provision Profit / Total Loans and Advances	<b>Increase/Decrease</b>
LA	Credit Risk = Loan to Asset ratio	<b>Increase/Decrease</b>
CAR	Credit Risk = Capital Adequacy Ratio	<b>Increase/Decrease</b>
ALF	Credit Risk = Advances over Loan Funds	<b>Increase/Decrease</b>
CDR	Credit Risk = Credit upon Deposit ratio	<b>Increase/Decrease</b>

The dependent variables in the models are Return on Equity and Return of Assets. These variables are proxy of profitability whereas proxy of credit risk are pre-provision profit over total loans and advances, loan to asset ratio, capital adequacy ratio, advances over loan funds and credit upon deposit ratio.

**RESULTS & DISCUSSIONS**

**Descriptive statistics**

**Table 2** shows the descriptive statistics of the data gathered from the banks. It can be observed that the average return on equity is 5.752% while the average return of assets is 275.61%. The average rate on pre-provision profit over total loans and advances is 2.466 % whereas average rate of loan to asset ratio is 12.5% which indicates a low level of credit risk and mean of capital adequacy ratio is

14.05. Similarly, the average rate of advances over loan funds is 74.71% and the average rate of credit upon deposit ratio is 83.33%. The standard deviation is highest in return of assets. Data of all the variables except ROA are platykurtic. Some variables are right skewed whereas some are left skewed.

**Table 2. Descriptive Statistics of Variables.**

Variable	Mean	S.D	Kurtosis	Skewness	Minimum	Maximum	Count
<b>ROE</b>	5.752	12.51	2.41	-1.62	-32.85	19.5	<b>60</b>
<b>ROA</b>	275.61	152.96	4.81	2.11	138.72	813.47	<b>60</b>
<b>PTLA</b>	2.466	0.796	-1.335	-0.249	0.98	3.56	<b>60</b>
<b>LAR</b>	0.125	0.013	-1.065	0.337	0.11	0.15	<b>60</b>
<b>CAR</b>	14.055	2.460	-0.970	-0.057	9.2	18.42	<b>60</b>
<b>ALF</b>	74.712	6.365	0.0749	-0.694	59.69	84.82	<b>60</b>
<b>CDR</b>	<b>83.332</b>	<b>10.456</b>	<b>-0.329</b>	<b>0.483</b>	<b>66.72</b>	<b>105.08</b>	<b>60</b>

**Test for multi-collinearity**

In order to check multi collinearity among the factors or independent variables, the study uses the test of coefficient diagnostics and calculated the values of Coefficient Variance and Uncentered Variance Inflation Factors (VIF) and Centered VIF. The results as shown in **Table 3** above show the value of the Centered VIF values for both independent variables ROA & ROE. The multi collinearity does not exist in the data as none of the VIF values for independent variables is higher than 10.

**Table 3. Test for Multi- Collinearity.**

Variables	Centered VIF
<b>PTLA</b>	6.146
<b>LAR</b>	2.688
<b>CAR</b>	4.785
<b>ALF</b>	2.352
<b>CDR</b>	3.518

**Test for autocorrelation**

This evaluation is needed to test for the presence or otherwise of first-order serial correlation (autocorrelation) in the independent variables. That is, it is used to determine whether or not the value of each variable (in this case factors of credit risk measure) in one period,  $t$ , depends on its value in another period  $t-1$ . The measurement of autocorrelation was done through Durbin- Watson statistic. From the regression results, computed value of Durbin-Watson statistic is around 2, which shows that there is no evidence of positive first-order serial correlation. Hence, there is no autocorrelation in credit risk variables. So, it is concluded that the values of the respective credit risk variables in one period did not depend on their values in another period.

**Unit root tests**

All estimations in this study are done using E-Views. The result of unit root test is shown in (Table 4). All the series are stationary at logarithmic first difference & they are significant at 1% level as p value is less than 0.05. Hence, the null hypothesis that the series has unit root was rejected. So, series are stationary at I (1).

**Table 4. The results of unit root tests.**

Variables	ADF Statistics	P-Value	Order of Integration
<b>PTLA</b>	-5.987	0.0000	I (1)
<b>LAR</b>	-5.629	0.0001	I (1)
<b>CAR</b>	-7.461	0.0000	I (1)
<b>ALF</b>	-6.225	0.0000	I (1)
<b>CDR</b>	-4.603	0.0010	I (1)

**Regression analysis**

The results of the regression are shown below in Table 5.

**Table 5. Model summary of regression.**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
(ROA)	0.2088 <sup>a</sup>	0.0436	-0.15564	164.438
(ROE)	0.8672 <sup>a</sup>	0.7520	0.700423	6.8483

*a: Predictors: (constant) and dependent variables are pre-provision profit over total loans and advances, loan to asset ratio, capital adequacy ratio, advances over loan funds and credit upon deposit ratio*

*Model 1 represents variable return on asset and Model 2 represents variable return on equity*

The R square value of 0.0436 shown in Model 1 (Table 5) shows that only 4.36% of the variation in the dependent variable, Return on Assets, can be explained by variations in the dependent variable. The R Square of 0.7520 for model 2 shows that 75.20% of the variations of the dependent variable, Return of Equity, can be explained by variations in the dependent variable. So, the return of asset is poorly explained by dependent variables whereas return of equity is good enough explained by selected dependent variables (Table 6).

**Table 6. Analysis of variance<sup>a,b</sup>.**

Dependent Variables	Model	Sum Squares	Mean Square	F	Significance F
<b>Return on Assets</b>	<b>Regression</b>	29588.74	5917.749	0.218851	0.9509 <sup>a</sup>
	<b>Residual</b>	648961.6	27040.07		
	<b>Total</b>	678550.3			
<b>Return on Equity</b>	<b>Regression</b>	3414.435	682.887	14.560	0.00000 <sup>b</sup>
	<b>Residual</b>	1125.591	46.899		
	<b>Total</b>	4540.026			

<sup>a</sup>Dependent Variable: Return on Assets

<sup>b</sup>Dependent Variable: Return on Equity

For Model 1, the p-value (significance F) of 0.9509 is far greater than 0.05 which shows that overall the model does not predict the dependent variable of return

on asset well. However, the p-value of Model 2 shows that the model predicts the dependent variable of return on equity well. Thus, Model 2 fits well in this research.

From **Table 7** the beta coefficients of both models can be observed. From the model, it can be seen that Return on Assets as a measure of profitability cannot be explained by credit risk because none of the p-values shows a statistically significant relationship. However, in case of return on equity as the profitable measure, the p-values of Advances over Loan Funds show that there is a statistically significant relationship between this variable and return on Equity whereas rest of the variables like Pre-Provision Profit to Total Loans and Advances, Loan to Asset Ratio, Capital Adequacy Ratio and Credit to Deposit Ratio shows very weak relationship with Return of Equity as well as with Return on Assets. The null hypothesis “H0: Credit risk has no significant relationship with profitability of banks listed on the national stock exchange” shall be rejected in ROE model and accepted in the case of ROA model.

**Table 7. Coefficients.**

Variables	ROA			ROE		
	Coeff.	t-value	Sig.	Coeff.	t-value	Sig.
<b>Constant</b>	264.68	0.455603	0.65277	-102.984	-4.25645	<b>0.00027**</b>
Pre-Provision Profit / Total Loans and Advances	-20.364	-0.21432	0.83210	3.878074	0.980017	0.33685
Loan to Asset Ratio	2052.7	0.556149	0.58325	114.277	0.743449	0.46442
Capital Adequacy Ratio	12.281	0.452407	0.65503	0.347091	0.307015	0.76148
Advances/loan funds	-1.8559	-0.25224	0.80300	1.072541	3.500211	<b>0.00184**</b>
Credit/ Deposit Ratio	-2.7691	-0.50548	0.61783	-0.0024	-0.01051	0.99170

*\*\*Significant at 1% level*

### **CONCLUSION**

The objective of this study is to assess the impact of credit risk on the profitability of banks listed in the national stock exchange of India. To analyze the relationship between credit risk and profitability of banks secondary data was collected for six banks three from public sector and three from private sector. ROE and ROA are used as indicators to measure the profitability of banks Based on the financial information of 2009 to 2017. The time series data passes through the multi collinearity test and proved that it does not exist in the data as none of the VIF values for independent variables is higher than 10. The result of unit root test was also checked to identify the stationarity of series. All the series are stationary at logarithmic first difference. Also, from the regression results, the value of Durbin-Watson statistic was checked which is around 2, which shows that there is no evidence of positive first-order serial correlation. Hence, there is no autocorrelation in credit risk variables. So, it is concluded that the values of the respective credit risk variables in one period did not depend on their values in another period. This study concludes that credit risk, as calculated from Pre-Provision Profit to Total Loans and Advances, Loan to Asset Ratio, Capital Adequacy Ratio, Credit to Deposit Ratio and Advances over Loan Funds have a non-significant relationship with profitability measured by Return on Assets whereas there is significant relationship exist between Advances over Loan Funds and profitability measured by Return on Equity. The study found model of ROE is better explained through the selected variables than the



model of ROA. Also the results of the regression analysis show that there exist a negative correlation between credit upon deposit ratio and return on equity. As per the current study, the Indian banks has to keep check on advances upon total funds ratio, as it was found most significant factor impacting the profitability of Indian banks.

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