Financial Inclusion through Self Help Groups – An Economic Catalyst to transform Rural India

Kalai Arasi D[1]* and Rohini A[1]

[1] Department of Agricultural & Rural Management, CARDS, TNAU, Coimbatore -641 003, India

ABSTRACT

This study attempted to create a comprehensive measure of Financial Inclusion (FI) with specific focus on SHGs among 33 major states in India from the period of 2016 to 2020. Principal Component Analysis was employed to track the status of inclusion in Indian financial sector. The link between FI and development indicators like agricultural and industrial growth, access to basic education was explored through Ordered Probit Random effect model using panel data. Results indicated that majority of Eastern and North Eastern states have poor FI, in addition Financial Inclusion Index (FII) showed a positive relation with agricultural growth.

INTRODUCTION

Achievement of attaining total financial inclusion (FI) is inevitable especially for India in the path of development. Several steps have been taken towards FI. In India FI has been started with opening 'no frills' account and issuing a few general purpose credit cards for all. It emphasized on the access to basic formal financial services at an affordable cost in a sustainable manner for vulnerable people. Financial inclusion provides affordable access to financial goods and services for a broader portion of the population. Rangarajan (2008) defines financial inclusion as "the process of ensuring access to financial services and timely and adequate credit where needed by vulnerable groups such as weaker sections and low-income groups at an affordable cost." According to Reddy (2017), financial inclusion's major objective is to transform the lives of vulnerable and poor people by providing them access to financial services.

There are several barriers for poor and deprived from receiving financial services, including lack of financial literacy and low level of growth. Sixty-seven percent of Indians lack access to financial institutions, denying them access to structured credit and forcing them to rely on informal moneylenders and exacerbating their problems (Yadav, Singh and Velan, 2020).

FI-Index and Sub-indices

Generally, Financial Inclusion Index (FII) was measured in three dimensions, *viz.,* access, usage and quality comprising of 97 indicators, carries a weightage of access 35 per cent, usage 45 per and quality 20 per cent. The dimensions taken for access of FI are number of branches per 100,000 adults, number of ATMs per 100,000 adults, and number of Points of Service terminals per 100,000 inhabitants; usage dimension captures no. of credit accounts, no. of deposits accounts, loans outstanding, loans disbursed and quality dimension captures financial literacy, consumer protection, and inequalities and deficiencies in financial services. The FI index captures information in a single value ranging between 0 and 100, where 0 represents complete financial exclusion and 100 indicates full financial inclusion.

From Table 1, the three sub-indices, FI-Access with the index value at 73.3, expectedly, is higher as compared to both FI-Usage (43.0) and FI-Quality (50.7) which indicated that building blocks for greater financial inclusion in the form of financial infrastructure needs to be built upon by deepening the FI through focusing on promoting 'Usage' and improving 'Quality'. It indicated that even though over the years (2017 to 2021) access to financial services has penetrated deeper; usage and quality dimensions have to be promoted in terms of financial infrastructure for attaining higher FI.

DATA AND METHODOLOGY

A composite form for Financial Index has been calculated using principal component techniques. The objective is to construct an index using the principal component analysis (PCA) to measure financial inclusion over a period.

*Corresponding author's e-mail: kalai28dk@gmail.com

In India, the term "financial inclusion" was used for the first time in April 2005 in the annual policy by the governor of RBI. This study has taken the timeframe of 2016–2020 (5 years). Annual data has been collected for 33 States from 2015–2016 to 2019–2020, ie., the period of the 13th five year plan. The main data sources referred are NABARD's annual reports on state of microfinance and the RBI database available online. Due to unavailability of data for every indicator, Daman & Diu, Dadra Nagar Haveli and Lakshadweep have been left out. The composite index was computed using seven well-defined indicators. The interrelated indicators which have been used to construct the index are percentage of savings of SHGs to the total amount of savings annually, percentage of loan disbursed by SHGs to the total amount of loan disbursed annually, percentage of loan outstanding by SHGs to the total amount of loan outstanding annually, number of offices of scheduled commercial banks (SCBs), number of credit accounts of SCBs, number of deposit accounts of SCBs and the credit-deposit ratio in percentage.

Table 1. FI-Index and Sub-indices

Year	Access	Usage	Quality	FI-Index
Mar-17	61.7	30.8	48.5	43.4
Mar-18	63.9	33.7	51.4	46
Mar-19	67.5	38.7	52.6	49.9
Mar-20	71.6	42	53.8	53.1
Mar-21	**73.3**	**43**	**50.7**	**53.9**

In order to derive the relative importance of the indicators of financial inclusion and to construct the Financial Inclusion Index for each state in India, PCA was employed on the selected indicators of financial inclusion. This is a data reduction method that is used to re-express multivariate data in fewer dimensions. The motive is to re-orient the data so that a multitude of original variables can be summarized with relatively few factors or components that capture the maximum possible information from the original variables. Thus, we need to find components $z = [z_1, z_2,........,z_p]$ which are linear combinations of the original variables $x = [x_1, x_2,......., x_p]$ that achieve the maximum variance. The major sources of data have been derived from the annual reports of State of Microfinance in India, Statements II(a)–II(d); NABARD, 2015–2016, 2016-2017, 2017–2018, 2018–2019 and 2019–2020; RBI online database; Flash statistics of elementary education in India: progress towards universalisation of elementary education (UEE), district information system for education (DISE) survey.

Results and Discussion

SECTION I - CONSTRUCTING OF FINANCIAL INCLUSION INDEX

This composite index employed to measure state-wise status of financial inclusion to compare states' performances over the past 5 years using PCA. This was done to estimate the impact of financial inclusion on developmental indicators of a rural economy, namely agricultural productivity (measured by agricultural share of gross state domestic product in amount at constant prices with base year 2011–2012) and improvement in elementary education in rural areas (measured by number of enrolments in government managed and privately managed schools between classes I–V). In order to apply PCA, we have to first ensure that the size of the sample taken for study is adequate. This is done by inspecting whether the value of Kaiser–Meyer–Olkin measure of sampling adequacy is greater than 0.5 or not (see Table 2). Second, we need to check whether the selected indicators of financial inclusion are intercorrelated, which is true if the value of chi-square statistic in Bartlett's test of sphericity is statistically significant (see Table 2).

Table 2. Kaiser–Meyer–Olkin Measure and Bartlett's Test of Sphericity

MEASURE	2016	2017	2018	2019	2020
Kaiser-Meyer-Olkin Measure	0.699	0.616	0.621	0.704	0.761
Bartlett's Test of Sphericity	382.456***	382.658***	335.04**	369.087***	368.166**

Note: *** is significant at 1% level of significance

Scree Plot

Component Matrix^a
a. 2 components extracted.
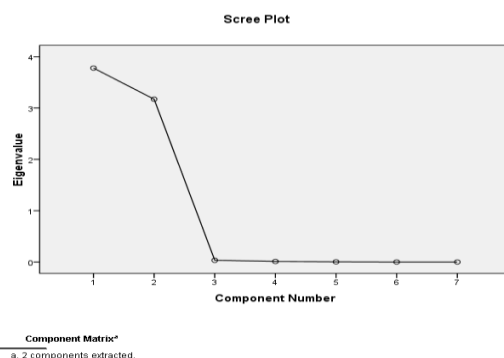
Factor loadings are the correlations between the original variables x and the components z. In case of PCA without rotation, the eigenvectors may not align close to the data clusters and thus may not focus on the actual states as well. The rotated PCA methods rotate the PCA eigenvectors so that they align closer to the cluster of data. For this, the Varimax rotational method has been used which computes the rotated sum of square loadings for each identified principal component and indicates what percentage of variation in financial

inclusion has been explained by a particular indicator. The components are numbered as one, two, and so on the basis of decreasing rotated sum of square loadings (see Table 3).

For each state, the respective rotated component scores have been obtained by applying regression method and are stored as factors. This makes most factor loadings on any specific factor small while only a few factor loadings are large in absolute value. Hence, these factors can be interpreted as the clusters of variables that are highly correlated with a particular factor. It could be noticed from the Table 3 that the first two components in each of the five periods explain almost 88 per cent of the variation in the given data. Now, FIN_IND is basically a weighted sum of the first two components that explain most of the variation:

$$FIN\_IND_{it} = (0.70 \times factor1_{it}) + (0.30 \times factor2_{it})$$

where, $i = 1, 2, …,33$ and $t = 1, 2, …, 5.$

This procedure gives a unique score for each state, that is, the composite IFI. This index was used to measure state-wise financial inclusion. The higher the value of the index, the better will be condition of the state in terms of financial inclusion (see Table 4).

Table 3. Initial Eigenvalues and the Percentage of Explained Variation

Year	Component	1	2	3	4	5	6	7
2016	Eigenvalue	4.64	1.538	0.555	0.197	0.051	0.014	0.005
	Percentage of variation	66.29	21.97	7.93	2.82	0.73	0.20	0.07
2017	Eigenvalue	4.517	1.57	0.57	0.203	0.122	0.017	0.002
	Percentage of variation	64.54	22.43	8.15	2.89	1.74	0.24	0.02
2018	Eigenvalue	4.401	1.612	0.594	0.244	0.124	0.019	0.006
	Percentage of variation	62.88	23.02	8.49	3.49	1.77	0.27	0.08
2019	Eigenvalue	4.481	1.61	0.61	0.185	0.096	0.014	0.004
	Percentage of variation	64.02	23.01	8.71	2.64	1.37	0.21	0.05
2020	Eigenvalue	4.431	1.688	0.623	0.183	0.052	0.015	0.007
	Percentage of variation	63.31	24.12	8.91	2.62	0.75	0.21	0.10

Source: Author's Analysis

It can be claimed that high yielding states on the basis of financial inclusion are Uttar Pradesh, Maharashtra, Tamil Nadu, West Bengal, Karnataka, Bihar and Madhya Pradesh. This meant that the outreach of banks to the rural population has been most successful in these states, and the possible reasons for this are awareness programmes, dominance of MFIs and SHGs and bank linkage programmes connecting with scheduled commercial banks. It's surprising to note that Andhra Pradesh, Gujarat, Kerala and Odisha being generally considered as most financially included states, are not performing so well when measured in terms of composite index.

However, at present, states that require immediate concern to be financially included are Arunachal Pradesh, Nagaland, Mizoram, Sikkim and Andaman & Nicobar.

SECTION II: FINANCIAL INCLUSION AND ECONOMIC GROWTH: PANEL DATA ANALYSIS

Increasing commercialization of agriculture and rural activities is bound to result in a cycle of higher income, higher consumption, higher savings and higher investment resulting into higher income. Financial inclusion will strengthen financial deepening and provide resources to the banks to expand credit delivery. Thus, financial inclusion is not only the cause but also the outcome of economic development. There should be a two-way causal relation among these variables. In this section, it is examined how financial inclusion impacts on economy's basic indicators for inclusive growth such as agricultural production and elementary education. The following model could be used to explain the relationship between financial inclusion and macroeconomic variables such as agricultural output growth, industrial output growth and enrolment status in elementary education. Specifically, the variables that have been used to examine the impact of financial inclusion on the inclusive growth are as follows:

"ln_agsdp": Natural logarithm of agricultural share of gross state domestic product at constant prices (base year being 2004–2005).

"ln_enrol": Natural logarithm of number of enrolments in all government and privately managed schools for class I–V.

"ln_industrygr": Growth rate of gross state domestic product in industry sector.

"fin_ind_class": Financial inclusion category where financial inclusion status is categorized into five different levels according to the performance ranking for financial inclusion.

A panel data model over five year periods, the first being 2016-17, and so on, across 33 cross sectional units for each period was taken for this study. The performance rank of the states were classified into five different levels.

$$P(fin\_ind\_class_{it}) = constant + b1\ ln\_agsdp_{it} + b2\ ln\_enrol_{it} + b3\ industrygr_{it} + e_{it}$$

An ordered probit random effect model was employed to analyse the impact of economic growth on different levels of financial inclusion. Do developed states get faster financial inclusion than others? Ordered probit technique is a generalization of the linear regression analysis to cases where the dependent variable is discrete and takes only a finite number of values possessing a natural ordering. Here, states' financial inclusion status is categorized into five different levels according to the performance ranking for financial inclusion. Therefore, dependent variable is

discrete and naturally ordered. As states are ranked according to the performance level of financial inclusion, index value refers to the state. It was now concerned regarding changes in the predictors translate into the probability of observing a particular ordinal outcome.

P(fin indclass) = 1if rank of the states according to fin ind ≤ 7;

P(fin indclass) = 2 if rank of the states according to 8< fin ind ≤ 14;

P(fin indclass) = 3 if rank of the states according to 15< fin ind ≤ 21;

P(fin indclass) = 4 if rank of the states according to 22< fin ind ≤ 28;

P(fin indclass) = 5 if rank of the states according to 29 < fin ind ≤ 33;

Table 4. Ranking of States Over the Period 2016-2020 on the Basis of Financial Index

Region/State	2016	2017	2018	2019	2020
Uttar Pradesh	1	1	1	1	1
Maharashtra	2	2	2	2	2
Tamil Nadu	3	4	3	3	3
West Bengal	4	3	4	4	4
Karnataka	5	5	5	5	5
Bihar	6	6	6	6	6
Madhya Pradesh	7	7	7	7	7
Andhra Pradesh	8	9	9	9	10
Gujarat	9	8	8	8	8
Rajasthan	10	10	10	10	9
Kerala	11	12	11	11	11
Telangana	12	11	12	12	12
Punjab	13	13	14	14	14
Odisha	14	14	13	13	13
New Delhi	15	15	16	16	16
Haryana	16	16	15	15	15
Jharkhand	17	17	17	17	17
Assam	18	18	18	18	18
Chhattisgarh	19	19	19	19	19
Jammu and Kashmir	20	20	20	20	20
Uttarakhand	21	21	21	21	21
Himachal Pradesh	22	22	22	22	22
Goa	23	24	24	23	23
Tripura	24	23	23	24	24
Chandigarh	25	25	25	25	25
Puducherry	26	26	26	26	26
Meghalaya	27	27	28	27	27
Manipur	28	28	27	28	28
Arunachal Pradesh	29	29	29	29	29
Nagaland	30	30	30	30	30
Mizoram	31	31	31	31	31
Sikkim	32	32	32	32	32
Andaman & Nicobar	33	33	33	33	33

Here, dependent variable is the financial inclusion class which is classified according to the performance of financial inclusion. States are classified according to the FI values. For each observation, our best guess for the predicted outcome is the one with the highest predicted probability. The reported likelihood-ratio test shows that there is enough variability between states' financial inclusion status and growth

Therefore, only if agricultural growth increases, financial inclusion performance will be more for high yielding states. There is no significant impact by other explanatory variables considered in the model. There exists a one-way causal relationship between agricultural growth and financial inclusion. On the other hand, results claim that elementary education does not have much influence in the scope of financial inclusion for the states. However, the theory suggests that access to basic education provides information and awareness about the availability of subsidized credit markets which makes formal financial market accessible and eventually it decreases demand side constraints, whereas the major constraints in recent times is to provide easily accessible financial service to the vulnerable section of population. Similar findings were reported by Mukherjee, S., Mallik, S. S., & Thakur, D. (2019).

Table 5. Summary Statistics of the variables

Variable	Mean	Standard Deviation	Minimum	Maximum
Financial inclusion category [extremely good = 1; extremely poor = 5]; f in_ind_class	2.87	1.38	1	5
ln_agsdp	13.74	2.29	7.01	16.50
ln_enrol	14.90	1.73	11.25	17.64
ln_igsdp	15.40	1.76	11.82	17.94

Source: Author's Analysis

CONCLUSION

This study has sought to address a question in the development literature that whether targeting financial inclusion causes economic growth and development and the welfare of children through education and vice versa. The results of analysis show that for the past 5 years, high productivity in agricultural sector and moderate improvement in elementary education could not generate much financial inclusion for Indian states. "Financial Inclusion" is definitely an excellent approach to achieve the inclusivity for an economy, but for a diversified country like India, it is necessary to first create the needed infrastructure and then customize the models as per the need. Otherwise, financial reforms will fail to generate a system which can accelerate inclusive economic growth. With lack of proper understanding and information about the structure and arrangement of existing financial tools and processes, financial inclusion is not possible. There is a major demand side constraint which has not been eliminated yet, i.e., a need to increase participation through augmenting financial literacy and financial counselling. Formal financial institutions need to mobilize greater resources from a wider customer base and extend credit towards business activities of vulnerable section of the society in order to encourage productive investment. A proper financial infrastructure could help to lead a more sustainable and inclusive economic structure in near future.

Ethics statement

No specific permits were required for the described field studies because no animal subjects were involved in this research.

Table 6. Ordered Probit Random effect model

finindclass	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf. Interval]	
enrol	-4.370352***	1.40507	-3.11	0.002	-7.124228	-1.616475
igdp	-1.547274**	.639365	-2.42	0.016	-2.800407	-.2941417
agdp	.4125449*	.227806	1.81	0.070	-.0339466	.8590363
/sigma2_u	1.6208	.052086				

Notes: * indicates 10% level of significance (90% confidence interval), ** indicates 5% level of significance (95% confidence interval), and *** indicates 1% level of significance (95% confidence interval).

Originality and plagiarism

This is original research work and/ or words for others, has been appropriately cited.

Consent for publication

All the authors agreed to publish the content.

Competing interests

There were no conflict of interest in the publication of this content

Data availability

All the data of this manuscript are included in the MS. No separate external data source is required. If anything is required from the MS, certainly, this will be extended by communicating with the corresponding author through corresponding official mail; kalai28dk@gmail.com

REFERENCES

Mukherjee, S., Mallik, S. S., & Thakur, D. 2019. Tracking Financial Inclusion in India: A Study of SHG Initiatives. *Indian Journal of Human Development.*, **13(1):** 32-46.

Vij, D., 2020. SWOT Analysis of Microfinance and Self Help Groups in India. *In book: Micro Finance and Self Help Groups in India: The Way Ahead.,* (pp.15-30).

Yadav, V., Singh, S.K., Velan, N., Aftab, M.A., Kumar, R., and Swarnkar, A.K. 2020. Impact Assessment of Pradhan Mantri Jan-Dhan Yojana in Augmenting Financial Inclusion in India - A District-Level Analysis. Palarch's *Journal of Archaeology of Egypt/Egyptology.,* **17(9):** 5449-5475.

Yadav, V., & Velan, N. 2021. Computing a composite Financial Inclusion Index for the Indian States: A Principal Component Analysis. *PalArch's Journal of Archaeology of Egypt/Egyptology.,* **18(2):** 779-799.