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CREDIT RISK MANAGEMENT AND FINANCIAL PERFORMANCE: A COMPARATIVE STUDY OF BRICS SELECTED BANKS

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ABSTRACT
The financial sector plays an important role in the overall growth of the nation but the banks are the main players in this field. For understanding the risks faced by these banks, this study attempted to analyse the impact of credit risk on the financial performance of BRICS-selected banks which are conducted for the period 2018-2022. Twenty-two state-owned banks have been taken for this study. Descriptive statistics, Correlation matrix, Hausman test, Variation Inflation Factor Test, and Random Effect Model have been used for analysis. The results of the study showed that NPLR and CIR have a significant impact on the ROA of selected banks and CAR and LDR do not have any significant impact on the ROA of selected banks of BRICS.
KEYWORDS: *Financial Performance, Credit Risk, BRICS, Banks, Random Effect Model (REM)*

INTRODUCTION

Banks play an important role as mediators between borrowers and lenders in an economy (Breuer et al., 2010). And globally the functioning of banks increases. Due to this, the level of risk increases for banks. There are different types of risks like capital risk, market risk, operational risk, liquidity risk, credit risk, and so on. The present study mainly focuses on credit risk which is an important risk that influences banks very much. Credit risk is a prevailing danger for keeping the money portion (Moradi & Rafiei, 2019). The money that is deposited by the savers into the bank is given to borrowers as a loan. So it's become the responsibility of the lender which is the bank to maintain this balance of transfer. Nowadays, it becomes a major issue for banks to recover the amount from borrowers that's why credit risk management is important for the banks. The process of credit risk management includes identification, measurement and controlling of credit risk for the long-term success of the financial institutions (Singh, 2015).

BRICS is a group of five powerful developing countries formed in 2009. At that time, it was called BRIC. The founder members of this organisation were Brazil, Russia, India, and China. In 2010, South Africa was added and it became a permanent member of BRICS. Brazil, Russia, India, and China are among the top 10 largest countries in terms of GDP and population. The main motive of this group is to develop their countries by promoting trade and investment at the global level. They hold summits on a regular basis on a wide range of issues according to their countries. Financially, there are so many different types of banks working in these countries like state-owned, private, foreign banks, etc. For this study selected state-owned banks have been taken from each country.

REVIEW OF LITERATURE

Siddique and Khan (2021) analyzed the model by taking ROA and ROE as financial performance indicators and CAR, CER, NPL, and LR as credit risk indicators. They concluded that NPL, CER, and LR have a strongly negative impact on financial performance (ROA) but other factors have a positive impact on the financial performance of Asian commercial banks.

Tamakloe et al. (2023) examined the effect of risk management on the commercial bank's performance in Ghana. The sample data was restricted to seven banks. They have framed the model by taking four types of risks i.e., credit risk, operational risk, liquidity risk, and market risk. The results through regression analysis showed that operational risk has a significant impact on Ghana's bank's financial performance.

Manaf et al. (2021) focused on the credit risk management practices of the Islamic and conventional banks in Malaysia. By using regression analysis and the Random Effect model on the selected credit risk and financial performance variables, all the independent variables have a positive significant relationship with the dependent variable except ROE which has a negative relationship.

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Buyukoglu et al. (2023) attempted to overview the impact of competition on the BRICS and Turkey's financial development. Data for the study was used from the year 2005-2021. Augmented Mean Group (AMG) estimation and Common Correlated Effects (CCE) estimation were used for analyzing results and found that competition has a significant impact on both countries.

Serwadda (2018) found that Uganda commercial banks have a negative impact on Non-performing loans on its performance which also effect the liquidity of the banks. Analysis in this study was done by creating a regression model and correlation matrix for the period 2006-15 of twenty commercial banks of Uganda.

Herath et al. (2021) study on Sri Lanka's banking sector, non-performing loans were found to detrimentally affect the return on assets, while the net charge-off ratio and loan-to-deposit ratio did not significantly impact the bank's profitability. The research revealed a positive correlation between the capital adequacy ratio and returns on assets. This highlights the crucial role of managing credit risk and maintaining adequate capital levels for enhancing the profitability of banks in Sri Lanka.
After reviewing different studies conducted, it is clear that major studies have been focused on a country basis. Researchers focus the analysing the impact of credit risk management on banks' performance but up to a particular country. There is no study taken into consideration in which a group of countries is included. The present study is an attempt to examine the impact of credit risk management on the financial performance of BRICS countries' banks.

OBJECTIVE OF THE STUDY

To analyse the impact of credit risk management on the financial performance of BRICS countries' selected banks.

HYPOTHESES DEVELOPMENT

H_{01}: Capital Adequacy Ratio (CAR) has no significant impact on the bank's Return on Asset (ROA) of BRICS countries.
H_{02}: Non-performing loans Ratio (NPLR) has no significant impact on the bank's Return on Asset (ROA) of BRICS countries.
H_{03}: Cost Income Ratio (CIR) has no significant impact on the bank's Return on Asset (ROA) of BRICS countries.
H_{04}: Loan to Deposits Ratio (LDR) has no significant impact on the bank's Return on Asset (ROA) of BRICS countries.

RESEARCH METHODOLOGY

This part covers the methods which are used to achieve the objective of the research – Analysing the impact of credit risk management on financial performance of Selected Banks of BRICS countries. The study has been conducted for the financial years 2018 to 2022. BRICS association is the major target sample of this study which includes Brazil, Russia, India, China, and South Africa. This study is purely based on secondary data extracted from the annual reports of the selected twenty-two banks which include dependent variables i.e, Return on assets, and Independent variables i.e, Capital Adequacy Ratio, Non-Performing Loans Ratio, Cost Income Ratio, and Loan to Deposits Ratio. The study utilizes panel data analysis to assess the impact of independent variables on return on assets, acknowledging the need to account for both time series and cross-sectional dimensions of the data. To this end, the research employs fixed and random effects techniques for estimation. Subsequently, the study employs the Hausman specification test to determine the most suitable technique for the analysis. Variation Inflation Factor (VIF) has been applied to check the problem of multicollinearity in the data. The correlation matrix is also used to estimate the level of correlation between the dependent variable and the independent variable. The analysis of data was conducted by using E-views.

MODEL SPECIFICATIONS

The regression model framed according to the variables is as follows:

$$\mathbf{FP = \beta_0 + \beta_1 CAR_{it} + \beta_2 NPLR_{it} + \beta_3 CIR_{it} + \beta_4 LDR_{it} + e_{it}}$$

FP is financial performance which is measured through Return on Asset (ROA). β are the intercepts.
CAR_{it} = Capital Adequacy Ratio for the current time t
$NPLR_{it}$ = Non=Performing Loans Ratio for the current time t
CIR_{it} = Cost Income Ratio for the current time t
LDR_{it} = Loan to Deposit Ratio for the current time t

SAMPLE OF THE STUDY

Table 1: Sample Banks of BRICS Countries

Brazil	Russia
1. Bradeso	1. Sberbank
2. Itau-Unibanco	2. VTB (VIBR)
3. Santander Brasil	3. Gazprombank (GAZP)
4. Banco do Brasil	4. Credit Bank of Moscow
5. Caixa Economica Federal	5. Rosselkhozbank
China	India

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1. Industrial and Commercial Bank of China	1. State Bank of India
2. China Construction Bank	2. Punjab National Bank
3. Bank of China	3. Bank of Baroda
4. Agricultural Bank of China	4. Canara Bank
	5. Union Bank of India
South Africa	
1. Development Bank of Southern Africa	
2. Land and Agricultural Development Bank of South Africa	
3. Postbank	

RESULTS AND DISCUSSION

This section includes parts: First is the descriptive analysis of the credit risk and financial performance variables. The second is a correlation matrix for examining correlated variables. Third is the Variation Inflation factor for checking multicollinearity and the Hausman specification test for choosing the effect model. The fourth and Last is, the application of the Random effect model.

Table 2: Descriptive Statistics for BRICS Banks

	ROA	CAR	NPLR	CIR	LDR
Mean	0.87	17.38	5.09	41.12	77.43
Median	0.97	13.65	3.1	43.41	92
Maximum	3.07	65	47.7	98.65	110.3
Minimum	-3.7	0.04	0.02	0.49	3.1
Standard Deviation	0.45	10.1	4.98	21.55	13.85
Skewness	-0.63	1.11	1.2	-0.31	-3.15

Source: Computed by Author through MS-Excel

Table 2 shows the descriptive analysis of the present study which includes the independent and dependent variables. The highest average value CAR in BRICS countries is 35.32867 in South Africa, and 62.588 is the highest mean value of Russia in terms of CIR. Again, South Africa has the highest mean value of NPLR and LDR i.e., 13.91 and 92.80 respectively. At the same time, the Cost Income Ratio has the highest standard deviation (21.55) which shows the highest variability, and the Return on Asset has the lowest standard deviation (0.45) which indicates stable variability. All the variables show positive mean values that's why there is the least variability in the data. The maximum value among the variables is of Loan Deposit Ratio i.e., 110.3, and the minimum is -3.7 of Return on Asset. For checking the symmetry of the data, skewness is calculated. According to this data, only CAR and NPLR have positive values so they skewed to the right, and ROA, CIR, and LDR have negative values so they skewed to the left.

Table 3: Pearson's Correlation Matrix

	CAR	*NPLR*	*CIR*	*LDR*	*ROA*
CAR	1				
NPLR	0.367888004	1			
CIR	0.453640971	0.341586	1		
LDR	0.434907886	0.443787	0.403842	1	
ROA	-0.006613586	-0.11147	-0.21379	0.148721139	1

Source: Computed by Author through MS-Excel

For checking the correlation between independent and dependent variables or estimating the existence of multicollinearity, a correlation matrix has been prepared. This matrix shows how much independent variables correlated with the dependent variable i.e., ROA. Table 3 shows that each value is perfectly correlated with itself. The result shows that CIR and LDR have a high correlation which means if the banks' CIR and LDR increase then the bank's ROA also increases. Wooldridge (2015) states that multicollinearity exists if the correlation coefficient is higher than 0.7. In this result, no value is higher than 0.7, so the multicollinearity does not exist in this data.

To further ensure that the problem of multicollinearity is not present in this data set, the Variation Inflation Factor test has been conducted in Table 4. All the values of VIF are less than 5 and the Tolerance value is more than 0.10 of all the variables; this shows that have no collinearity problem.

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Table 4: Variance Inflation Factor (VIF) - Collinearity

Variable	Variation Inflation factor	Terence
ROA	3.68	0.785
CAR	4.5	0.568
NPLR	2.7	0.248
CIR	1.3	0.321
LDR	1.8	0.265
Mean VIF	2.796	

Source: Computed by Author through E-views

Table 5: Hausman specification test

Test Summary	Chi-square Statistics	Chi-square (d.f.)	Probability
Cross Section	1.8745	4	0.875

Source: Computed by Author through E-views

After checking the multicollinearity issue, the Hausman test has been used in the study to check which model is suitable according to the data. There is a correlation between the errors and the regressors or not checked by the Hausman test. Table 5 displays the results of the Correlated Random Effects-Hausman test, showing that the null hypothesis is accepted. This is supported by a Chi-Square statistic of 1.8745 and a probability (p-value) of 0.491247, which is considered statistically insignificant. As a result, the random-effects model (REM) was chosen as the preferable model for this study. Consequently, the study will utilize the coefficients from the random effect model as presented in Table 6 for further analysis and discussion.

Effect of Credit Risk on BRICS Bank's Financial Performance

Table 6: Random- Effects Model: ROA is the dependent variable

Variable	Coefficient	Std. Error	p-value
Constant	**0.0385**	**0.06548**	**0.4875**
CAR	**0.0387**	**0.05201**	**0.6854**
NPLR	**-0.0212**	**0.01385**	**0.0045**
CIR	**-0.0178**	**0.01474**	**0.0075**
LDR	**0.0133**	**0.01875**	**0.1210**
R-Squared	**0.8557**		
Adj. R Squared	**0.8024**		
Chi-Squared			

Source: Computed by Author through E-views

DISCUSSION

Capital Adequacy Ratio (CAR): Table 6 indicates that the capital adequacy ratio does not have any significant impact on the bank's financial performance of BRICS countries which is measured through Return on Asset (ROA). The P-value of CAR is 0.4875 at 5% level of significance and the regression coefficient value is 0.0385 which means that a 1% increment in CAR affects the increment in ROA by only 0.0387% which is insignificant. The findings failed to reject $H_{01.}$ So, Capital Adequacy Ratio (CAR) has no significant impact on the bank's Return on Asset (ROA) of BRICS countries.

Non-Performing Loans Ratio (NPLR): Table 6 shows that the non-performing loans ratio has a negative impact on the ROA (a financial indicator of Banks). At a 5% level of significance, the p-value of NPLR is 0.0045, and the regression coefficient value is (-0.0212) which means that a 1% increase in NPLR decreases the ROA by 0.021%. So the findings reject the null hypothesis H_{02} and NPLR have a significant impact on the bank's Return on Asset (ROA) of BRICS countries.

Cost-to-income Ratio (CIR): Cost-to-income ratio also has a negative impact on the ROA of banks according to the findings given in Table 6. The P-value of CIR at 5% level of significance is 0.0075 which is significant and the regression coefficient value is (-0.0178) which indicates that 1% increment in CIR effect negatively ROA and decreases it by 0.0178%. So, the null hypothesis (H_{03}) in this case is rejected and CIR has a significant impact on the bank's Return on Asset (ROA) of BRICS countries.

Loan-to-deposit ratio (LDR): According to the analysis, it is found that LDR impacts the ROA of banks positively. An increase in LDR also increases the ROA of banks. At a 5% level of significance, the p-value is 0.1210, and the regression coefficient is 0.0133

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which shows that 1% increase in LDR increases the level of ROA by 0.0133% which concludes that the null hypothesis (H_{04}) failed to reject. So, Loan to Deposits Ratio (LDR) has no significant impact on the bank's Return on Asset (ROA) of BRICS countries.

Table 7: Summary Table:

Hypothesis	Rejected/Accepted
H_{01}: Capital Adequacy Ratio (CAR) has no significant impact on the bank's Return on Asset (ROA) of BRICS countries.	Accepted
H_{02}: Non-performing loans Ratio (NPLR) has no significant impact on the bank's Return on Asset (ROA) of BRICS countries.	Rejected
H_{03}: Cost Income Ratio (CIR) has no significant impact on the bank's Return on Asset (ROA) of BRICS countries.	Rejected
H_{04}: Loan to Deposits Ratio (LDR) has no significant impact on the bank's Return on Asset (ROA) of BRICS countries.	Accepted

CONCLUSION

This study was conducted to analyse the impact of credit risk management on the financial performance of twenty-two banks of BRICS countries from the period 2018-2022 by using the Random Effects Model (REM). In the current study for financial performance dependent variable is Return on Asset (ROA) and for credit risk independent variables are Capital Adequacy Ratio (CAR), Non-Performing Loans Ratio (NPLR), Cost Income Ratio (CIR), and Loan Deposit Ratio (LDR). Through the findings, it is concluded that the Non-Performing Loans Ratio and Cost-to-income ratio have a negative impact on the financial performance of banks of BRICS countries. On the other hand, other ratios have a positive impact on the ROA of banks. Capital adequacy Ratio has the highest coefficient in comparison to other variables. It is believed that the credit scoring of banks is totally dependent on the bank's cost, profit, or in other words overall financial performance. After analysis, findings, and discussion, it is concluded that the banks should focus on their non-performing loans and their timely recovery. They should check the history of borrowers for smooth functioning and proper risk management. It is also recommended that banks should use their resources in those areas which impact positively on the performance of banks.

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