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PERFORMANCE EVALUATION OF MERGED REGIONAL RURAL BANKS IN INDIA : A LONGITUDINAL STUDY

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Abstract
The present study aims to evaluate the performance of merged regional rural banks (RRBs) in the post-merger era. The performance of Regional rural banks' is examined by two variables: Return on Equity(ROE) and Return on Assets (ROA). The results exhibited that although there has been a decline in ROA and ROE of merged RRBs during the study period. However, they performed better than the national average of all RRBs operating in the country in the corresponding years. In the second part of the analysis, the study dwells on the variables that influence the performance of merged RRBs for observed performance. The results revealed that bank-specific variables such as non-interest income or other income ratio, capital adequacy ratio, and operating expenses ratio have a significant impact on the profitability of rural banks. In contrast, the Inflation rate (INFLA) and Gross Domestic Product (GDP) have been insignificant in explaining the variation in merged RRBs' performance.
Keywords: Determinants, India, Performance Evaluation, Profitability, Regional Rural Banks.

1. Introduction

An efficient and robust banking system is an essential component of the financial sector and a stimulus for economic growth and prosperity for a country. Since India is an agrarian nation, a considerable part of its population still lives in rural areas. An institution providing commercial bank services on the rural platform is an inseparable segment of the Indian banking system. The purpose of the formation of regional rural banks (RRBs) was to enhance India's rural credit delivery system (Misra, 2006). On Narasimhan Committee recommendations, the Government of India established the first regional rural bank in India, intending to ensure adequate institutional finance to agriculture and its allied sectors and address the issues and requirements of the rural poor. An attempt was made to integrate commercial banking within the broader policy drive towards social banking while taking into consideration local peculiarities, with joint ownership by the Central Government, the relevant State Government, and the sponsoring bank. Agricultural labourers, small or marginal farmers, and rural artisans can get loans through regional rural banks, which pool capital from rural and peri-urban regions (Ibrahim, 2016). Regional rural banks in India were projected to accelerate their branch growth, collect deposits, and offer loans to rural communities. Their motto was 'social banking,' and they paid little attention to bank efficiency and profitability (Khan & Ansari, 2018). Regional rural banks' operating performance began to catch the interest of Government and authorities after over a decade of their existence. Economic bankruptcy, shortage of capital to mobilize, restricted

interest earnings, and stiff competition from commercial banks in rural financing as part of priority sector lending were all critical challenges for RRBs (Suresh, 2015). As a result, the Indian Government, on the advice of the Reserve Bank of India (RBI), organized many committees to address issues with the operation of regional rural banks.

In 2004, the Vyas Committee II proposed two different models: a zonal bank for RRBs in the North-East and state-level rural banks for the rest of the nation and a two-phase reorganization of RRBs. In the first step, all RRBs of the same sponsor bank should be amalgamated to form a single institution, and in the second stage, RRBs of different sponsor banks should be amalgamated. Need-based and efficient customer services were expected from amalgamated RRBs due to improved banking joint publicity/marketing efforts, branch mechanization, infrastructure, computerization, and optimum utilization of available trained and experienced workforce. It may also reap the benefits of a vast operating area due to economy of scale, improved mobilization of financial resources, efficient credit deployment, and a more comprehensive range of banking services (Kumar & Kansal, 2018). In September 2005, the decision to amalgamate regional rural banks in India made them profitable, efficient, and consolidated rural banking institutions. Since the authorities observed no dominant or efficient bank, predecessor banks were dissolved, and their assets were consolidated into a new and larger entity. Since then, numerous studies have been conducted to examine the effect of the amalgamation on the performance of RRBs, but there is no sincere attempt to explore the variables that impact the performance of RRBs in the post-merger era.

2. Review of Literature

The fundamental motivation for bank consolidation, according to industry practitioners, is improved revenues and cost reduction. Risk diversification and the aim to become "too big to fail" are two reasons for bank mergers and acquisitions. Several studies measured the banks' performance in the post-merger period. Zafar and Shah (2020) examined acquiring banks' performance using CAMEL ratios in the long run and concluded that the ratios of the merged banks outperformed industry averages significantly. Bajomo and Akinlo (2018) assessed the impact of reforms and consolidation on bank performance. They found that the profitability of the post-consolidation banking system in Nigeria was derived from banks' internal management decisions and the industrial structure prevalent at the time. Kolapo et al. (2016) examined the relationship between the profitability and size post-2005 consolidation in Nigeria and revealed that the bank size is inversely related to the bank's profitability. Soyemi et al. (2013) explored the variables that influenced Nigerian Deposit Money Banks' profitability in the post-consolidation period and revealed that bank size and capital adequacy ratio were significantly negative in explaining bank's profitability. Furthermore, due to inefficiencies associated with big complex organisations, major Nigerian banks face a diseconomy of scale. Odetayo et al. (2013) evaluated the performance of two major banks, i.e., United Bank for Africa (UBA) Plc and Access Bank. The findings revealed that net assets and shareholders' funds were not the significant predictors of banks' profitability in the post-consolidation period, signals that increasing selected banks' size in terms of assets does not lead to high profitability, suggesting that size is no longer a driver of bank profitability in the post-consolidation era. Knapp et al.(2006) evaluated the merger of Bank Holding Companies(BHCs). They found that the post-merger profitability for merged BHCs is lower than the industry average. Poor post-

merger performance is caused by two significant factors: credit quality and fee income generation.

In the Indian rural banking scenario, Das (2021) evaluated the performance of two RRBs, i.e., Paschim Banga Gramin Bank (PBGB) and Bangiya Gramin Vikash Bank (BGVB), following their amalgamation, it was discovered that both banks work well in rural regions by offering serviceability in microfinance and microcredit. Bhattacharya and Dutta (2016) examined the determinants influencing the RRBs' performance in West Bengal in the post-merger period. The study used the net income to total assets as a dependent variable and loans and advances, investments, liquidity, and net income of sponsor banks as independent variables. The results revealed that investments and liquidity significantly impacted RRBs' performance. However, loans and advances and sponsor bank net income were not significant in explaining RRB performance in West Bengal. Jorum and Mali (2012) examined the performance of RRBs in the post-merger period and found improved performance in terms of profitability. In addition, the results revealed improvement in deposit mobilization, credit deployment, recovery performance, and a decrease in non-performing assets. Misra (2006) evaluated the effect of factors affecting the performance of RRBs from 1993-94 to 2002-03. Net income to total assets was taken as a proxy for RRB performance. The results revealed that investments and sponsor banks positively impacted the financial performance of profit-making RRBs.

Previous studies related to rural banks in India mainly focused on performance indicators after the merger. At the same time, few studies, such as Misra (2006), explored the determinants of profit and loss-making regional rural banks in India. Bhattacharya and Dutta (2016) tried to explore the factors that influenced the performance of regional rural banks in West Bengal in the post-amalgamation period. Therefore, the present study adds to the limited knowledge by evaluating the performance of RRBs formed as a result of a merger in the post-merger era. In addition, it is likely among the few studies which break down the post-merger performance into its constituent parts to determine the primary elements influencing observed performance.

3. Conceptual Framework and Hypotheses Development

In the first part of the analysis, we evaluate the performance of merged RRBs. Two performance indicators are considered, i.e., Return on Equity (ROE) and Return on Assets (ROA). In addition, the ROA and ROE of merged banks will be compared with the average of all RRBs. In the second part of the analysis, an attempt has been made to explore the variables that impact the performance of merged regional rural banks in the post-merger era using panel data regression by regressing with various internal or bank-specific and external or macroeconomic explanatory variables.

3. Variables Explanation

3.1 Dependent Variables

Return on Assets (ROA)

The return on assets (ROA) has been utilized to measure a bank's profitability. It depicts a company's earnings in relation to its assets. The greater the size of this ratio, the better the bank's performance. Kolapo et al. (2016) and Bernad et al. (2013) used ROA to measure profitability. Misra (2006), Bhattacharya, and Dutta (2016) used ROA as a proxy of the profitability of RRBs and denoted it as net income to total assets (NITA). Goenka (2017) also took ROA as a profitability indicator of regional rural banks in Rajasthan.

Return on Equity (ROE)

Return on Equity (ROE) is defined as earnings earned by banks in proportion to their shareholders' funds. It is derived by dividing net income by total equity. ROE demonstrates the bank's management competency in utilizing shareholder funds. Studies such as Soyemi et al. (2013), Almaqtari et al. (2018), Homaidi et al. (2018), and Maiti and Jana (2017) used ROE as a dependent variable to measure profitability.

3.2 Independent or Explanatory Variables

Explanatory variables are divided into two groups in Table 2, i.e., internal or bank-specific and external or macroeconomic determinants. Size of the bank, liquidity and capital adequacy, operating expenses ratio, non-interest or other income ratio, loan to total asset ratio, and non-performing asset ratio are all bank-specific factors. GDP and inflation rate are macroeconomic factors of bank profitability. The following is a description of both types of explanatory variables.

3.2.1 Bank-Specific Variables

Size

The bank size affects its profitability because bigger banks take advantage of economies of scale. Prior studies used a natural log of total assets to represent the bank size; hence it is expected to capture economies of scale and cause higher profitability. The size of a bank and profitability have a positive relationship observed by studies such as Almaqtari et al. (2018) and Homaidi et al. (2018). In some cases, large banks become complex organisations after the merger. Such banks start creating diseconomies, eventually influencing profitability negatively. Studies such as Kolapo et al. (2016) and Soyemi et al. (2013) observed an inverse relationship between the bank size and profitability. Whereas, Odetayo et al. (2013) observed an insignificant impact of the size of a bank on the post-merger banks profitability. Due to inconclusive evidence in this context, the present study hypothesized that:

H1a : There is a significant and positive relationship between Size and Profitability.

H1b : There is a significant and negative relationship between Size and Profitability.

Capital Adequacy

A well-capitalized bank offers greater strength to function through financial crises and enhanced depositor safety under uncertain macroeconomic situations (Soyemi et al., 2013). The RRB recapitalization programme, initially implemented in 1994-95, has impacted profitability. A capital adequacy ratio is essential for assessing a bank's safety and soundness. According to Mbizi (2012), a higher degree of capital adequacy positively impacts a bank's overall performance. Hence, the hypothesis is drafted :

H2 : There is a significant and positive relationship between Capital Adequacy and Profitability.

Loan to Total Asset ratio

RRBs are scheduled commercial banks whose primary sources of revenue are lending and investing (Misra, 2006). Soyemi et al.(2013) also took a loan to asset ratio to measure its influence on profitability. Total credit in loans and advances attracts a higher level of risk and entails a higher profit (Cebenoyan and Strahan, 2004). This leads to the following hypothesis:

H3: There is a positive and significant relationship between the Loan to Total Asset ratio and profitability.

Liquidity

The liquidity of the RRBs is represented through the liquid assets as a proportion of their total assets. Lower rates of return are closely attributed to liquid assets. It is anticipated that increased liquidity will be linked with profitability deterioration (Molyneux and Thornton, 1992). A higher liquidity ratio is associated with low profitability. This led to the formulation of the hypothesis :

H4: There is a significant and negative relationship between Liquidity and Profitability

Operating Expenses Ratio

Rising operating expenditures are projected to support expanding corporate operations. The disparity between growing expenditures and non-operating expenses is problematic and demonstrates inadequate expense management. The non-interest or operating expenses as a proportion of total expenditure (OER) are used as an explanatory variable to evaluate the influence of expense management on a bank's profitability. Studies such as Maiti and Jana(2017), Bhatia et al. (2012), and Misra (2006) observed a significant negative association of operating expense ratio with profitability. Hence, the following hypothesis is drafted:

H5: There is a significant and negative relationship between the Operating Expenses ratio and profitability.

Non-Interest Income or other income Ratio

Non-interest income or other income refers to the revenue earned from commissions, service charges on deposit accounts, consultancy and advising fees, safe deposit box rentals, profit from the sale of securities, and insurance operations. The non-interest or other income ratio is calculated by dividing non-interest income by total assets. Banks have diversified their fee-for-service offerings to include insurance, mutual fund sales, and investment banking. Second, banks are increasingly charging separate fees for financial services that were formerly packaged with deposit accounts. Studies such as Aspal et al.(2019), Maiti and Jana (2017), Misra (2015), and Dutta, Gupta, and Rao (2013) observed a favourable association between non-interest income ratio with profitability. Hence, the following hypothesis is drafted:

H6: There is a significant and positive relationship between the Non-Interest Income ratio and profitability.

Net Non-Performing Asset Ratio

Non-performing assets (NPA) represent those loans and advances on which repayments, i.e., principal and interest, are not received within a prescribed time. The quality of assets represents the financial strength of a bank. Asset quality (AQ) is used to assess the percentage of non-performing assets in total assets. Capital erosion and higher credit and capital risks result from poor asset quality. Every bank tries to keep non-performing assets as low as possible because high NPA is associated with low profitability. The net NPA ratio is derived by dividing net non-performing assets by net advances. Various Studies such as Aspal et al. (2019) and Maiti and Jana (2017) observed an inverse relationship between the NPA ratio with the banks' profitability. Thus, the following hypothesis is framed :

H7: There is a significant and negative relationship between Net Non-Performing Asset Ratio and Profitability.

3.2.2 Macroeconomic Determinants

GDP Growth rate

Gross domestic product refers to the total value of goods and services produced inside a country's domestic territory (GDP). A high GDP signifies increased economic activity and the

expansion of credit in the economy. High credit may bring in more significant revenue for the bank, but it also risks asset quality. Numerous studies such as Aspal et al. (2019), Karimzadeh et al. (2013), Misra (2015), Sinha and Sharma (2016), Sufian and Noor (2012), and Soyemi et al. (2013) have used GDP to evaluate the influence of macroeconomic conditions on the profitability of the bank, finding both a negative and positive relationship between GDP growth and profitability of a bank. Hence, we have no prior expectations for the GDP variable. Hence, the following hypothesis is drafted :

H8a: There is a significant and positive relationship between GDP and Profitability.

H8b- There is a significant and negative relationship between GDP and Profitability.

Annual Inflation Rate

It indicates the general upward tendency in the cost of goods and services. Inflation may have direct impacts on bank profitability, such as an increase in labour price, as well as indirect ones, such as alterations in asset values and interest rates. According to Perry (1992), inflation impacts the performance of banks depending on whether the inflation is predicted or unforeseen. Interest rates are altered to reflect this in the projected scenario, resulting in an increasing rate of revenues than the costs and, as a result, increased bank profitability. In the unanticipated scenario, banks are hesitant to modify their rates of interest; as a result, a sudden increase in bank expenditures relative to their revenues has an inverse impact on bank profitability. Studies such as Aspal et al. (2019), Almaqtari et al. (2018), Karimzadeh et al. (2013), and Sinha and Sharma(2016) observed an inverse relationship between inflation and bank profitability. In contrast, Homaidi et al. (2018), Misra (2015), and Soyemi et al. (2013) exhibit a positive association between inflation and banks' profitability. Thus, the following hypothesis is framed :

H9a: There is a significant and positive relationship between Inflation and Profitability.

H9b: There is a significant and negative relationship between Inflation and Profitability.

Table 1 List of variables employed in Panel data analysis

Variable	Acronym	Measure	Hypothesized relationship
Dependent variables			
Profitability	ROA	Net Profit/Total Assets	
	ROE	Net Profit/Total Equity	
Bank specific variables			
Size	LNAS	Natural logarithm of total assets	+/-
Capital Adequacy	CAD	Equity/Total Assets	+
Loan to Total Asset ratio	LOTA	Loans & advances / Total assets	+
Liquidity	LIQ	Liquid assets/ Total assets	-
Operating Expense Ratio	OER	Operating expenses/ Total expenditure	-
Net NPA Ratio	NNPR	Net non-performing assets/Net loans and advances	-
Non- Interest Income ratio	NIIR	Non-Interest or other income or other income / Total Assets	+

Macroeconomic Determinants			
Annual GDP Rate	GDP	GDP Growth Rate	+/-
Annual Inflation Rate	INFL	Annual inflation rate	+/-

Source: Authors' Compilation

4. Research Methodology

4.1 Sample and Data collection

The sample units used in the study consist of regional rural banks formed in the first phase of merger. A sample of 14 regional rural banks (Appendix-A) for ten years from 2010 to 2020 has been taken. This provides a panel of balanced data sets of 140 annual bank observations. The data utilized in the present study extracted manually from annual financial statements of RRBs in India provided by the National Bank for Agriculture and Rural Development (NABARD) and the Reserve Bank of India (RBI) official website.

4.2 Model specification and econometric tools

Extensive research on the performance of bank profitability supports using the functional and linear form for analysis. Studies such as Kolapo et al. (2016), Soyemi et al. (2013), Maiti and Jana(2017), Almaqtari et al. (2018), and Brahmaiah and Ranajee (2018) found the linear regression model suitable for the analysis. However, studies such as Misra (2006) and Homaidi et al. (2018) used GMM estimates as well along with linear regression models. The present study supports the adoption of linear regression models for parameter models because they give more consistent and comparable outcomes (Almaqtari et al., 2018). Further, Panel data analysis also demonstrates the ability to manage individual multicollinearity and heterogeneity. The study uses balanced panel data from fourteen RRBs from the year 2010 to the year 2020. All of the assumptions essential for linear regression were examined during the preliminary data analysis stage.

Various studies have developed panel data analysis frameworks (Almaqtari et al., 2018; Misra, 2006; Bhattacharya & Dutta, 2016). Using the panel data equation, this study used a similar approach and background to prior investigations:

$$\gamma nt = \alpha + \beta xnt + \varepsilon nt \quad (1)$$

where γnt represents the dependent variable (Profitability), α is the intercept term on the explanatory variables, β is a k × 1 vector of the parameter to be estimated, and the vector of observations is xnt, which is 1 × k, t = 1 …, T; n = 1, …, N. Equation 1 can also be written as:

Profitability = *f* (Bank- specific variables; Macroeconomic variables) (2)

Profitability is measured by return on equity (ROE) and return on assets (ROA). Bank-specific variables include capital adequacy, size, loan to total asset ratio, liquidity, non-interest income ratio, operating expense ratio, and net NPA ratio. External or macroeconomic variables are inflation rate and GDP. Hence, equation (2) may be reorganised and expanded as follows, utilising the two profitability proxies:

$$ROAit = \alpha i + \beta 1Sizeit - + \beta 2CADit + \beta 3LOTAit + \beta 4LIQit + \beta 5OERit + \beta 6NIIRit + \beta 7NNPRit + \beta 8GDPit + \beta 9INFLit + \varepsilon it \quad (3)$$

$$ROEit = \alpha i + \beta 1Sizeit - + \beta 2CADit + \beta 3LOTAit + \beta 4LIQit + \beta 5OERit + \beta 6NIIRit + \beta 7NNPRit + \beta 8GDPit + \beta 9INFLit + \varepsilon it \quad (4)$$

where i is a specific bank, t denotes the year, β1: β9 denotes the variables coefficients , and ε is the error term; and all other variables are as defined in Table 1.

5. Data Analysis and Results

5.1 Performance of merged RRBs

Table 2 shows the performance of merged regional rural banks based on their profitability, like returns on equity and return on assets, along with the mean ROA and ROE of all RRBs operating in the country for the same year. It has been observed that return on assets reduced from 1.015 percent in 2010-11 to -0.328 percent in 2019-20. The average ROA of all RRBs also reduced from 0.91 percent in 2010-11 to -0.4 percent in 2019-20. Similarly, return on equity also reduced from 13.64 percent in 2010-11 to -4.79 percent in 2019-20. The average ROE of all RRBs also reduced from 12.38 percent in 2010-11 to -6.37 percent in 2019-20.

Table 2 : Performance indicators of merged RRBs with industry average (all RRBs)

Year	No. of RRBs	Return on Assets (ROA)	Mean ROA(All RRBs)	Return on Equity (ROE)	Mean ROA(All RRBs)
2010-11	14	1.015	0.91	13.64	12.38
2011-12	14	1.025	0.85	12.84	11.28
2012-13	14	1.077	0.88	13.06	11.68
2013-14	14	1.118	0.92	13.69	12.15
2014-15	14	1.060	0.83	13.26	10.94
2015-16	14	0.665	0.53	9.03	7.45
2016-17	14	0.654	0.51	9.30	7.52
2017-18	14	0.548	0.31	7.77	4.74
2018-19	14	0.308	-0.13	4.49	-2.02
2019-20	14	-0.328	-0.4	-4.79	-6.37

Source : Authors compilation

The analysis revealed that although ROA and ROE of merged regional rural banks show a declining trend in the post-merger era yet they have performed better than industry-average ROA and ROE. This signifies that merged RRBs have proven to be less sensitive to industry shocks and downtrends.

5.2 Panel data analysis

In the second part of the analysis, we attempted to investigate the variables that impact the profitability performance of merged regional rural banks in the post-merger era using panel data regression by regressing with internal or bank-specific and external or macroeconomic explanatory variables.

5.2.1Descriptive analysis

Table 3 depicts summary statistics of variables used in the study. The independent or explanatory and dependent variables are presented in average, median, minimum, maximum, and standard deviation.

Table 3 : Descriptive Statistics

Variables	Mean	Median	Minimum	Maximum	Std. Dev.
Dependent Variables					
ROA	0.63	0.71	-3.24	2.3	0.99
ROE	6.20	9.99	-77.78	28.57	19.23
Bank Specific Determinants (Independent Variables)					

LNAS	13.55	13.62	11.77	14.95	0.70
CAD	6.42	5.89	1.95	12.49	2.24
LOTA	0.54	0.541	0.07	0.99	0.16
LIQ	23.52	22.35	3.48	52.37	12.73
OER	0.32	0.32	0.16	0.57	0.07
NIIR	0.63	0.60	0.12	1.66	0.33
NNPR	4.10	2.25	0.00	36.13	5.77
Macro-Economic Determinants (Independent Variables)					
GDP	5.05	6.45	-7.96	8.25	4.51
INFL	6.33	5.78	3.32	11.06	2.52

Source: Authors' calculation

During the period 2010-2020, the descriptive statistics show profitability trends and outcomes for bank-specific and macroeconomic factors. The findings revealed that ROA and ROE range between the minimum values of -3.24 and -77.78 and maximum values of 2.3 and 28.57, respectively. The mean values of ROE and ROA are 0.632 and 6.201. Skewness in the distribution is observed during the study period. Bank specific variables such as LNAS, CAD, LOTA , LIQ, OER ,NIIR and NNPR have a mean values of 13.55, 6.42, 0.54, 23.52, 0.33, 0.63 and 4.10 with standard deviation of 0.70, 2.24, 0.16, 12.73, 0.07, 0.33 and 5.78.GDP has a maximum value of 8.25 and a minimum value of -7.96, with a mean of 5.05. Similarly, the maximum value of the inflation variable is 11.06, and the minimum value is 3.32,, with an average value of 6.33.

5.2.2 Diagnostic analysis

To assess the appropriateness of the models presented in the study, prefatory diagnostic tests have been performed. All assumptions, including multicollinearity, autocorrelation, and heteroskedasticity, have been examined and modified to ensure that the models provided in the research are appropriate.

Table 4 Pairwise correlation between variables used in the study

Panel A : Matrix of Correlation										
Measures of profitability			**Bank specific determinants**						**Macroeconomic variables**	
Variables	**ROA**	**ROE**	**LNAS**	**CAD**	**LOTA**	**LIQ**	**OER**	**NIIR**	**NNPR**	**GDP**	**INFLA**
ROA	1.000										
ROE	0.908	1.000									
Bank- Specific Determinants (Independent Variables)											
LNAS	-0.036	-0.113	1.000								
CAD	0.550	0.380	0.232	1.000							

LOTA	0.489	0.371	-0.115	0.434	1.000					
LIQ	-0.143	-0.075	-0.110	-0.172	-0.515	1.00				
OER	-0.640	-0.612	0.124	-0.348	-0.444	0.253	1.000			
NIIR	0.199	0.144	0.213	0.358	0.438	-0.574	-0.170	1.000		
NNPR	-0.558	-0.498	0.148	-0.322	-0.475	0.266	0.291	-0.289	1.000	
Macroeconomic Variables										
GDP	0.397	0.457	-0.233	0.130	-0.006	0.017	-0.436	-0.212	-0.058	1.000
INFL	0.125	0.058	-0.410	0.056	0.094	0.082	0.048	-0.046	-0.086	0.086	1.0
Multicollinearity Diagnostics										
VIF			1.735	1.767	2.224	1.874	1.701	1.885	1.383	1.589	1.341

Source: Authors' calculation

Pairwise correlation matrix (Table 4) indicates the correlation among the profitability, bank-specific variables such as LNAS, LIQ, OER, and NNPR depict negative relation with ROA and ROE and a negative contribution toward bank profitability. In contrast, CAD, LOTA, and NIIR positively correlates with ROA and ROE.

Concerning macroeconomic variables, i.e., GDP and INFLA reveal a positive correlation between ROA and ROE. The highest correlation value is observed among independent variables between LOTA and NIIR, i.e., 0.438. As seen from the table, independent variables have a low correlation with each other. The correlation coefficient of explanatory variables above 0.80 signals the problem of multicollinearity (Kennedy,2003). Variance inflation factor (VIF) has a maximum value of 2.22, which is within acceptable bounds (VIF<10) which indicates the models have proven to be devoid of multicollinearity.

Table 5. Prefatory Test and Model Selection

	ROA		**ROE**	
Breusch–Pagan Test (heteroskedasticity)	$\chi2$ (8) = 92.40	Prob > $\chi2$ = 0.0	$\chi2$ (8) =148.07	Prob > $\chi2$ = 0.0

Wooldridge Test (Autocorrelation)	F(1, 13) = 0.593	Prob > F =0.454	F(1, 13) = 0.978	Prob > F = 0.34
Hausman Test (Fixed Effect or Random Effect)	χ^2 (7) = 24.44	Prob > χ^2 = 0.00	$\chi 2$ (7) = 73.47	Prob > $\chi 2$ = 0.0
Model accepted	Fixed effect		Fixed effect	

Source: Authors calculation

The Breusch–Pagan test was used to determine the presence of heteroskedasticity in the model. Table 4 shows that both models have heteroskedasticity problem. To alleviate the issue of heteroskedasticity in the model, robust standard errors were presented and interpreted in the study. The null hypothesis of no first-order autocorrelation is supported by the Wooldridge test results (Wooldridge, 2010). It indicates that the previous values of ROE/ROA(i.e., the dependent variables) have no bearing on their future values. As a result, the explained variables have no lag values in the model. Finally, the Hausman test has been employed to confirm the suitability of the random or fixed effect model. The Hausman test recommends fixed effect model for both ROA and ROE models.

6. Results and Discussions

Table 6 shows the results of panel data analysis for both models. The results revealed that the within R square for return on assets is 0.64. This shows that explanatory variables account for approximately 64% of the variation in performance as evaluated by return on assets. The within R square of return on equity is 0.67. This implies that explanatory variables account for around 67 percent of the variance in a bank's profitability as assessed by return on equity.

Table 6 : Results of Panel Data Analysis

	Dependent Variables			
Independent Variables	**Return on Assets (ROA)**		**Return on Equity (ROE)**	
	Coefficient(p-value)	Robust Standard errors	Coefficient(p-value)	Robust Standard errors
Intercept	3.91 (0.37)	4.25	92.25(0.19)	67.84
	Bank Specific Variables			
LNAS	-0.27 (0.30)	0.25	-7.69(0.11)	4.48
CAD	0.22 (0.00)***	0.25	5.72(0.00)***	1.31
LOTA	.791 (0.06)	0.38	24.56(0.05)	11.84
LIQ	0.06(0.40)	0.007	0.19(0.25)	0.16
OER	-5.75(0.00)***	1.27	-126.79(0.00)***	24.32
NIIR	0.45(0.04)**	0.20	15.87(0.02)**	6.21
NNPR	-0.04(0.03)**	0.01	-0.68(0.09)	0.38

		Macroeconomic Variables		
GDP	0.02 (0.10)	0.01	0.52 (0.09)	0.29
INFLA	0.005 (0.90)	0.04	0.72 (0.34)	0.74
R^2 (Within)	0.64		0.67	

Source: Authors' calculations

Note: Three*** and two ** asterisks represents statistical significance at 1% and 5% level respectively.

Bank-specific variables such as CAD, OER, and NIIR, have a statistically significant impact on the profitability performance of merged regional rural banks in the post-merger era. The positive and significant relationship between capital adequacy and profitability signifies that banks with high equity capital tend to earn high profits. Hence, H2 is accepted. Adequate capital is often related to high profitability, maybe because a well-capitalised bank can reap the benefits of more business opportunities while also meeting any unforeseen losses that may come in the future. The results are aligned with the findings of the studies such as Misra (2015), Konboye, and Nteegah(2016). The negative and significant relation between OER and ROA implies that high operating expenses as a percentage of total expenses negatively influence the profitability of merged RRBs. Hence H5 is accepted. This is aligned with the findings of the studies such as Misra (2006), Bhatia et al. (2012), Dutta et al. (2013), and Misra (2015), who also concluded that there is an inverse relationship between operating expenses and profitability. NIIR has a positive impact on profitability. Hence, H6 is accepted. The results are consistent with the findings of Aspal et al. (2019). They found that income from non-traditional sources enhances the banks' profitability. The net NPA ratio has a negative effect on the ROA of merged RRBs that, signifies that deterioration in banks' asset quality is associated with low profitability.

The liquidity and size of the bank are insignificant, explaining the variation in profitability measured as ROE. The positive coefficient of liquidity indicates that high liquidity is beneficial for the profitability of rural banks. On the contrary, the negative coefficient of bank size represents that big banks are not successful in transferring advantages created through economies into high profitability; instead, an inverse relationship between bank size and profitability is depicted through the results.

Addressing the influence of macroeconomic variables on regional rural banks' profitability, table 6 exhibits that the coefficient of GDP is positive, which signifies a positive direction of GDP with the profitability of merged RRBs, but the influence is not statistically significant. Inflation is statistically insignificant and does not seem to impact the profitability of merged regional rural banks significantly.

7. Conclusion

The present study evaluated the profitability performance of merged regional RRBs in the post-merger era. Profitability is measured by return on assets and return on equity. The first part of the analysis revealed that the ROA and ROE of merged RRBs declined during the study period,

but these banks' mean ROE and ROA are higher than the average ROE and ROA of all RRBs. In the second part of the analysis, the reasons for observed performance have been evaluated. Panel data analysis has been employed to explore the variables that impact the profitability performance of merged RRBs in the post-merger era. The results of panel data analysis revealed that bank-specific or internal variables such as the capital adequacy ratio positively impact the profitability of merged regional rural banks in the post-merger era.

In contrast, operating expenses and net non-performing asset ratios negatively influence the profitability of rural banks. In addition, the creation of economies after the merger was expected from the RRBs, but results revealed an insignificant influence of bank size on the profitability of merged RRBs. The liquidity of banks has not been significant in explaining the profitability of RRBs. Macroeconomic or external variables, i.e., GDP and Inflation rate, are not significantly impacting the profitability of RRBs as measured by ROA and ROE.

The study concluded that in the post-merger era, equity financing has been lucrative for the regional rural banks; hence priority may be given to equity financing rather than external borrowing, which imposes a fixed cost in interest payments that are eventually absorbed by profits. Operating expenses in proportion to total assets have been a significant contributor to the deterioration of profitability performance of merged RRBs. A sudden surge of operating expenses in later years of study may be attributed to implementing the Pension Scheme for RRB employees that brought about parity in pension for RRB employees in line with nationalised commercial banks putting extra burden in terms of employee compensation, eventually increasing operating expenses. Surprisingly, the size of RRBs had no significant influence on the performance of amalgamated RRBs, which is not in favour of the theory that large banks create economies of scale and are eventually able to increase profitability. Relatively non-traditional sources of income have been an essential contributor to enhancing the profitability of merged RRBs in the post-merger era.

The scope of this research is restricted to the limited variables that indicate performance. Different performance proxies such as net interest margin or cost to income ratio (CTIR) could also be employed to reconfirm the results. Future research may address unexplained variation by including different variables to explore the influence of the variables on the profitability performance of RRBs to reconfirm the current study's conclusions.

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Websites

https://www.rbi.org.in

https://www.nabard.org

Appendix A

Name of the Regional Rural Bank	***Sponsor Bank***	***State/UT***
Andhra Pradesh Grameena Vikas Bank	State Bank of India	Telangana
Chaitanya Godavari Grameen Bank	Andhra Bank	Andhra Pradesh
Telangana Grameena Bank	State Bank of India	Telangana
Karnataka Vikas Grameena Bank	Syndicate Bank	Karnataka
Kashi Gomti Samyut Gramin Bank	Union Bank of India	Uttar Pradesh
Sarva Haryana Gramin Bank	Punjab National Bank	Haryana
Andhra Pragathi Grameena Bank	Syndicate Bank	Andhra Pradesh
Bangiya Gramin Vikash Bank	United Bank of India	West Bengal
Paschim Banga Gramin Bank	UCO Bank	West Bengal
Saptagiri Grameena Bank	Indian Bank	Andhra Pradesh
Baroda Uttar Pradesh Gramin Bank	Bank of Baroda	Uttar Pradesh

Uttar Bihar Gramin Bank	Central Bank of India	Bihar
J & K Grameen Bank	J and K Bank	J & K, Ladakh
Maharashtra Gramin Bank	Bank of Maharashtra	Maharashtra

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