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FINANCIAL INCLUSION IN INDIA: AN ANALYSIS USING A NEW AND COMPREHENSIVE FINANCIAL INCLUSION INDEX

Dr. Parmeshvar Prasad Chandravanshi
Principal, Govt. Navin Girls College, Bemetara (C.G.)

Abstract

This paper examines the state of financial inclusion (FI) in India by constructing a comprehensive index that incorporates both commercial and cooperative banks and distinguishes between the rural and urban regions. The results show that economically better-off states such as Himachal Pradesh, Goa, and Karnataka have done well in FI, but the rural-urban financial inclusion gap shows an increase for several states. While the access has increased significantly after the Jan Dhan Yojana programme, usage does not show the much-needed improvement. Further, a panel data regression model is estimated to examine whether credit access has improved for the self-employed, who are in regular need of credit for their businesses. To do this, we have used the constructed indices as the dependent variable and have brought in explanatory variables on self-employment from NSSO sources. The estimation results show that for the self-employed household, credit access has not improved as much during the drive period as compared to pre-drive years.

1. Introduction

Financial inclusion (FI) is important for developing countries to reduce poverty and improve the welfare of their people (Burgess & Pande, 2005; Honohan, 2007). Financial inclusion ensures that all individuals, particularly the socially and economically disadvantaged populations, should have access to a wide range of suitable financial services at affordable costs. Access to financial services allows people to save, facilitates human capital development, opens up new economic opportunities, and helps to buffer against future contingencies (Banerjee & Newman, 1993; Galor & Zeira, 1993; Ghosh et al., 2000). Despite these documented benefits, the number of unbanked adults is still high in developing countries across the world. For example, according to the Findex data, 1.7 billion adults globally were unbanked in 2017 (Demirguc-Kunt et al., 2018). Out of this, India accounts for 190

million unbanked adults and ranks second, lower than China. India, along with Pakistan, Indonesia, China, Nigeria, Mexico, and Bangladesh, have almost half of the world's unbanked adults (ibid.).

Though the situation has improved in recent years in India, more needs to be done to bring the excluded into the financial mainstream. To hasten the progress in financial inclusion, we first need to identify the regions that remain excluded as well as the areas in which financial inclusion is deficient. For this, we need a measure for financial inclusion that is comprehensive and representative of the financial inclusion scenarios in the various states of the country.

There have been several attempts at constructing an index in the Indian context. These indices, however, are based on the spread and services of commercial banks only (Chakravarty & Pal,

2010; Sarma, 2012). There is much focus on commercial banks, mainly because data on their operations are easily available, and they account for a bulk of activity in the financial system. However, an important financial institution that has not been accounted for in current literature is the cooperative banks. Even though they have played a critical role in improving rural financial inclusion in India since independence, recent literature has neglected these institutions' impact on improving financial inclusion.

The cooperative system is a three-tiered system with the primary agricultural credit societies at the lowest tier. The primary agricultural credit societies (PACSs) in rural India have allowed farmers to access credit at a relatively low-interest rate. Also, another advantage of these organisations is that they have better access to customer information which allows them to serve poor households and small businesses. Additionally, due to the Government's support over the years, these organisations have developed a widespread ground presence in the villages. In this paper, we propose to utilize the indicators of cooperative banks and scheduled commercial banks to develop a comprehensive financial inclusion index. The index is also split into rural and urban sub-indices to measure the heterogeneity between the two sectors in India. Further, in this paper, we also focus on understanding the supply-side factors that impact on financial inclusion. For instance, using the FI index we developed as dependent variable, we estimate a panel data model to analyse how the FI drive period has affected financial inclusion. The Union Government of India has introduced financial inclusion drive policies as early as 2006, and since then, there have been a variety of different policies and programmes. Among these policies, the ongoing Jan Dhan Yojana (since 2014) has been a significant one. This programme aims to provide access to a basic savings account, overdraft facility, and insurance cover to the account holder. Given this background, understanding the impact of financial inclusion drive on improving financial inclusion is an important exercise.

Another specific aspect we address pertains to the self-employed people. The self-employed people in a developing country like India are poor and are forced to adopt self-employment as a survivalist strategy due to a lack of alternative employment opportunities (Banerjee & Duflo, 2011). As entrepreneurs with limited resources, the self-employed require a regular flow of credit services to cover their working capital needs as well as formal systems for saving money to mitigate risks, which an effective financial inclusion drive can ensure. Thus, a crucial question that arises in this context is regarding the credit access of the self-employed, especially whether or not the FI drive has improved access to credit for the self- employed.

Our analysis of the indices constructed using macro-level data from the Reserve Bank of India (RBI) sources reveal that the extent of financial inclusion has indeed increased in many states. However, there has been a marked bias toward urban financial inclusion in most states, and rural financial inclusion has not changed much despite several efforts. This is concerning, as most poor people reside in rural areas, and their lives could be improved if they had access to various financial services. Further, the results from the analysis of the supply-side determinants suggest that the determinants of financial inclusion drive positively impacts of financial inclusion. Additionally, the binary variable representing the Jan Dhan Yojana period shows a significant and positive impact on the overall financial inclusion index. However, as far as actual usage is concerned in terms of credit for the self-employed, no significant improvement has been observed during the drive period.

Against this backdrop, this paper proceeds as follows: the next section provides a brief overview of relevant literature on financial inclusion. Section 3 explains the data and methodology used. Section 4 discusses the analysis and results. The last section provides the concluding observations.

2. Brief Literature Review

We have divided the literature review into three sections: the importance of financial inclusion, measurement of financial inclusion, and the importance of local institutions with special reference to cooperatives. This review provides a background for subsequent analyses where we study the effect of drive policies and other factors on financial inclusion.

2.1 Importance of financial inclusion

Access and use of different financial services are beneficial in several ways. Having a savings account helps people to store their money safely, smoothen consumption during difficult times, and improve productive investment (Deaton, 1990; Dupas & Robinson, 2013). Another essential basic financial service is the bank credit. In a country like India, where the majority are self- employed, access to suitable credit is crucial (Rajeev & Vani, 2017; Saravanabhavan & Rajeev, 2018). Facilitating credit allows individuals to start new businesses and provides businesses with the capital for their daily expenditures (Rajeev & Scherrer, 2021).

Furthermore, finance enables risk-taking and encourages innovation and technology in society (Schumpeter, 1934). This is particularly relevant for the agricultural sector, where incomes are low. Access to agricultural credit has been found to increase incomes and ultimately contribute to the growth in agricultural GDP (World Bank, 2008).

2.2 Measuring Financial Inclusion and factors determining financial inclusion

The Government of India has long placed special emphasis on financial inclusion (FI) and has introduced several financial inclusion policies over time, which have increased the number of bank accounts. Despite years of policy support, however, the actual usage of financial services by the poor has not improved adequately, and the gains have been unevenly spread across the country (Goedecke et al., 2018).

To enhance FI in the country, it is crucial to understand the actual inclusion level. There have been attempts to develop a suitable measure for financial inclusion across Indian states (Chakravarty and Pal, 2010; Sarma, 2012). Indices to measure financial inclusion in India have been based on indicators mainly related to scheduled commercial banks. For example, Sarma (2008) uses three indicators: banking penetration, availability, and usage. Similar indicators have been used in most other studies to develop indices (Arora & Arora, 2010; Kumar, 2013; Mehrotra et al., 2009).

Further, studies have also looked at the various factors that impact FI. Income is an important factor determining FI, especially in developing countries where more affluent adults are likely to be financially excluded than poorer ones (Demirguc-kunt & Klapper, 2013; Pal & Pal, 2012). Also, when it comes to credit, adults in lower-income countries depend on informal services (Bhattacharjee & Rajeev, 2014), which may include money lenders, friends, family, local credit groups, etc., than adults in higher-income countries (ibid.). Macroeconomic factors such as inflation volatility and bank concentration also impact FI (Rojas-Suarez, 2013).

Socio-economic factors also influence the access and use of financial services. For instance, Kumar (2013) has studied the effect of population density, the average population per branch, credit deposit ratio, proportion of factories, and employment status on credit penetration and deposit penetration. Another study (Chakravarty and Pal, 2013) examined the role of social banking policy on FI and found that the pro-market policies after 1991 had an adverse effect on the pace of FI.

2.3 Importance of local institutions with special reference to cooperatives

In rural areas, the number of branches of scheduled commercial banks is lower than in urban areas (Burgess et al., 2005; RBI, 2019). As a result of the lower outreach of bank branches, last-mile access has been a critical issue in determining the efficacy of the FI drive. In such a scenario, Primary Agricultural Credit Societies (PACSs) can play a significant role as these institutions are spread across 79% of total Indian villages (NAFSCOB, 2017). However, several cooperatives today are ailing due to structural, managerial, and loan recovery issues (RBI, 2012). Despite these problems, their wide presence indicates the relevance of cooperative banks in the rural regions of India and the critical role they could play in improving FI in these regions in the current scenario (Pramanik et al., 2014). Recognizing the potential of the cooperative system, especially for rural areas, the Government has used them to reach out to the poor (RBI, 2020). In many states of India, they remain as one of the prominent institutions through which the state governments disburse credit to the rural poor at a subsidized cost.

Since rural credit cooperatives are widespread and an important avenue for formal financial access among rural populations, it is necessary to consider them while examining the progress of FI in the country. There is also a lack of more updated and comprehensive FI indices at the state level that demarcates rural and urban regions, which the current paper wishes to address.

3. Data and Methodology

The data for constructing the comprehensive FI indices are taken from various government sources. Information on scheduled commercial banks is collected from multiple issues of the Basic Statistical Returns of Scheduled Commercial Banks, published by the Reserve Bank of India (RBI). We used the Statistical Statements Relating to Cooperative Banks in India, brought out by the National Bank for Agriculture and Rural Development (NABARD) and the National Federation of State Co-operative Banks (NAFSCOB), for the information on Primary Agricultural Credit Societies. Various issues of the Census are used to obtain the adult population data (for those aged 14 and above). The data for the panel data regression is compiled from different sources. The self-employment data is taken from Employment Unemployment Survey reports provided by NSSO (GOI, 2000, 2011, 2013; NSSO, 1997, 2006); the data for all other variables are taken from the Reserve Bank of India database. We have included 17 major states in India for our analysis.

3.1 Variables used for the construction of indices

Comprehensive FI indices are constructed for the major states in India, separately for urban and rural areas of the country, keeping in mind the differences in the profile of financial institutions in these two areas. In urban areas, the index comprises indicators (of scheduled commercial banks) measuring demographic outreach, geographic outreach, deposit account penetration, deposit services usage, credit account penetration, and credit services usage. For rural zones, similar bank indicators are used, along with two additional measures: the

demographic outreach of cooperatives (PACSs) and the credit usage of cooperatives credit3. The definitions and

Table 1: Definition and measurement of indicators

Rural/Urban demographic outreach (SCB)	-Average number of rural/urban bank branches per unit rural/urban population -Calculated as the total rural/urban bank branches divided by the total rural/ urban adult population in the state
Rural/urban geographic outreach (SCB)	-Average number of rural/urban bank branches per unit rural/urban area -Calculated as the total number of rural/urban bank branches in a state divided by the total rural/urban geographical area.
Rural/urban deposit account penetration (SCB)	-Average number of rural/urban deposit accounts per unit rural/urban population -Calculated as total number of rural/urban deposit accounts divided by total rural/urban adult population.
Rural/urban deposit services usage (SCB)	-Average amount of rural/urban deposits per unit rural/urban population -Calculated as total rural/urban deposit volume divided by total rural/urban adult population.
Rural/urban bank credit account penetration (SCB)	-Average number of rural/urban credit accounts per unit rural/urban population -Calculated as total number of rural/urban credit accounts divided by total rural/ urban adult population.
Rural/urban Credit usage (SCB)	-Average amount of rural/urban credit per unit rural/urban population -Calculated as total rural/urban credit volume divided by total rural/urban adult population
Geographic outreach of cooperatives	-Total number of PACS per unit of the rural population. -Calculated as the total number of PACSs divided by the total rural adult population.
Credit from PACS	-Average amount of rural/urban credit from PACSs per unit population -Calculated as total rural credit (from PACSs) volume divided by the total rural adult population.

3.2 Methodology

3.2.1 Construction of FI Indices

We employ factor analysis to calculate the weights for the indicators, following the method proposed by Nicoletti et al. (1999). For the rural FI index weights are calculated for the following

indicators as follows: Rural banks geographic outreach (weight 0.16), Rural banks demographic outreach (weight 0.18), Rural banks deposit account penetration (weight 0.20),

Rural banks deposit services usage (weight 0.19), Rural bank credit account penetration (weight-.11), Rural Banks credit usage (weight 0.16), Rural PACS credit usage (weight 0.53) and Rural PACS demographic outreach (weight 0.38). Similarly, for the urban index, we compute weights for the following indicators as follows: Urban banks geographic outreach (weight 0.13), Urban banks demographic outreach (weight 0.16), Urban banks deposit penetration (weight 0.22), Urban banks deposit services usage (weight 0.21), Urban banks credit penetration (weight 0.11), and Urban banks credit usage (weight 0.17).

Following Nicoletti et al (1999), indicators are statistically grouped into sub-indices and further combined to form the comprehensive index. While constructing the Rural Index, the intermediate indices are the Rural Banks Index (including the indicators related to commercial banks as detailed above) and the Rural Cooperatives Index (including indicators related to cooperatives). The Urban Index is constructed from the commercial bank indicators only. A weighted geometric mean is used to calculate the rural and urban indices individually, and they are finally combined to form the comprehensive FI Index using a simple geometric mean.

Requirements such as the normalisation of entities are non-random, as they are likely to experience common disturbances. Ignoring cross- sectional dependence will not result in inconsistent parameter estimation. However, the standard errors will be inconsistent, leading to unreliable statistical inferences (Driscoll & Kraay, 1998). The conventional model choice is to use Feasible Generalised Least Squares (FGLS)(Kmenta, 1986). However, it is accepted that time, T should be substantially higher than the number of entities, N, in the panel, and T/N should be much higher than 3 (Beck and Katz 1995). In our data, T is 24, and N is 17. To overcome the issues related to FGLS, Beck and Katz (1995) suggested using panel corrected standard errors that are robust in the presence of cross-sectional dependence. FGLS model is problematic when N approaches T, and in such cases also, a Driscoll-Kraay estimator is suggested (Hoechle, 2007). The Driscoll- Kraay estimator gives standard errors robust to autocorrelation, heteroscedasticity, spatial, and temporal dependence (Hoechle, 2007). The estimable fixed-effects model is as follows

$$y_{it} = \beta_k X_{it} + \alpha_i + U_{it}$$

indicators were done before the factor analysis

Here Yit denotes the FI index for the i state
th

to allow meaningful comparison between states

for tth period. X

represents the set of independent

and years. We have also carried out Bartlett's (Bartlett, 1950) and Kaiser Meyer Olkin's (Kaiser, 1958) tests for appropriateness (with acceptable values greater than 0.6). Both the tests

indicate the presence of unobserved latent variables and, hence, the use of factor analysis can be justified.

3.2.2 Regression Analysis

Fixed-effect model with Driscoll-Kraay (1998) estimator is used to estimate the various factors that affect FI. The choice of this model is due to the presence of cross-sectional dependence in the data. In general, cross-sectional dependence is common in macroeconomic data, where the variables. βk is the estimated coefficient of the independent variables, αi is the specific intercept for each state and Uit is the error term.

In addition, we conduct the following diagnostic tests and their results are summarised in following Table 2 and Table 3.

The Sargan-Hansen test for over-identifying restrictions suggests a fixed-effect model is appropriate. Tests for stationarity (Levin Lin Chu tests, Pesarans unit root tests) are conducted to examine the stationarity of variables under consideration. Further, the variables are tested for multicollinearity. The average variance

inflation factor (VIF) value is 2.24, indicating that multicollinearity does not pose a problem. The Wald statistic for group-wise heteroscedasticity shows the presence of heteroscedasticity. We also checked for cross-sectional dependence using Pesaran's cross-sectional dependence test,

Table 2: Diagnostic tests and results

and it indicates the existence of cross-sectional dependence. This justifies the use of a fixed-effect model with the Driscoll-Kraay estimator. Other tests such as Pesaran's unit root test has also been conducted which also indicates overall stationarity.

Diagnostic tests	Model 1	Model 3	Model 5
Test of overidentifying restrictions: Fixed vs Random effects (Sargan Hansen)	26.64 Chi-sq (7) Pr = 0.0004	64.08 Chi-sq (7) Pr = 0.0000	80.07 Chi-sq (7) Pr = 0.0000
Breusch-Pagan LM test of independence	chi2(136) = 737.27, Pr = 0.0000	chi2(136) = 839.65, Pr = 0.0000	chi2(136) = 637.72, Pr = 0.0000
Pesaran's test of cross-sectional independence	5.43, Pr = 0.0000	4.98, Pr = 0.0000	14.87, Pr = 0.0000
Modified Wald statistic for groupwise heteroskedasticity	chi2 (17) = 30635.40 Prob = 0.0000	chi2 (17) = 1574.43 Prob = 0.0000	chi2 (17) = 863.76 Prob = 0.0000

Table 3: Stationarity test results

	Levin Lin Chu (Cross-sectional means removed) H0: Panels contain unit root	
Variable	Adjusted t	p-value
Log of FI	-25.0308	0.0000
Log of deposit volume	-1.8683	0.0309
Log of credit volume	-4.0508	0.0000
Log of per-capita income	-3.5348	0.0002
Agricultural share	-2.9131	0.0018
Rural non-agricultural SE	-3.4102	0.0003
Urban SE	-3.7315	0.0001

4. Analysis and Results

4.1 FI Indices

We begin our analysis by constructing a comprehensive index that incorporates indicators representing the access and usage of both commercial banks and cooperative banks from 1994 to 2017. During this period, India faced several changes such as liberalisation, the 2008 global financial crisis, the introduction of financial drive policies in 2006, and the Jan Dhan Yojana in 2014. Keeping these changes in perspective, we will examine our results.

The Indices for the year 2017 are presented in Table 4. The index values range from 0 to 1. We see that there are large differences in FI across the states. States like Himachal Pradesh, Goa, Karnataka, and Haryana have relatively higher financial inclusion than other states. Of these states, Himachal Pradesh and Goa have performed well under both the rural and urban indices. Another important inference from this table is the vast disparity between the rural and urban indices for the states. This implies that rural FI has not improved as much as urban FI, despite various efforts by the Government. For instance, Assam has a wide disparity in index values across the rural and urban areas; the urban index value for Assam is .45, while the rural index value is only .01. Other states with wide disparity are Maharashtra, Andhra Pradesh, and Bihar.

We have also looked at the trend of FI from
1994 to 2017 as given in Table 5, Table 6 and

Table 7.

Table 4: FI Index by major states of India-2017

State	**RI**	**Rank**	**State**	**UI**	**Rank**	**States**	**FI**	**Rank**
High RI states			**High UI states**			**High FI states**		
GA	0.17	1	**HP**	0.75	1	**HP**	0.35	1
HP	0.16	2	**HR**	0.61	2	**GA**	0.31	2
WB	0.12	3	**GA**	0.56	3	**KA**	0.26	3

GJ	0.12	4	**MH**	0.56	4	**HR**	0.25	4
KA	0.12	5	**PB**	0.55	5	**OR**	0.23	5
Medium RI states			**Medium UI states**			**Medium FI states**		
OR	0.12	6	**KA**	0.54	6	**MH**	0.23	6
TN	0.11	7	**AP**	0.52	7	**PB**	0.23	7
HR	0.10	8	**KL**	0.50	8	**AP**	0.21	8
MH	0.10	9	**AS**	0.45	9	**TN**	0.21	9
PB	0.09	10	**OR**	0.45	10	**GJ**	0.20	10
Low RI states			**Low UI states**			**Low FI states**		
AP	0.09	11	**BR**	0.41	11	**WB**	0.19	11
RJ	0.08	12	**TN**	0.38	12	**BR**	0.18	12
UP	0.08	13	**RJ**	0.36	13	**RJ**	0.17	13
BR	0.08	14	**GJ**	0.34	14	**KL**	0.17	14
MP	0.07	15	**UP**	0.31	15	**UP**	0.16	15
KL	0.06	16	**MP**	0.30	16	**MP**	0.15	16
AS	0.01	2	**WB**	0.30	17	**AS**	0.05	17

Note: AS-Assam, BR-Bihar, MP-Madhya Pradesh, WB-West Bengal, OR- Odisha, UP- Uttar Pradesh, RJ- Rajasthan, AP-Andhra Pradesh, PB-Punjab, TN-Tamil Nadu, KA-Karnataka, HP-Himachal Pradesh, HR- Haryana, GJ- Gujarat, MH- Maharashtra, KL- Kerala, GA-Goa RI-Rural Index, UI-Urban Index, FI- Financial inclusion Index

Source: Authors' calculation using RBI data

Table 5: Trend of Urban index across major states of India : 1994-2017

1994			**2012**			**2017**		
State	**UI**	**Rank**	**State**	**UI**	**Rank**	**State**	**UI**	**Rank**
KL	0.16	1	**HP**	0.51	1	**HP**	0.75	1
PB	0.11	2	**MH**	0.41	2	**HR**	0.61	2
GA	0.11	3	**GA**	0.41	3	**GA**	0.56	3
HR	0.08	4	**PB**	0.36	4	**MH**	0.56	4
MH	0.07	5	**HR**	0.36	5	**PB**	0.55	5
KA	0.07	6	**KL**	0.34	6	**KA**	0.54	6
HP	0.07	7	**KA**	0.33	7	**AP**	0.52	7
TN	0.06	8	**AP**	0.33	8	**KL**	0.50	8
AS	0.06	9	**OR**	0.26	9	**AS**	0.45	9
WB	0.06	10	**TN**	0.25	10	**OR**	0.45	10

AP	0.05	11	**AS**	0.25	11	**BR**	0.41	11
GJ	0.04	12	**BR**	0.20	12	**TN**	0.38	12
BR	0.04	13	**RJ**	0.20	13	**RJ**	0.36	13
RJ	0.03	14	**UP**	0.19	14	**GJ**	0.34	14
OR	0.02	15	**GJ**	0.19	15	**UP**	0.31	15
MP	0.00	16	**WB**	0.16	16	**MP**	0.30	16
UP	0.00	17	**MP**	0.15	17	**WB**	0.30	17

Note: AS-Assam, BR-Bihar, MP-Madhya Pradesh, WB-West Bengal, OR- Odisha, UP- Uttar Pradesh, RJ- Rajasthan, AP-Andhra Pradesh, PB-Punjab, TN-Tamil Nadu, KA-Karnataka, HP-Himachal Pradesh, HR- Haryana, GJ- Gujarat, MH- Maharashtra, KL- Kerala, GA-Goa
Source: Authors' calculation using RBI data

Table 6: Trend of Rural index across major states of India:1994-2017

1994			2012			2017		
State	**RI**	**Rank**	**State**	**RI**	**Rank**	**State**	**RI**	**Rank**
GA	0.17	1	**GA**	0.18	1	**GA**	0.17	1
HP	0.11	2	**HP**	0.14	2	**HP**	0.16	2
PB	0.11	3	**TN**	0.10	3	**WB**	0.12	3
HR	0.08	4	**KA**	0.09	4	**GJ**	0.12	4
KA	0.06	5	**WB**	0.09	5	**KA**	0.12	5
TN	0.06	6	**PB**	0.09	6	**OR**	0.12	6
GJ	0.05	7	**GJ**	0.09	7	**TN**	0.11	7
UP	0.05	8	**OR**	0.08	8	**HR**	0.10	8
WB	0.05	9	**UP**	0.07	9	**MH**	0.10	9
MH	0.04	10	**HP**	0.07	10	**PB**	0.09	10

1994			2012			2017		
State	**RI**	**Rank**	**State**	**RI**	**Rank**	**State**	**RI**	**Rank**
AP	0.04	11	**MH**	0.07	11	**AP**	0.09	11
BR	0.04	12	**AP**	0.06	12	**RJ**	0.08	12
OR	0.03	13	**BR**	0.06	13	**UP**	0.08	13
RJ	0.03	14	**RJ**	0.05	14	**BR**	0.08	14
MP	0.03	15	**Ker**	0.05	15	**MP**	0.07	15
KL	0.03	16	**MP**	0.05	16	**KL**	0.06	16
AS	0.01	17	**AS**	0.03	17	**AS**	0.01	2

Note: AS-Assam, BR-Bihar, MP-Madhya Pradesh, WB-West Bengal, OR- Odisha, UP- Uttar Pradesh, RJ- Rajasthan, AP-Andhra Pradesh, PB-Punjab, TN-Tamil Nadu, KA-Karnataka, HP-Himachal Pradesh, HR- Haryana, GJ- Gujarat, MH- Maharashtra, KL- Kerala, GA-Goa
Source: Authors' calculation using RBI data

Table 7: Trend of Comprehensive FI index across major states of India:1994-2017

1994			2012			2017		
State	**UI**	**Rank**	**State**	**UI**	**Rank**	**State**	**UI**	**Rank**
GA	0.13	1	**GA**	0.27	1	**HP**	0.35	1
PB	0.11	2	**HP**	0.27	2	**GA**	0.31	2
HP	0.09	3	**PB**	0.18	3	**KA**	0.26	3
HR	0.08	4	**KA**	0.18	4	**HR**	0.25	4
KL	0.07	5	**MH**	0.17	5	**OR**	0.23	5
KA	0.07	6	**TN**	0.16	6	**MH**	0.23	6
TN	0.06	7	**HR**	0.16	7	**PB**	0.23	7
MH	0.06	8	**OR**	0.15	8	**AP**	0.21	8
WB	0.05	9	**AP**	0.14	9	**TN**	0.21	9
GJ	0.05	10	**KL**	0.13	10	**GJ**	0.20	10
AP	0.05	11	**GJ**	0.13	11	**WB**	0.19	11
BR	0.04	12	**WB**	0.12	12	**BR**	0.18	12
RJ	0.03	13	**UP**	0.12	13	**RJ**	0.17	13
AS	0.03	14	**BR**	0.11	14	**KL**	0.17	14
OR	0.03	15	**RJ**	0.10	15	**UP**	0.16	15
MP	0.01	16	**MP**	0.09	16	**MP**	0.15	16
UP	0.00	17	**AS**	0.08	17	**AS**	0.05	17

Note: AS-Assam, BR-Bihar, MP-Madhya Pradesh, WB-West Bengal, OR- Odisha, UP- Uttar Pradesh, RJ- Rajasthan, AP-Andhra Pradesh, PB-Punjab, TN-Tamil Nadu, KA-Karnataka, HP-Himachal Pradesh, HR- Haryana, GJ- Gujarat, MH- Maharashtra, KL- Kerala, GA-Goa
Source: Authors' calculation using RBI data

Although FI has improved for most states from 1994 to 2017, the disparity between rural and urban FI has increased (Saravanabhavan, 2021). For instance, in 1994, for Maharashtra, the rural index value was .04, and the urban index was .07. In 2017, the disparity increased, and we see that for Maharashtra urban index is .56, and the rural index is still at .10. Similar is the case for most other states.

For urban areas, there has been a marked improvement in FI for most states. However, rural FI has not changed much in several states such as Assam, Madhya Pradesh, Uttar Pradesh, and Bihar. These lagging states are some of the lowest-

income states in the country. Human development indicators are also poor in these states. Another reason for the poor development in rural areas could be that scheduled commercial banks have focussed on urban areas where it is more profitable for them as there are more wealthy customers. Moreover, many unprofitable branches were closed down in rural areas after the termination of the bank licensing policies of the seventies and eighties.
To further understand rural financial inclusion, we also examined the sub-indices of the rural index (RI) as given in Table 8.

Table 8: Sub-indices of Rural financial inclusion index-2017

States	Cooperatives Index	Rank	States	Rural Banks Index	Rank
PB	0.16	1	**GA**	0.29	1
MH	0.15	2	**HP**	0.14	2
HR	0.12	3	**PB**	0.11	3
GJ	0.11	4	**WB**	0.08	4
TN	0.08	5	**KA**	0.08	5
HP	0.08	6	**UP**	0.08	6
KL	0.07	7	**TN**	0.07	7
KA	0.06	8	**HR**	0.07	8
WB	0.06	9	**OR**	0.06	9
RJ	0.05	10	**BR**	0.06	10
OR	0.05	11	**GJ**	0.05	11
AP	0.04	12	**AP**	0.05	12
MP	0.04	13	**MH**	0.04	13
GA	0.03	14	**AS**	0.03	14
UP	0.02	15	**RJ**	0.03	15
BR	0.01	16	**MP**	0.03	16
AS	0.00	17	**KL**	0.01	17

Note: AS-Assam, BR-Bihar, MP-Madhya Pradesh, WB-West Bengal, OR- Odisha, UP- Uttar Pradesh, RJ- Rajasthan, AP-Andhra Pradesh, PB-Punjab, TN-Tamil Nadu, KA-Karnataka, HP-Himachal Pradesh, HR- Haryana, GJ- Gujarat, MH- Maharashtra, KL- Kerala, GA-Goa
Cooperatives Index -Intermediate index of Rural Index, where only cooperative indicators are used, Rural Banks Index- Intermediate index of Rural Index, where only scheduled commercial banks' indicators are used
Source: Authors calculation using the RBI and NAFSCOB data

States such as Punjab, Maharashtra, Haryana, and Gujarat have performed well under the cooperatives index, while states such as Goa, HP, and Punjab have performed well under the Rural Banks index. It can be inferred that it is primarily the economically developed states that have performed well under the cooperative index. Kerala has performed moderately well under the cooperative index and low under the Rural Bank's Index.
When we examined the component indicators, we observed that Kerala does not do well with regard to bank indicators (in both rural and urban indices). While our results more or less show similar performance vis-à-vis few of the earlier studies, other studies have shown Kerala as one of the better-performing states (Chakravarty & Pal, 2010). We find Kerala's performance satisfactory in terms of urban indices but rural indices do not show a similar achievement. Further, it is also to be noted that these studies are not strictly comparable as the indices are

constructed for earlier years. Another difference is that we have taken the usage indicators (deposit volume and credit volume) in terms of population. In contrast, other studies have used it in terms of per capita income (deposit volume per capita income, credit volume per capita income). We argue that to get the true representative indicator which measures the share of each individual we need to divide the deposit/ credit volume by the population.

In the above section, we presented the status of FI across different regions using the comprehensive index, and we see that there are significant regional variations in FI. To explain this differential performance, we now examine important factors that may impact FI by taking up the FI index and some of the important usage indicators as dependent variables for our analysis.

4.2 Determinants of FI

We considered relevant explanatory variables to understand the factors that may have an impact on FI. We have represented the drive period using a binary variable that takes the value of one, if, the year is later than or equal to 2008 and zero otherwise. The recommendations for the FI drive were brought out in 2005 by the Khan committee (Khan, 2005) but impact of the drive policies were noticeable after 2008. Also, in 2008, the Rangarajan committee (RBI, 2008) brought out its recommendations for improving FI, many of which have been diligently put into practice by the Reserve Bank of India from 2008. Further, we have accounted for the changes after the introduction of Jan Dhan Yojana scheme using a binary variable that takes the value of one if the year is equal to or later than 2014.

As mentioned earlier, a sizable percentage of the working population in India is self-employed. In the rural sector, about 80 percent are small and marginal farmer households with fragmented holdings and negligible savings. They require credit on a steady basis to buy seeds, fertilizers, equipment, and other inputs. To estimate how states' dependence on agriculture affects overall FI, the share of agriculture in GDP is included as an explanatory variable. On the other hand, the non-farm sector primarily consists of own account enterprises (around 80%), operating without hired labour. Many of these operate at a subsistence level with very small capital, and most of them face several constraints in accessing formal finance (Rajeev, 2015).

To represent these sectors, we have included the number of non-agricultural self-employed households per 100 households in rural areas as a variable. Correspondingly, we have also considered the number of total self-employed households per 1000 households in the urban sector. Finally, we have also included per capita income in the regression. Income is an important determinant of FI, especially in developing countries (Demirgüç-

Table 9: Summary statistics

Kunt and Klapper 2013; Pal and Pal 2012). It also captures the level of economic activities in a region. The summary statistics of variables used in the estimations are given in Table 9.

Variables	Description	N	Mean	Standard Deviation	Minimum	Maximum
Log FI	Log of FI Index	408	-2.42	0.74	-8.99	-1.06
Log FI	Log of FI Index	408	-2.42	0.74	-8.99	-1.06

Log Deposit usage	Log of deposit volume/Total adult population	408	-1.41	1.14	-3.95	1.62
Log Credit usage	Log of credit volume/Total adult population	408	-2.05	1.30	-4.80	0.78
Drive	=1 if year >=2008	408	0.42		0.00	1.00
Jan Dhan Yojana	=1 if year >=2014	408	0.17		0.00	1.00
Log of per capita income	Log value of per capita income	408	10.86	0.55	9.68	12.64
Agricultural share	Agricultural GDP/Total GDP	408	0.24	0.09	0.04	0.53
Rural non-agri SE	Proportion of rural non- agricultural self-employed households	408	148.04	38.98	63.00	320.00
Urban SE	Proportion of total urban self-employed households	408	347.70	60.90	189.00	533.00
Number of groups		17				

4.3 Econometric analysis and results

To identify the factors that impact the overall FI and usage of important financial services such as deposit and credit, separate regression exercises have been carried out. Table 10 presents the estimation results of six regression models.

In models 1 and 2, we have the FI Index as the dependent variable. Considering the bounded nature of the variable, we have also estimated it using a Tobit model. The likelihood ratio test, however, was insignificant, implying that the Tobit model is not better than the pooled regression.

In Models 3 and 4, 5 and 6, the dependent variables are the usage indicators, namely, deposit usage (commercial banks) and credit usage (commercial banks), respectively. More precisely, the usage indicators are deposit volume per head (log value) and credit volume per head (log value).

From Models 1 and 3 in Table 10, we find that the drive variable is positive and significant with regard to FI Index and deposit usage, which suggests that the policies implemented during the drive period have improved overall FI and formal savings. However, the drive variable is not significant in the case of credit usage (see model 5). This could mainly be because improving credit was not given due importance during the initial years of the FI drive.

Table 10: Determinants of FI and usage indicators- Fixed-effect model (Driscoll-Kraay estimator)

Variables	(Model 1)	(Model 2)	(Model 3)	(Model 4)	(Model 5)	(Model 6)
	Log FI	Log FI	Log deposit volume	Log deposit volume	Log credit volume	Log credit volume

Drive	0.1730*** (0.039)	-0.0616 (0.312)	0.2040** (0.083)	0.7735*** (0.197)	0.2228 (0.132)	0.5604*** (0.183)
Jan Dhan yojana	0.1454*** (0.032)	0.1790*** (0.039)	0.0829** (0.032)	0.1163*** (0.036)	-0.0502 (0.069)	0.0134 (0.059)
Log Per capita income	0.8807*** (0.099)	0.8402*** (0.103)	1.5366*** (0.106)	1.3630*** (0.151)	1.8264*** (0.158)	1.8139*** (0.166)
Agricultural share	-0.1115 (0.362)	0.0257 (0.355)	-4.1790*** (0.528)	-4.6306*** (0.482)	-4.9617*** (0.385)	-5.0376*** (0.316)
Rural Non- agri SE	0.0030 (0.002)	0.0054*** (0.002)	0.0038** (0.001)	0.0060*** (0.002)	0.0039** (0.001)	0.0059*** (0.001)
Urban SE	-0.0022 (0.002)	-0.0031 (0.003)	0.0015 (0.001)	0.0017 (0.001)	0.0010 (0.001)	0.0017 (0.001)
Drive * Agri share		0.3008 (0.715)		0.1083 (0.527)		2.1750*** (0.557)
Drive * Rural Non agri SE		-0.0037*** (0.001)		-0.0031*** (0.001)		-0.0024*** (0.001)
Drive * Urban SE		0.0022 (0.001)		-0.0003 (0.001)		-0.0012* (0.001)
Constant	-11.746*** (1.452)	-11.377*** (1.455)	-18.288*** (1.257)	-16.666*** (1.721)	-21.687*** (1.688)	-22.067*** (1.743)
Observations	408	408	408	408	408	408
No of groups	17		17		17	
Overall r2	0.625	0.644	0.900	0.900	0.806	0.819

Note: Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1, Dependent variables for models 1and 2, 3 and 4, 5 and 6 are Log of FI index, log of deposit volume per head, and log of credit volume per head respectively. Number of groups=17

Further, the binary variable representing the Jan Dhan Yojana period shows a significant and positive impact on the overall FI index but the effect on credit usage is insignificant. This result is important as it implies that though there has been significant improvement in owning bank accounts, there is no significant effect on improvement in access to credit even in the Jan Dhan Yojana period. Our analysis also includes interaction terms to understand the impact of FI drive policies on the self-employed. The interaction between the drive variable and self-employment (both urban and rural) shows a negative and significant effect. On closer examination of the interaction results, we observe that this negative effect is mainly because the positive effect between credit usage and self-employment is stronger in the pre-drive period compared to the drive period. We see similar results with deposit usage too. Agricultural share during the drive period shows a positive and

significant effect implying that the positive effect between agricultural self-employment and credit usage is stronger in the drive period than in the non-drive period4. We also find that the coefficient of per capita income is positive and significant in all the models, indicating that when the income level improves, and as a result, the economic activity in the system gains momentum, overall FI as well as usage improves. Several reasons could be attributed to this. When income increases, people have additional funds to be saved (in a bank). Similarly, when economic activity in a society increases, the need for funds for new investment and, side by side, the need to manage finances formally also rises. Most importantly, this could also mean that even after a massive FI drive in the country, credit often goes to the well- off rather than to the poorer regions, even though the poorer regions require more funds to support their economic activity.

Overall, our results offer two crucial evidences. First, even after the FI drive, the usage of financial services has not improved to the desired level, especially the credit services usage. Second, our results indicate that agricultural credit has improved during the drive period than in pre- drive years.

5. Concluding observations

To our knowledge, existing literature on FI has focused primarily on commercial banking and has overlooked cooperative banks, which are prominent institutions in the rural areas. By constructing a comprehensive index of FI, from 1994 to 2017 that subsumes the indicators of cooperatives banks, a more representative and comprehensive index is presented. While the FI drive has improved overall inclusion in many states, there is evidence of an increasing rural-urban gap. Even after the recent Jan Dhan Yojana, urban FI continues to improve while rural FI did not change much for most states.

Though the Jan Dhan Yojana has improved the general level of FI, there is no significant impact on the usage of financial services. Further, the non- agricultural self-employed individuals (both rural and urban), who are supposedly in regular need of credit, are likely to have less credit during the drive period as compared to the pre-drive period. Lack of awareness about FI programmes, financial literacy-related limitations and constraints resulting from social and economic backwardness could be impeding their access and use of financial services. This area needs special attention in the FI policies as the self-employment sector is increasing in volume (see also Saravanabhavan and Rajeev, 2020), So, necessary efforts need to be made to improve the small-scale self-employment segment through adequate and suitable provision of finance and financial literacy programmes that can help them to earn their livelihood in the absence of proper formal sector jobs.

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