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NAFINDEX: Measure of Financial Inclusion based on NABARD All India Rural Financial Inclusion Survey (NAFIS) Data

Dr. K J S Satyasai and Dr.Ashutosh Kumar [1]

Financial inclusion (FI) is a multi-dimensional phenomenon unlike its pre-cursor concepts of access to credit or access to savings bank account which define financial inclusion in a narrow sense. Hence, measuring financial inclusion is complicated and requires developing a suitable index. FI index should manifest the actual usage of financial services in terms of breadth, intensity and extent of digital penetration. We, therefore, propose NAFINDEX, based on state-wise household level access to financial services based on field level data from NABARD All India Rural Financial Inclusion Survey (NAFIS) 2016-17. NAFINDEX has been constructed for different states of India using three dimensions, traditional banking products, modern banking services, and payment systems. The average value of index at all India is 0.337. There are variations across states in the value of NAFINDEX and dimension indices. Interestingly, many states which saw lower penetration of traditional banking products as reflected in the respective dimension index, the modern banking products and payment mechanisms showed higher values. This underlines the direction for the future banking expansion in hitherto unreached states.

1. Introduction

Financial inclusion is increasingly being recognized world over as a key driver of economic growth and poverty alleviation. Apart from these benefits, financial inclusion (FI) imparts formal identity, provides access to the payments system and to savings safety net like deposit insurance, and enables the poor to receive direct benefit transferred in a leak-proof manner. At a macro level, greater FI is considered crucial for sustainable and inclusive socio-economic growth for all. However, the FI is not an end in itself as it is only a means to reach higher levels of development. It is widely believed that access to affordable financial services - especially as savings, loan, remittance and insurance services - enlarges livelihood opportunities and empowers the poor to take charge of their lives. Such empowerment also adds to social and political stability in the economy.

2. What is Financial Inclusion?

With an objective to extend such financial services to a sizeable majority of population particularly who continue to remain excluded from the opportunities and services provided by the financial sector, a Committee on Financial Inclusion (CFI) was set up by the Govt. of India under the Chairmanship of Dr. C. Rangarajan in 2006. This Committee on Financial Inclusion (Rangarajan, 2008) defined Financial Inclusion as: "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 affordable costs."

The report identified demand and supply sides of financial services and emphasised on improving human and physical resource endowments. Subsequently, Planning Commission, Govt. of India (2009) in a Report of the Committee on Financial Sector Reforms mentioned:

"Financial Inclusion is not only about credit but involves a wide range of Financial Services including savings accounts, insurance and remittance products. Moreover, credit provision without adequate measures to create livelihood opportunities and enhance credit absorption amongst poor will not yield desired results."

Emphasizing the importance of those financial products, the report recommended that access to safe and remunerative methods of savings, remittances, insurance and pension need to be expanded. They suggested crop insurance for farmers and health insurance for the poor as vulnerability reducing instruments.

The recent developments in banking technology have transformed banking from the traditional brick-and-mortar infrastructure like staffed branches to a system supplemented by other channels like automated teller machines (ATM), credit/debit cards, internet banking, online money transfers, mobile money, UPI, etc. The moot point, however, is that access to such technology is restricted only to certain segments of the society. Indeed, some trends, such as increasingly sophisticated customer segmentation technology – allowing, for example, more accurate targeting of certain sections of the market – have led to restricted

[1] CGM & DGM respectively, Department of Economic Analysis & Research, NABARD, Mumbai.
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access to financial services for some groups. There has been a growing divide, with an increased range of personal finance options for a segment of high and upper middle-income population on one hand and a significantly large section of the population who lack access to even the most basic banking services on the other. This is termed "financial exclusion". These people, particularly, those living on low incomes, cannot access mainstream financial products such as bank accounts, credit, remittances and payment services, financial advisory services, insurance facilities, etc. The essence of financial inclusion is in trying to ensure that a range of appropriate financial services is available to every individual and enabling them to understand and access those services. Total financial inclusion or "Sampoorn Viteeyea Samaveshan" (SVS) envisaged to cover six broad areas 1) Ensuring every district with 1,000-5,000 households had access to banking services within 5 km by March 2016, 2) Provide financial literacy, 3) Provide basic banking for all beneficiaries of government schemes by March 2016, 4) An overdraft of Rs. 5,000, 5) Micro insurance and 6) Pension scheme for the unorganized sector (Mehta and Shah, 2014). Now the question arises, how do we get to know the level of financial inclusion of a population in a geography? This necessitates measurement of level of financial inclusion through an objective tool say financial inclusion index. .

3. Developing Indices of Financial Inclusion

Financial inclusion is a multi-dimensional phenomenon representing demand and supply factors that could be measured through developing a suitable financial inclusion index (FII). A composite financial inclusion index provides scope for multiple dimensions of financial inclusion to be reduced to a single one, making it simpler for analysts and policymakers alike. In general, such indices have no units and are constructed by making all the measured dimensions comparable. Several scholars developed FI index mostly following methodology of Human Development Index, based on secondary data with few exceptions like World Bank's Findex. Whatever existing measures were used so far had some limitations or the other to be resolved/improved upon.

4. Data and Methodology: Index Based on NAFIS data

To take care of some of the limitations of the existing measures, we have tried to build an index, NAFINDEX, based on NABARD All India Rural Financial Inclusion Survey (**NAFIS**) 2016-17 data. NAFIS was undertaken by NABARD pan-India during 2016-17 covering both financial and livelihood aspects of 40327 sample households covering 245 districts across 29 states. The survey covered all aspects of financial inclusion from a household perspective, viz., savings, borrowing, investment, remittances & payments, and insurance. Besides, the survey also covered financial literacy and experience of households with payment mechanisms.

The index is generated at all India and state-level based on the field level data collected from households. For constructing NAFINDEX, we covered three dimensions

Table 1 : Indicators used for constructing NAFINDEX

Dimension	Service/sub-dimension	Indicator	Symbol of normalised indicator	Weight
Traditional Banking Products (T)	Savings	% households that made any saving in the last 1 yr	T11	0.125
		mean savings (with all agencies) per household in the last 1 year [base: saver household who reported their saving amount]	T12	0.125
	Investment	% households that made any investment in the last one year	T21	0.125
		mean investment in all assets for household reporting any investment in the last one year	T22	0.125
	Loans	incidence of indebtedness	T31	0.125
		average outstanding debt per indebted household (Rs.)	T32	0.125
	Others	% households with at least one member having any insurance	T41	0.125
		% households having pension	T42	0.125
Modern Banking services (M)	Usage	% ATM users	M11	0.167
		% internet banking users	M12	0.167
		% mobile banking users	M13	0.167
	Ease in using	% users having ease of using ATM	M21	0.167
		% users having ease of using internet banking	M22	0.167
		% users having ease of using mobile banking	M23	0.167
Payment Mechanisms (P)	Usage	% users of cheque	P11	0.25
		% users of debit/credit card	P12	0.25
	Ease in using	% users having ease in using cheque	P21	0.25
		% users having ease in using debit/credit card	P22	0.25

– traditional banking products (T), modern banking services (M), and payment mechanisms (P). The services/ dimensions, indicators used and weights assigned for this Index are given in Table 1.

The indicators are combined to form dimension indices which are in turn combined into NAFINDEX. The values of all indicators are normalized to scale down values of indicators between 0 and 1 using formula at (1). The values of all indicators are normalized to convert values of indicators between 0 and 1 using formula below:

$$d_n = \frac{A_n - m}{M - m} \qquad (1)$$

where, for n^{th} State

d_n is the normalized value of indicator.

A_n is the actual value of indicator.

M is maximum value of indicator.

m is the minimum value of indicator.

Individual dimension indices are computed as below,

$Tn = \sum(Wij*Tij)$

$Mn = \sum(Wij*Mij)$

$Pn = \sum(Wij*Pij)$

Where, Tn is the dimension index for traditional banking products for n^{th} state;

M_n is the dimension index for modern banking services; and,

P_n is the dimension index for payment mechanisms.

Subscripts i and j stand for sub-dimension and indicator, respectively.

$NAFINDEX = \sqrt[3]{(T_n * M_n * P_n)}$

5. State-wise NAFINDEX values

The state wise Index of FI calculated based on NAFIS data are given in Table 2. The NAFINDEX for all India is 0.337 in a scale of 0 to 1. The value of the index for banking

Table 2: NAFINDEX values for different states and all India

State	Traditional Banking products	Rank	Modern Banking Services	Rank	Payment mechanism	Rank	NAFINDEX	Rank
Goa	0.472	5	0.946	1	0.761	1	0.600	1
Punjab	0.617	1	0.473	12	0.383	19	0.486	2
Karnataka	0.533	3	0.430	14	0.438	13	0.483	3
Telangana	0.482	4	0.563	8	0.478	8	0.480	4
Andhra Pradesh	0.424	7	0.703	4	0.529	5	0.473	5
Kerala	0.609	2	0.446	13	0.362	21	0.470	6
Manipur	0.385	12	0.791	2	0.558	3	0.464	7
Tripura	0.366	14	0.523	10	0.558	3	0.452	8
Jammu & Kashmir	0.420	8	0.427	15	0.450	12	0.435	9
Odisha	0.379	13	0.381	24	0.477	9	0.425	10
Haryana	0.409	10	0.328	26	0.423	14	0.416	11
Mizoram	0.322	16	0.580	6	0.476	10	0.392	12
Assam	0.237	21	0.482	11	0.625	2	0.385	13
Himachal Pradesh	0.460	6	0.565	7	0.310	23	0.377	14
Meghalaya	0.318	17	0.240	29	0.403	17	0.358	15
Arunachal Pradesh	0.337	15	0.353	25	0.374	20	0.355	16
Sikkim	0.253	20	0.678	5	0.486	7	0.351	17
Nagaland	0.318	17	0.734	3	0.325	22	0.322	18
West Bengal	0.202	25	0.419	16	0.507	6	0.320	19
Maharashtra	0.224	22	0.416	18	0.416	16	0.305	20
Jharkhand	0.200	26	0.321	27	0.451	11	0.301	21
Gujarat	0.215	24	0.531	9	0.420	15	0.300	22
Uttar Pradesh	0.217	23	0.417	17	0.397	18	0.294	23
Tamil Nadu	0.387	11	0.404	20	0.208	25	0.284	24
Uttarakhand	0.420	8	0.401	21	0.189	27	0.281	25
Bihar	0.198	27	0.387	23	0.264	24	0.229	26
Rajasthan	0.276	19	0.398	22	0.178	28	0.222	27
Madhya Pradesh	0.141	29	0.266	28	0.195	26	0.166	28
Chhattisgarh	0.160	28	0.411	19	0.055	29	0.094	29
All India	0.307		0.345		0.370		0.337	

products dimension is 0.307. The value for the payment mechanisms dimension is the highest at 0.370 followed by 0.345 for banking services. Punjab, Kerala, and Karnataka ranked top three states in banking products dimension while Bihar, Chhattisgarh, and Madhya Pradesh are at the last three positions. Goa, Manipur, and Nagaland are at the top for banking services dimension and Jharkhand, Madhya Pradesh, and Meghalaya are at the bottom. For the payment mechanisms dimension, top ranking states are Goa, Assam, Manipur and Tripura while Uttarakhand, Rajasthan, and Chhattisgarh are at the bottom.

Table 3 gives results of a pooled linear regression model estimated to explain the variation in NAFINDEX, the dependent variable, across states. Independent variables included in the final estimated model are: type of household taking '1' for agricultural household and '0' for non-agricultural household (HH_TYPE); proportion of households trained (%TRAINED); interaction between dummy for household type and proportion of households trained (%TRAINED*HH_TYPE); share of institutional loan in total (%INSTTLOAN); index of average monthly income per household (INCOME_INDEX); and, index of proportion of households reporting membership in microfinancing institutions including SHGs (MF_MEMBER).

The intercept dummy (HH_TYPE) and slope dummies except for %TRAINED*HH_TYPE are not statistically significant. This means, the regression models estimated for agricultural and non-agricultural households are not structurally different. States with higher proportion of trained households have higher NAFINDEX. The relation is statistically significant. However, for agricultural households the relation is weaker and not significant as reflected in significantly negative coefficient for slope dummy, %TRAINED*HH_TYPE. Income and membership with microfinance agencies including SHGs have significant and positive influence on NAFINDEX. That is, states with higher household income and higher outreach of microfinance institutions among households have higher financial inclusion.

Table 3: Factors explaining variation in NAFINDEX

Variable	*Coefficient*	*t-ratio*
CONSTANT	0.1617	4.69 ***
HH_TYPE	0.0447	1.31
%TRAINED	0.1907	2.99 ***
%TRAINED*HH_TYPE	−0.1766	−1.87 *
%INSTTLOAN	0.0501	0.95
INCOME_INDEX	0.1957	3.47 ***
MF_MEMBER	0.2084	4.74 ***
R-squared	0.5088	n=58
F(6, 51)	8.8054	

6. Conclusion

Based on the field level data collected through NAFIS 2016-17, NAFINDEX has been constructed for different states of India. Three dimensions, traditional banking products, modern banking services, and payment systems are considered for constructing the index. The average value of index at all India is 0.337. There are variations across states in the value of NAFINDEX and dimension indices. Interestingly, many states which saw lower penetration of traditional banking products as reflected in the respective dimension index, the modern banking products and payment mechanisms showed higher values. Higher level of financial inclusion is associated with higher proportion of trained households, better outreach of microfinancing institutions among households, higher household incomes across states. The results highlight where to focus and underline the direction for the future banking expansion in hitherto unreached states.

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Chief Editor & Publisher: Dr. K.J.S. Satyasai, CGM, Department of Economic Analysis and Research (DEAR), NABARD, Head Office: Plot No. C-24, 'G' Block, Bandra-Kurla Complex, Bandra (E), Mumbai- 400051

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