IOSR Journal of Business and Management (IOSR-JBM)
e-ISSN: 2278-487X, p-ISSN: 2319-7668. Volume 21, Issue 4. Ver. I (April. 2019), PP 102-109
www.iosrjournals.org

Measuring the extent of reach of Financial Inclusion among the Southern States Using Multidimensional Index

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Abstract:*This paper analyzes and compares the selective parameters to measure the extent of reach of Financial Inclusion among Southern States. The regions such as Adrapradesh, Karnataka, Kerala, Pondicherry and Tamilnadu were selected as it consist comparatively higher literacy than other states of India. Multidimensional approach (IF) – Index of Financial Inclusion was applied to measure the parameters "penetration", "availability" and "usage of financial services". The objective of the study is to determine the highest extent of reach of financial inclusion and set the benchmark for the other states that dwindles to covers its population under formal financial system.*
Key Words: *Extent of Reach, Financial Inclusion, Parameters, formal financial system*

I. Introduction

Financial inclusion is the measure that has been initialized by Reserve Bank of India to avail the financial services to the vulnerable groups at the most affordable cost. The most challenging part of financial inclusion includes the usage and utilization of financial services that could enhance the habit of utilizing the services of formal financial system. But usage and utilization of financial services depends on its penetration and availability. Hence for determining the reach of the financial inclusion the parameters such as Banking Penetration, Banking Availability and Banking Usage must be measured and analyzed. The study throws a light on the concept that a region may have significant number of population possessing bank accounts and have adequate facilities of Banking services but if they are not utilized sufficiently and adequately then population in the particular state may get impacted with low inclusive growth. The study has utilized the southern states to measure the impact of financial inclusion.

The parameters such as Banking Penetration, availability and usage have been used to measure the extent of reach. In order to anlyze the reach of the parameters, the southern states such as Adrapradesh, Karnataka, Kerala, Pondicherry and Tamilnadu have been chosen. The states have been selected based on higher level of literacy among the people compared to other states of India. The reason for choosing higher literacy states is to analyze the extent utilize formal financial system though being better in literacy. The Government have taken enormous steps in enhancing financial inclusion but qualitative measure such as usage is highly missing among the people of India. A huge laggard has been notified in utilizing the financial services among the states that struggle in enhancing minimum literacy among their people. Hence, the states that are high in literacy rate can be the benchmarks for the other states. Financial literacy is only the key that could uplift the usage of formal financial system among the people than mere opening a bank account. General educational literacy can boost the usage of financial service but it doesn't mean that an uneducated person cannot utilize financial services. Just a regular visit to the banks itself can pool up enormous financial information in an individuals. Hence penetration, availability and usage all matters in enhancing financial inclusion among the people. Highly literate states can depict valuable instances to the other states in terms of creating penetration, demanding availability and use maximum of products of formal financial system.

II. Literature Review: Measuring Financial Inclusion

Cámara & Tuesta (2014) have included various dimensions to measure the financial inclusion of the world. The dimensions such as usage of financial services, barriers to utilizing financial inclusion and extent of accessibility of financial services. In their study they have 42 developed and less developed countries for the purpose of ranking the financial inclusion of the various countries. In order to measure the financial inclusion, they have assigned weight by employing two stage Principal Component Analysis. The FII (Financial Inclusion Index) designed by them offers a systematic and easy understand of the situation of financial inclusion in various developed and underdeveloped countries of the world.

Demirgüç-Kunt et al. (2015) explained that the Global Findex which was introduced in the year 2011, includes various indicators to measure financial inclusion of all the countries. The indicators have measured the parameters such as people's borrowing, savings and payment habits across the world. The database of 2014 edition determined that 62% of the world population have bank accounts. It showed a vast penetration of accounts opening due to mobile money especially in South Africa. Hence the author of the study highlighted about huge opportunities that lies in enhancing financial inclusion across the world. Recent technologies such digital payments would assist the account holders to access the financial services in an easiest way.

Beck (2016) his research paper highlights about the recent advances in measuring financial inclusion. In the paper the author has highlighted that among the other financial services, access to payment services considered as one of important parameters towards deriving the enhancement of financial inclusion. The author has also stressed that enhanced delivery channel with technological advancement could also give greater drive to financial inclusion.

Sarma (2016) distinguished economies and financial sector based on its development. He considered Japan, Singapore and Korea as the development economies while Cambdia, Nepal and Bangladesh as low income economies. He specified Malaysia and Maldives as the middle income countries that scores better than India and Pakistan. He has contradicted with the concept that well developed financial system of any country could lead to all inclusive growth of their people. In all the developed, low income and middle income countries a section of people always left uncovered in formal financial system. Hence, financial inclusion must meant to be those deprived categories who are unable to utilize the financial services due their non-eligibility criteria. Hence all the countries of the world must define its financial system in such a way that it covers the poorest of the country.

Goel & Sharma (2017) introduced an index that depicts overall picture of Indian financial inclusion. She has also used one of three dimensions to measure the levels of usage and accessibility of financial services. She has highlighted in the study that if accessibility of financial services is easily available to the weaker section then country can be pushed towards higher economic growth.

Park & Mercado (2018) introduced new FII (financial inclusion index) for 151 countries. The principal component analysis has been applied to calculate total weights the index of financial inclusion. In order to calculate the index, the parameters such as usage, access and availability have been used. The purpose of the study is to use cross sectional approach to provide effective evidence. It was determined that the countries with strong financial inclusion have comparative low poverty, improved entrepreneurship, and higher female empowerment. The countries with lower financial inclusion index impacted with huge uncovered deprived sectors. Hence the study has used unique index that segregates the world's economies with higher or lower financial inclusion.

Enhancing Financial Inclusion

Gosh (2013) explain in their study that India is considered as the fastest growing economy but there is a witness of uneven distribution in growth performance of the same (economy). This can be reduced with inclusive growth, with the generation of various resources and hence this generation and mobilization of resources is possible with Financial Inclusion. Therefore, this article focuses on Financial Inclusion as an instrument to Inclusive Growth with reference to Indian states for the development of economy in turn.

At current, Financial literally and awareness remains the same regardless to the advent of various Financial products. Hence it's the right time for the collaboration of all NGOs, Banks, Government and regulators to stimulate the same for effective Financial Inclusion. The researcher has made use of secondary data for research on this domain along with the emphasis laid on various economic parameters such as GDP, literacy, unemployment rate and index of financial inclusion (with reference to Johnson R.A. & Wichern D.W., 2000) on few states of India.

Mamta et al (2016) elucidates that at current India is the fastest growing economy in the world with a witness on drastic growth during 2003-04 to 2007-08. Yet there were few failures in the domain of unemployment and poverty in spite of increased economic growth and this resulted 'inclusive growth' a important growth strategy. However, such growth can be witnessed only with the operations of Financial Inclusion.

The concept of financial inclusion includes the ensured access of credit and financial services to the underprivileged. Hence, to assist this progress Nationalization of private banks (1965) was a huge step. However, addressing financial exclusion is not a easy task and it incurs many challenges such as creating awareness on financial inclusion, education and counselling on credit and savings. Hence, with such blocks on path, various strategies, models, technology advancement to enable ATM access are initiated. Therefore, this article clearly explains on the issues and measures undertaken to promote financial inclusion. These operations shall lead to inviting global market player resulting in increased employment and business participants, eventually making India a global player itself.

The study by **Evans (2016)** provides empirical evidence on the effects of economic and financial development on financial inclusion in Africa, using panel FMOLS. He further highlights various variables that show a positive impact on the concept of Financial Inclusion namely: Economic growth, GDP Per Capita, Income of individuals, Deposit Interest Rate, Internet access.

The author also encourages on the concept of Financial Literacy and Islamic banking presence or activities as they are associated with higher Financial Inclusion. He propounds that the factors of Inflation and low Deposit interest do not encourage the inclusive financial systems. It is well established in this study that although both social and financial development promote financial inclusion, yet the effects of economic developments are much stronger for the same and must be emphasized.

Srijaanil (2017), proclaims that during the last few decades, there is a vast growth in the domain of Banking Industry. Regardless to various development in the fields of financial viability, profitability and competitiveness, there are aspects where in the banks are not able to include them in the banking folds (i.e., underprivileged). Hence, the concept of financial inclusion has become a concern of focus both Nationally and Internationally. The author is with the view that financial inclusion can indeed lift up the financial condition and poor's standard of living. There also seems a huge gap between the urban and rural housing which results in rural population fleeing to urban areas for livelihood. Hence, Financial Inclusion acts as a key solution for such disadvantaged. With proper access to pubic goods and services without any discrimination this is can be possible. Further, the author recommends on modified strategies by banks, linkage with Microfinance firms, progressing Technology, ATMs as user friendly, no

The study by **Williams et al., (2017)** is to empirically investigate the role of financial inclusion in poverty reduction and economic growth in a developing economy using panel data analysis ranging from 2006 to 2015 within a log linear model specification framework.

From the regression result it is concluded that the number of ATM, Bank Branches and Government Expenditures were the most robust predictors for financial inclusion on poverty reduction in a developing economy. One percent increase on ratio of active ATM will leads to about 0.0082 percent increase in the gross domestic product and a reduction of poverty in developing economy (excluding SARMA – South Africa Ready-mix Association)

Consequently, the study recommends that Government should focus on poverty reduction through focus on infrastructural development that will enhance banking services along with the establishment of commodity market leading to assistance in allocation of investments and strong returns on commercial bank branches in rural area that results in solving uncertainty problems, transaction costs and information problems between sellers and buyers of agricultural products and also stimulate in poverty reduction, economic growth through increase in agricultural product and risk reduction. Moreover, empirical studies have shown repeatedly that financial inclusion will drive economic development through investment if properly managed and active ATMs are implemented. Also bank lending to rural dwellers has not positively causes economic growth and poverty reduction; therefore, any attempt made by banks to fully finance agriculture in developing economy should be encouraged with attention to inflation and bank lending rates.

III. Methodology

a. Weights for Measuring Selective Paramters:

Parameter I – Banking Penetration

The study defines Banking Penetration as number of population covered under formal financial system. In other words, the number of people that are banked in certain region or state. In order to measure the stated parameter, the study has set 1 as the highest number for the extent of penetration. It states that if any of stated States scores 1, then it is understood that every person in the state is banked and has the awareness of banking system and financial services. It order to measure the penetration, the total number of bank accounts in particular region or state has been considered.

Parameter II – Availability of Banking Services: The parameter considers various banking services that are available in certain region. Three sub parameters such as Number of Bank Branches, Number of ATMs, and Number of Business Correspondents responsible for opening bank accounts have been taken in to consideration. These three sub parameter have been segregated in to five indexes assigned with different weights. 0.3 weight for number of bank branches per 10,000 population, 0.3 for number of bank branches per square km, 0.175 for number of ATMs per 10,000 population, 0.175 for number of ATMs per square km, 0.05 for number of Business Correspondents per 10,000 population.

Paratmeter III – Usage: Usage of banking services is one of the most important factor for determining the inclusive growth among the population. The population in certain region may be banked but if the usage of banking services are minimal then it do not serve the purpose of reaching actual financial inclusion. In order to measure the Usage parameter, the study has utilized the outstanding credit and deposits information of all the region.

B. Multidimensional Index "IFI" Index of Financial Inclusion:

In this study, state-wise Index of Financial Inclusion (IFI) for Southern Regions of India is calculated. For computing IFI, we have to calculate a dimension index for each dimension of financial inclusion. A weight w_i, where w_i is between 0 and 1, is added to the dimension i demonstrating the relative significance of the dimension i with respect to other dimensions, in measuring the inclusiveness of region.

A dimension index for the i_{th} dimension, d_i, is calculated by the subsequent formula:

$$d_i = w_i \frac{P_i - m_i}{M_i - m_i}$$

where,

w_i = Weight for dimension i, w_i is between 0 and
1

P_i = Specific value of dimension i

m_i = lower boundary for dimension i, taken as the observed minimum for dimension i

M_i = upper boundary for dimension i, taken as the empirical 94th quantile for dimension i

The above formula ensures that $0 \leq d_i \leq w_i$. A greater value of d_i indicates higher achievement by a region in dimension i. For r dimensions of financial inclusion, a state will correspond to a point D = (d_1, d_2, d_3, ….d_r) on the r-dimensional Cartesian space. In the r-dimensional space, the point O = (0, 0, 0,…0) corresponds to the point representing the worst scenario while the point W = (w_1, w_2, …..w_r) corresponds to the highest achievement in all dimensions.

The distance of a point D = (d_1, d_2, d_3, ….d_r) from the worst point O and best possible point W determines the value of the corresponding IFI value for a state. Greater the distance between D and O, higher is the financial inclusion. Also, smaller the distance between D and W, higher is the financial inclusion. Two points in the r-dimensional space can be at the same distance from O but different distances from W and vice versa.

So, two states can have their index points at same distance from either O or W but at different distances from the other point. If the index points of two states have the same distance from O but different distance from I, then the state with the point nearer to W is more financially inclusive whereas if the index points are at same distance from W but at different distance from O, then the state with the point farther from O has greater financial inclusion. Thus, to account for the distances, we take a simple average of the normalized Euclidian distance between D and O and the normalized inverse Euclidian distance between D and W. While calculating the average, we use the inverse Euclidian distance between D and W to ensure that the value lies between 0 and 1.
The formula for Calculation Financial Index

In this study, we consider three dimensions for evaluating the extent of financial inclusion: banking penetration to measure accessibility, availability of banking services and usage of banking services.
With the three mentioned dimensions – penetration, availability and usage – we can represent a state by any point P (p_1, p_2, p_3) in the three dimensional Cartesian space, where p_1, p_2 and p_3 denote the dimension indexes for that state. In the three dimensional Cartesian space, the point (0, 0, 0) indicates the worst scenario i.e. zero financial inclusion and the point (1, 1, 1) indicates ideal situation i.e. total financial inclusion.

$$A_1 = \frac{\sqrt{(d_1)^2 + (d_2)^2 + .. + (d_r)^2}}{\sqrt{(w_1{}^2 + w_2{}^2 + .. + w_r{}^2)}}$$

$$A_2 = 1 - \frac{\sqrt{(w_1 - d_1)^2 + (w_2 - d_2)^2 + .. + (w_r - d_r)^2}}{\sqrt{(w_1{}^2 + w_2{}^2 + .. + w_r{}^2)}}$$

$$IFI = \frac{1}{2}(A_1 + A_2)$$

IV. Analysis And Results

Table 1: Parameter I – Bank Penetration

Southern Region	Total Accounts	Total Population
Andhra Pradesh	73,614,383	84,655,533
Karnataka	53,580,133	61,130,704
Kerala	33,860,495	33,387,677
Puducherry	1,368,486	1,244,464
Tamil Nadu	62,503,282	72,138,958

Table 1.1 : Calculation of Dimension 1

Southern Region	Total Accounts	Total Population	Total Ac/Tot pop	Dimension 1
Andhra Pradesh	73,614,383	84,655,533	0.8696	0.01
Karnataka	53,580,133	61,130,704	0.8765	0.04
Kerala	33,860,495	33,387,677	1.0142	0.63
Puducherry	1,368,486	1,244,464	1.0997	1.00
Tamil Nadu	62,503,282	72,138,958	0.8664	0.00

Table1.1. depicts that the population of Puducherry and Kerala have highest number of Bank Accounts than other states.

Table 2: Dimension II - Availability

Region/State Union Territories	Population	Number of Branches of Scheduled Commercial Banks (as on March 2021	Number of Branches of SCBs per Population (Parameter 1)	Area Per Square Km	Number of Branches of SCBs per Square Km (Parameter 2)
Andhra Pradesh	84,655,533	7,947	0.93	275,045	0.028
Karnataka	61,130,704	6,810	1.11	191,791	0.035
Kerala	33,387,677	4,783	1.432	38,863	0.123
Lakshadweep	64,429	12	1.862	32	0.375
Puducherry	1,244,464	161	1.293	479	0.336
Tamil Nadu	72,138,958	7,253	1.005	130,058	0.055

Source: Population: Census of India, 2011
State-wise Number of Branches of Scheduled Commercial Banks: Quarterly Statistics on Deposits and Credit of Scheduled Commercial Banks, Reserve Bank of India, March 2012

Area : Official website of Census of India, Official Websites of the State Governments, Report on Comparative Statistics of States by the Government of Andhra Pradesh

Table 2.2: State-wise Number of ATMS per 10,000 Population, Per Square Km

Region/ State/Union Territory	Population	Number of ATMS	Number of ATMs Per 10,000 Population (Parameter 3)	Area (Per Square Km)	Number of ATMs Per Square Km (Parameter 4)
AndhraPradesh	84,655,533	8,753	1.0340	275,045	0.0318
Karnataka	61,130,704	8,180	1.3381	191,791	0.0427
Kerala	33,387,677	4,485	1.3433	38,863	0.1154
Lakshadweep	64,429	9	1.3969	32	0.2813
Puducherry	1,244,464	315	2.5312	479	0.6576
Tamil Nadu	72,138,958	10,134	1.4048	130,058	0.0779

Source: State-wise Number of ATMs: Quarterly Statistics by Reserve Bank of India

Table 2.3: Number of Business Correspondents per 10,000 Population (State-wise)

Region/ State/Union Territory	**Population**	**Number of Business Correspondence**	**Number of Business Correspondence per 10,000 Population**
Andhra Pradesh	84,655,533	6,262	0.7397
Karnataka	61,130,704	3,035	0.4965
Kerala	33,387,677	104	0.0311
Lakshadweep	64,429	0	0
Puducherry	1,244,464	34	0.2732
Tamil Nadu	72,138,958	4,051	0.5616

Source: State-wise Number of Business Correspondents: State-wise Financial Inclusion Progress, Reserve Bank of India, March 2012

Table 2.4: Calculation of Dimension II

Region	Index 1	Index 2	Index 3	Index 4	Index 5	Dimension II
Andhra Pradesh	0.122	0.029	0.114	0.026	0.352	0.42
Karnataka	0.145	0.037	0.148	0.035	0.236	0.32
Kerala	0.188	0.129	0.148	0.096	0.015	0.15
Puducherry	0.169	0.353	0.280	0.545	0.130	0.43
Tamil Nadu	0.132	0.058	0.155	0.065	0.267	0.36

Table 3: Dimension III - Usage

Region	**Deposits**	**Credit**	**Deposits + Credit**	**Gross**
Andhra Pradesh	3468.00	3826.99	7294.99	6551.81
Karnataka	4117.24	2912.36	7029.60	4606.07
Kerala	2005.73	1515.26	3520.99	3152.06
Puducherry	4011.82	4660.31	8672.13	142.99
Tamil Nadu	3468.00	3826.99	7294.99	6653.12

Source: Gross State Domestic Product: GSDP at Current Prices for 2011-12 (as on 01-08-2013) by Planning Commission. Deposits and Credit (as on March 2012): Statistical Tables Relating to Banks in India 2011 - 2012

Table 2.5.1 : Calculation of Dimension III

Region	Deposit + Credit/GSDP	Dimension III
Andhra Pradesh	1.113	0.32
Karnataka	1.526	0.99
Kerala	1.117	0.32
Puducherry	0.921	0.00
Tamil Nadu	1.303	0.63

Table 2.5 deals with measuring Bank Penetration in various states and depicts that Puducherry and Kerala have highest number of Bank Accounts among other regions. Table 2.4 deals with measuring the availability of Banking services in various states and shows that Puducherry, Andhra Pradesh, Karnataka and Tamilnadu have greater availability of Banking Services. Table 2.5 explains about the usage of Banking Services and shows that Karnataka tops in maximum utilization.

Financial Inclusion Index Calculation

The Index for Financial Inclusion was calculated for Southern Region using the data on all three dimensions (penetration, availability and usage).

Region	Dimension 1	Dimension 2	Dimension 3
Andhra Pradesh	0.01	0.42	0.32
Karnataka	0.04	0.32	0.99
Kerala	0.63	0.15	0.32
Puducherry	1.00	0.43	0.00
Tamil Nadu	0.00	0.36	0.63

Calculation of Index of Financial Inclusion

Region	A1	A2	Index of Financial Inclusion (IFI)	Rank
Andhra Pradesh	0.30	0.24	0.27	5
Karnataka	0.60	0.33	0.47	2
Kerala	0.41	0.35	0.38	3
Puducherry	0.63	0.35	0.49	1
Tamil Nadu	0.41	0.28	0.34	4

V. Observations

From the Calculation of index of Financial Inclusion, it is clear that Puducherry ranks first among the other States with IFI of 0.49 due to higher score in Parameter 1 namely “Penetration”. This is due to serious effort was taken by the government in the year 2012 to open mandatory bank account to the entire population. In 2012, Puducherry was declared as the state in achieving 100% financial inclusion. The subsidies and pension fund benefits were directly linked to the bank accounts with the help of Aadhar Card.

Karnataka tops next to Puducherry with IFI of 0.47 by scoring higher in Parameter 3 “Usage of Financial Services”. This is due to the existence of major services industry hubs especially in information technology. This has led to a drastic increase in the total volume of credits and deposits. The increase in deposits must have had a substantial effect on GDP as well.

Kerala tops in Dimension I (i.e) Bank Penetration and in Dimension III (Usage). It has done an excellent job in opening a bank account to almost entire population and in increase in GDP (Deposit and

Credit).But it gives an average performance in Dimension II (i.e) in terms of number of ATMs Per Square Km and number of Business Correspondents.

Tamil Nadu and Andhra Pradesh also have performed well in banking penetration and thus considered as moderately fair. But these states lacks in covering many villages in terms of opening sufficient rural banks and providing effective financial services.

VI. Conclusion

The paper has analyzed the Financial Inclusion Index of Southern Region (Andra Pradesh, Karnataka, Kerala, Puducherry and Tamil Nadu). The overall FI of Southern Region is pretty good while compared to the other regions of India. But Financial Inclusion doesn't mean only the bank penetration but also Availability and Usage of banking services. The analysis showed the all the states have performed well in bank penetration but the states like Tamil Nadu and Andhra Pradesh still lacks in availability and usage of financial services. Still wider of sections of disadvantage people are uncovered due to large number of villages in these states.

The Government of India should put in a coordinated effort towards encouraging financial inclusion. The policies introduced in various sectors like health, education, income and infrastructure should also include financial inclusion as one of their objectives. The policy makers should incorporate financial inclusion in the bigger objective of economic and social development of the citizens of the country.

It is observed that although India has registered enormous growth especially in the last couple of decades, the effects of this growth have not percolated down to the poor and underprivileged sections of our society. One of the major reasons for this is the lack of adequate and safe banking facilities to these groups. While India has made continuous efforts towards greater financial inclusion, there is still a long way to go. The financial system in India has grown rapidly in the last three decades. However, the data still shows that there is exclusion and that the poorer sections of the society do not have adequate access to financial services from the organized financial system.

Financial inclusion will pull individuals out of dismal poverty conditions and lead to their social as well as economic development. There is a need for a coordinated endeavor by the Government, banks, Micro-finance institutions and NGOs to facilitate access to financial services amongst the low-income and less aware groups of the society. Financial access to everyone will open new opportunities for enterprises to grow which will attract more global organizations to our country. It will not only lead be a boost for the gross domestic product of the country but will also lead to an improvement in the standard of living of the citizens. Financial inclusion will lead to inclusive growth and thereby allow more people to participate effectively in the economic and social progress of the country. India needs to travel on the path of financial inclusion on its way towards becoming a global superpower.

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