Advances in Consumer Research
ISSN (Print): 0098-9258
ISSN(Online): 3079-1766

Vol. 2, Issue 4 (2025) https://acr-journal.com/

Can more RRB branches and higher Per Capita Income increase deposits? - A State-Wise Regression Analysis of India's Rural Banking Sector

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Cite this paper as: Vansh Gupta, Dr. Kulwinder Kaur, (2025) Can more RRB branches and higher Per Capita Income increase deposits? - A State-Wise Regression Analysis of India's Rural Banking Sector. *Advances in Consumer Research*, 2 (4), 812-819

KEYWORDS

RRBs, Bank Deposits, Regression Analysis, Per Capita Income, Credit, Rural Economy, Savings Rate

ABSTRACT

Credit availability in the rural areas of India becomes a prime focus when around 2/3rd of the population lives there. Since its establishment, Regional Rural Banks (RRBs) have functioned as an essential channel of making credit accessible to the weaker sections of society, such as marginal farmers and small craftsmen, who were previously exploited at the hands of moneylenders. This paper seeks to analyse two key determinants of the deposits of RRBs, which are, first, the number of RRB branches and, secondly, the per capita income of the population of a state. Through a cross-sectional regression analysis for the year 2023, the study finds that both the explanatory variables exhibit a significant impact on the mobilisation of deposits in the RRBs, with the number of branches having a dominant role. These results have key importance from a policy perspective. The government can achieve the twin objectives of bolstering financial literacy and minimising the leakages in the Cash-transfer schemes of any rural region by opening up more RRB branches, which will simultaneously increase the deposits in the RRBs. Further, if the government aims to achieve a higher savings rate in the economy, then one avenue for it will be to invest in MSMEs, rural industries, etc., which shall increase the per capita income, and subsequently, the deposits in the banks..

1. INTRODUCTION

A unique demographic characteristic of India is that 65% of its population resides in rural areas and **47% depend on agriculture** for their livelihood.[1] This significant statistic makes the goal and the initiatives rendering rural development and upscaling the rural economy a key focus. Further, a key requirement for agricultural development, fostering business in rural areas, and poverty reduction — **credit availability** was realised by the government a long time ago. Evidence of this lies in the setting up of the National Bank for Agricultural and Rural Development (**NABARD**), Regional Rural Banks **(RRBs**), Primary Agricultural Credit Societies (**PACS**) and multiple other microfinance institutions.

Keeping the focus of the paper central to RRBs, one of the most pertinent steps the government took to increase the availability of rural credit was the establishment of RRBs on 2 October 1975. Regarded as '**small man banks**', the RRBs were set to provide credit to the **weaker sections** of the **rural areas,** particularly the small and marginal farmers, artisans and small entrepreneurs. These banks differ from commercial banks in the sense that they **grant loans at concessional lending rates** to weaker sections of rural areas for productive purposes.

Further, the loans provided by RRBs increased from Rs 600 crore in 1991-92 to Rs 3,170 crore in 1999-2000 and to Rs 1,49,670 crore in 2018-19, i.e. an increase of about 250 times since 1991-92. Additionally, it has been observed that **90% of the loans of RRBs** have been provided to the **small and marginal farmers** and **agricultural labourers**, making them truly

a 'small man bank. ' Another novel aspect of RRBs is that they do not lay much emphasis on securities or guarantees while granting loans, which has helped the rural populace in overcoming the exploitation by the traditional moneylenders.

The objective that this paper will aim to achieve is to examine how the **deposits in the RRBs** are influenced by the **number of RRB branches** and the **state-wise per capita Net State Domestic Product (NSDP)** for the year 2023

2. LITERATURE REVIEW

As the penetration of banks has increased at a rapid scale in the past two decades, a key topic of multiple academic researchers has been deposit mobilisation, with an emphasis on determining factors such as branch expansion, GDP growth, and financial inclusion, among others, with a focus on state-level variations. This literature review amalgamates key findings from several studies, highlighting the existing gaps that shall be addressed in this paper, particularly focusing on deposits of RRBs across Indian states in 2023.

Indumathi M. (2021): The author's study on the progress and performance of RRBs analyses the financial conduct of the RRBs from the period 2001-2021. The research integrates the use of multiple regression components such as ANOVA table, correlation techniques, etc. It also found out that the performance of the RRBs has been improved due to the amalgamation of certain branches and multiple government initiatives over the period. While the paper provides a generic and broad overview of key metrics of RRBs, a specific **analysis pegging deposit mobilisation with the number of branches and per capita NSDP has been missing**, which has been a primary focus of this paper.

Mohd Anwar & Imlak Shaikh (2018) investigated the relationship between the income growth in India and the expansion of banks. The study found that there is a **positive relationship between banking expansion** and **state domestic product (NSDP)** as the former impacts credit disbursement. The research indicated that a 1% increase in deposits leads to a 0.57% increase in NSDP, while a 1% increase in credit results in a 0.46% rise in NSDP. This study highlighted the wide-ranging economic impact of banking activities, but **does not specifically focus on the factors that drive deposit growth in RRBs at the state level,** especially in the context of regional disparities, which the current paper shall address.

Nandini, Bosu, & Patijoshi (2021): With a focus on RRBs, the growth and performance of rural banking in India were analysed. The authors carried out the study from secondary data of the range 2008-09 to 2017-18, studying the relationship between the number of RRB branches, net profits and total deposits. The regression model showed that the **number of RRB branches and total advances had a statistically significant effect on its net profit.** Although this study undertook key performance indicators for RRBs, it did not establish a direct and clear link between the deposits in the RRBs and other economic variables, which the current study shall address by examining state-level economic factors such as GSDP.

T. Lakshmanasamy (2020): In his paper titled "*Financial Inclusion in the States of India*", the author undertook a panel data analysis, with a focus on account penetration and its determinants, on financial inclusion across the states of India. The research found that **bank branch networking,** per capita income and **access to banking services** are important factors influencing credit **and deposit penetration**. The study also revealed that population density and the level of industrial development are crucial drivers for credit penetration. Nonetheless, the research does not provide a specific analysis of the deposit determinants of the RRBs, especially when juxtaposed with the impact of per capita NSDP, which the current paper shall address.

Zhang, Arora, and Colombage (2021) studied the reasons influencing bank branch expansion in India with the use of longitudinal state-level data from 200G to 2017. The research identified that the **location of bank branches** is greatly influenced by **regional** and **bank-specific factors** such as **bank deposits and population size.** Further, the impact of these factors depends on the business environment and the type of bank in each state. This research highlights the importance of spatial factors in the expansion of banks, but it does not study the relation between deposit growth and branch expansion, a gap which this research paper shall cover.

Even though the above-mentioned studies offer valuable insights, a clear gap in understanding the relationships between the deposit mobilisation, branches of the bank and per capita income persists. Most of the research studied the banking sector at large without **firstly channelling a special emphasis on the RRBs** and **secondly** on the **determinants of deposit mobilisation,** primarily economic growth variables.

The current study is being carried out with the objective of filling these gaps by employing a regression model that will examine the **deposits of RRBs** as a dependent variable, with the **number of branches** and **per capita NSDP** at current prices as independent variables.

Further, the study is focused on the states of India for the year 2023, thus providing a contemporary understanding of the factors affecting deposit mobilisation in the context of regional variations.

Theoretical Frameworks

The regression model and the relationship between the dependent and explanatory variables that this paper has worked on are well grounded by multiple economic theories, the five most pertinent of which are mentioned hereafter:

1. Financial Intermediation Theory (Gurley & Shaw, 1955)

"The role of the banks has been, first, to borrow loanable funds from spending units with surpluses, issuing indirect securities in exchange. These securities have been the currency and deposits that spending. units would prefer over real assets or the direct security issues of ultimate borrowers. The role of the banks has been, second, to transmit the borrowed funds to spending units with deficits, receiving in exchange direct securities for their own portfolios. Finally, the banks have exchanged direct securities with spending units that wish to adjust their relative holdings of securities in direct and indirect form." [2]

This theory writes about the two crucial roles of financial intermediaries, such as banks, first in the **mobilisation of savings**, and secondly, to **channel the borrowed funds** for **productive functions**. The expansion of the networks of banks' branches, an explanatory variable in the current study's model, directly impacts the availability and accessibility of banking services to the public. This characteristic trait is pertinent to consider for areas/ regions previously untapped.

Thus, as the **outreach of the banks scales up, the savings,** and **in turn deposits of the banks increase**. The theory explains this due to reduced transaction costs, higher trust and convenience in the banking system. Thus, more branches translate to better financial services and subsequently to a higher volume of deposits.

2. Permanent Income Hypothesis (PIH) by Milton Friedman

In his *Permanent Income Hypothesis* of 1957, Milton Friedman proposed[3] that people base their consumption on what they consider to be their 'normal' or permanent income. This means that any **cyclical or short-term fluctuation** in income will have only a **little effect on the consumption pattern**s of the people. Other way, it means that people base their consumption and savings level on the long-term expected income, not short-term levels.

This theory can be applied in the paper's model, keeping it centred on the per capita NSDP variable. Thus, as the **per capita NSDP rises** (proxy for permanent income), the **tendency of the people to save more increases**, subsequently leading to higher bank deposits (higher RRB deposits).

3. Theories of Banking and Branch Expansion (Branch Banking Theory)

In his journal article, **Branch Banking: A Note on a Theory Dilemma,** J. Lloyd Blackwell III writes, "We may reasonably expect that the result of branch banking would be to shift bank portfolio composition in the direction of assets which benefit most from reductions in search costs, information costs, and risk. Furthermore, since costs in general are reduced, it would be expected that branch banks would be more profitable, and that total credit would increase" [4]

Thus, the branch banking theory that postulates a direct **positive relationship** between the **physical presence of banks** through **more branches** and **deposit mobilisation** clearly fits into the model. Thus, as the number of RRB branches increases (which has been the case over the years), the likelihood of higher deposit mobilisation increases.

4. The Life-Cycle Hypothesis by Ando and Modigliani

"In any given year t, total consumption of a person of age T (or, more generally, of a household headed by such a person) will be proportional to the present value of total resources accruing to him over the rest of his life"[5]

The life-cycle hypothesis postulates that the **income level of an individual follows a hump shaped pattern** such that the level is higher in the middle stage of life as compared to the young and retirement age. This means that **people tend to save** during the years they earn/work and dissave in the years they do not work, for example, retirement. In the current model, the expected income of an individual becomes a proxy of per Capita NSDP, such that as it rises, the **savings also mark** a rise in the present time period, leading to **higher deposits.**

5. Savings Behaviour Theory (Keynesian Theory of Saving)

In the *General Theory of Employment, Interest and Money* of 193G, John Maynard Keynes put forward the notion that income is either spent for consumption or saved. Further, he said that as the **income of an individual rises,** the consumption expenditure falls, whereas the **Marginal Propensity to Save (MPS) rises.**

This fits in the current study, because with the increase in per capita NSDP (income level), the savings of individuals rises, leading to higher deposits in the bank.

3. DATA AND METHODOLOGY

1. Data Sources

The data for the current study have been taken from the "*Handbook of Statistics on Indian States*" published by the Reserve Bank of India for the year 2023-24. Further, the study is **cross-sectional** in type, such that the variables "**State-wise Deposits of Regional Rural Banks**" and "**State-wise Number of Branches of Regional Rural Banks**" are taken for the year 2023, whereas the variable "P**er Capita Net State Domestic Product (Current Prices)**" has been taken for the year 2022-23.

The Dependent variable "State-wise deposits of Regional Rural Banks" is measured in Crores, whereas the explanatory variables "State-wise Number of Branches of Regional Rural Banks" and "Per Capita Net State Domestic Product (Current Prices)" are measured as a count and in Rupees (Rs), respectively.

Here's the data for the model attached:

Names of the States	State-wise Deposits of RRBs (Y) - *In Crores*	State-wise Branches of RRBs (X1)	Per Capita NSDP in Rs log (X2)	Per Capita NSDP (in Rs)
Andhra Pradesh	48536	1334	12.30084177	219881
Arunachal Pradesh	1255	33	12.20603264	199992
Assam	12388	478	11.68946366	119308
Bihar	41304	2123	10.88702563	53478
Chhattisgarh	14335	613	11.83013479	137329
Gujarat	20392	760	12.51521406	272451
Haryana	20563	693	12.60011274	296592
Himachal Pradesh	7851	276	12.2958585	218788
Jharkhand	9537	455	11.47676965	96449
Karnataka	51867	1756	12.62634098	304474
Kerala	21886	645	12.43980791	252662
Madhya Pradesh	27907	1343	11.79063296	132010
Maharashtra	20610	757	12.43872683	252389
Manipur	420	27	11.62494079	111853
Meghalaya	3583	94	11.72719778	123896
Mizoram	4970	104	12.27906285	215144
Nagaland	135	12	11.88818563	145537
Odisha	23342	1002	11.87595617	143768
Punjab	12423	443	12.10999117	181678
Rajasthan	42139	1618	11.92273446	150653
Tamil Nadu	19919	666	12.53466391	277802
Telangana	22001	937	12.65243015	312522
Tripura	8010	152	11.96631687	157364
Uttar Pradesh	117608	4351	11.34007095	84126
Uttarakhand	7143	289	12.35014702	230994
West Bengal	29402	976	11.84540402	139442

2. Model Specification

The regression model of the current study is defined as follows:-

$Y = \beta_0 + \beta 1.X_1 + \beta_2.\ln(X_2) + \epsilon$

where:

- **Y** = State-wise Deposits of Regional Rural Banks (in ₹ crores)
- $\mathbf{X_1}$ = State-wise Number of Branches of Regional Rural Banks (as a count)
- **ln (X_2)** = ln (Per Capita Net State Domestic Product (Current Prices))
- ϵ = Error term
- β_0 = Intercept
- **β1** & β_2 = Coefficients of Independent variables

3. Hypothesis Testing

The null and alternative hypothesis for the coefficients of the independent variables are defined as follows:-

A. Null Hypothesis:

H_0: β1 = 0 → The State-wise number of branches of RRBs does not significantly affect the state-wise deposits of RRBs.

H_0: β_2 = 0 → The log of State-wise per capita NSDP (at current prices) does not significantly affect the state-wise deposits of RRBs.

B. Alternative Hypothesis

$H_\propto$: $\beta_1 \neq 0$ → The State-wise number of branches of the RRBs significantly impacts the deposits in RRBs, for the respective states.

$H_\propto$: $\beta_2 \neq 0$ → The log of State-wise per capita NSDP (at current prices) significantly impacts the deposits in RRBs, for the respective states.

4. Estimation Method

The method that has been used for the regression analysis in the current study is the method of **Ordinary Least Squares (OLS)**, which states that **β1** and **β_2** should be chosen in such a manner that the residual sum of squares (RSS), $\sum e^2$ is as small as possible.

4. RESULTS

Here is the summary output of the regression:-

1. Regression Statistics Table:-

Regression Statistics	
Multiple R	0.985894359
R Square	0.971987687
Adjusted R Square	0.969551834
Standard Error	4220.314067
Observations	26

2. ANOVA Table:-

ANOVA					
	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	14214421109	7107210554	399.0337585	1.3948E-18
Residual	23	409654169	17811050.83		
Total	25	14624075278			

3. Coefficient/P-value table:-

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-75658.95362	24664.79898	-3.067487137	0.005451218	-126681.9775	-24635.92979	-126681.9775	-24635.92979
State-wise Branches of RRBs (X1)	27.01567572	0.981139403	27.53500231	4.12645E-19	24.98603424	29.0453172	24.98603424	29.0453172
Per Capita NSDP in Rs log (X2)	6270.522759	2022.630003	3.100182806	0.005045402	2086.393833	10454.65168	2086.393833	10454.65168

4. Regression Equation

The estimated regression equation follows as:-

$\hat{Y} = -75658.95 + 27.02\ X_1 + 6270.52 \ln(X_2)$

se = (24664.798) (0.981) (2022.630)

t = (-3.0674) (27.535) (3.100)

p = (0.0054) (4.126E-19) (0.0050)

$r^2 = 0.9719$

se = (24GG4.798) (0.981) (2022.G30)
t = (-3.0G74) (27.535) (3.100)

5. Economic Interpretation

- **A. Intercept:** If the expected value of X_1 and ln (X_2) is equal to zero, then on an average, the state-wise deposits in the RRB are Rs -75658.95. The intercept has no economic interpretation since the logarithm of Per Capita NSDP is unrealistic at zero.
- **B. β_1**: Ceteris peribus, if the state-wise number of RRB branches increased by a count, then, on an average, the state-wise deposits of the RRBs increase by 27.02 crores.
- **C. β_2:** Ceteris peribus, if the state-wise per capita NSDP at current prices increases by one per cent, then, on an average, the state-wise deposits of the RRBs increase by 62.70 crores.

6. Hypothesis Testing

Now let's turn the focus to the testing of the null and alternative hypothesis for the coefficients **β_1** and **β_2.**

A. **β_1**: (State-wise Number of RRB branches)

H_0: $\beta 1$ = 0 → The State-wise number of branches of RRBs does not significantly affect the state-wise deposits of RRBs.

$H_{\propto}$: $\beta_1 \neq 0$ → The State-wise number of branches of the RRBs significantly impacts the deposits in RRBs, for the respective states.

The p-value associated with the **$\beta 1$** is 4.13×10^{-19}, which is less than 0.05 at 95% confidence interval. Thus, we reject the null hypothesis. Hence, we conclude that the number of RRB branches significantly impacts the deposits of RRBs.

B. β_2: (State-wise per capita NSDP at current prices)

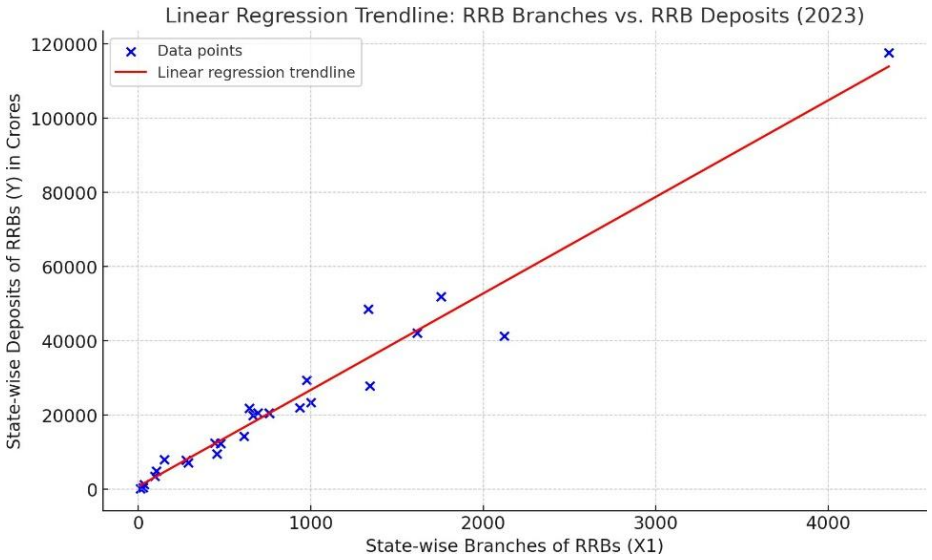
H_0: $\beta_2 = 0$ → The log of State-wise per capita NSDP (at current prices) does not significantly affect the state-wise deposits of RRBs.

$H_{\propto}$: $\beta_2 \neq 0$ → The log of State-wise per capita NSDP (at current prices) significantly impacts the deposits in RRBs, for the respective states.

Since the p-value associated with the β_2 is 0.0050, which is less than 0.05 (95% confidence interval test), the null hypothesis stands rejected. Hence, the per capita NSDP at the current price significantly impacts the deposits of RRBs.

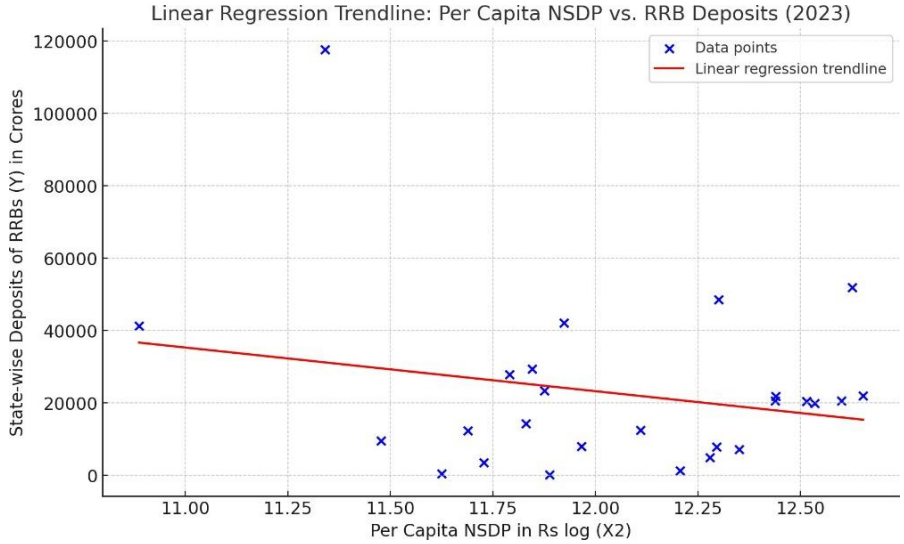
7. Graphical Inferences

A. State-wise deposits of RRBs (Y) and State-wise number of Branches of RRBs (X_1)



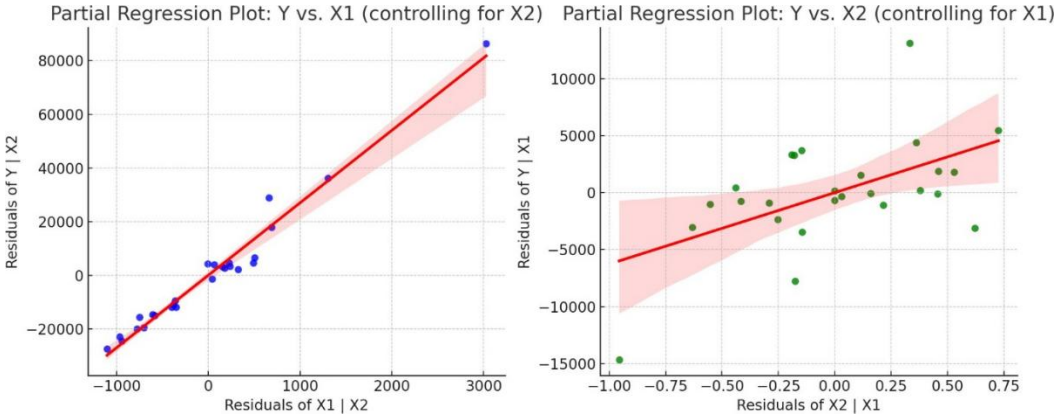
The above graph depicts a positive linear relationship between the number of branches of RRBs and the deposits in them. This result was confirmed by the results derived from the regression model, too.

B. State-wise deposits of RRBs (Y) and Per Capita NSDP (Current Prices) (X_2)



The trendline indicates a negative relation between the State-wise deposits of RRBs and per capita NSDP (ln), which contradicts the significant relation derived from the regression results. This could be explained, partially, by the trend that people with higher income levels tend to deposit more in the commercial banks than the RRBs, and partially by other reasons such as:-

- The scatter plot drawn is bivariate, i.e drawn for only per capita NSDP and Deposits of RRBs, whereas the regression analysis was carried out for X_1 and X_2, indicating that X_1 might have a stronger impact on Y, counteracting the effect of X_2.
- It shall be the case that few outliers distort the shape of the scatter plot. For example, states like Telangana, which have a high per capita NSDP of over 3 lacs, but comparatively fewer deposits in RRBs.
- Further, to eliminate the possibility of multicollinearity between the two explanatory variables, the VIF test conducted shows the results for the values of both the explanatory variables as 1.1215, which is less than five. Hence, there is no significant collinearity.
- Lastly, here are the results of the partial regression plot test, which helps to understand the unique contribution of each explanatory variable to the dependent variable after removing the effects of the other independent variables.



- Hence, it could be seen that in the partial regression plot of X_2, when X_1 is controlled, the negative relationship is less pronounced.

5. CONCLUSION

Thus, the regression analysis of the current study concludes that the number of branches of RRBs and the per capita NSDP significantly affect the deposits in the RRBs. Indeed, there establishes a direct positive relationship between the explanatory and dependent variables. From a policy perspective, many regions of Chhattisgarh, Bihar, and Rajasthan have poor financial literacy, thus, the government shall open more branches in such regions, leading to higher bank deposits. Secondly, in many instances, the government bears a huge cost on account of leakages in the Direct Cash Transfer schemes, especially in the areas mentioned before. This challenge can be rectified by opening more branches, which in turn will address the twin challenges of financial literacy and leakages in the schemes. Further, at a macro level, if the government and monetary institutions aim for higher investments in the economy, then one of the prime channels to achieve this target is to ensure a higher savings rate. This can be achieved by investments in rural infrastructure, MSMEs, etc., which shall increase the income of the people, leading to higher deposit mobilisation.

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