

CHAPTER 5

EMPIRICAL ANALYSIS

The present chapter deals with the empirical analysis of financial inclusion. It has been described below the inter-state analysis of the extent of financial inclusion. This is mainly based on the secondary data drawn from RBI (Hand book of statistics) and population data from Census 2011. The socio-economic characteristics of each socio-economic attributes such as per capita Income, literacy rate, urbanisation and poverty ratio on different facets of financial inclusion such as .opening of bank accounts, total amount that include deposit and credit amount and number of the offices. These three variables are state wise. This analysis has been carried out with the help of coefficient of variation, Index of Financial Inclusion and least square method.

Inter State Financial Inclusion

The interstate extant of financial inclusion is measured by preparing a composite index, namely Index of Financial Inclusion (IFI) by aggregating three Dimension Indexes: (c_1) representing Offices, (c_2) representing Amount and (c_3) denoting Account. In a financial inclusive system, banking services should be easily available to the users. The number of bank offices per adult population has been taken as an indicator of availability of financial system. For computation of dimension index the maximum is taken as maximum and zero as minimum. The weight for this index has been taken as 1.

Another important indicator c_2 of financial inclusion is the usage of the financial system which can be measured in term of deposited and credit amount in lakh per adult population. The weight has been taken as 1 for the penetration index. aThe usage of the banking services can be measured by deposit and credit Amount which is available at state level. Amount of deposit plus credit per Adult population has been taken as an indicator of usage of banking system. Maximum figure and zero have been taken as maximum and minimum for computation of usage dimension index.

The third one indicator c_3 is the banking penetration total account that includes deposit and credit account. The weight has been taken as 1 for the penetration index. To avoid the biasedness

account in numbers also has been taken per adult population. 1 and zero have been taken as maximum and minimum for computation of usage dimension index. Maximum value for account has been taken 1 per adult population and minimum is zero.

Following the classification used by Manidra Sarma (2010), depending on the value of IFI, the state level has classified into three categories, namely, high financial inclusion, medium financial inclusion and low financial inclusion.

1. $0.5 \leq \text{IFI} \leq 1$ high financial inclusion.
2. $0.3 \leq \text{IFI} \leq 0.5$ medium financial inclusion.
3. $0.0 \leq \text{IFI} \leq 0.3$ low financial inclusion.

As stated earlier, the number of the offices, total amount of credit and deposit, and number of accounts (credit and deposit both) in each state/union territory have been taken as components of extent of financial inclusion representing availability, penetration and uses of financial services. The absolute figure of three components along with the number of adult person in each state/union territory has been shown in table 5.1. Since the states and union territories are not of the similar in terms of the geographical size and hence population size. The difference in the above mentioned components across states may not be solely be due to differences in the extent of financial inclusion. The difference may be due to the extent of financial inclusion as well as differences in the size of population. To make the figures relating to the three components consistent and comparable, we have normalized these figures to a common denominator. For this purpose, the figures have been divided by the number adult persons in the respective states/union territories to make the comparison meaningful.

Table: 5.1
State wise Distribution In Number of Offices, Accounts, Amount and Adult Population(2011)

State/Union territory	Offices	Amount ¹	Accounts ²	Adult population
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Haryana	2438	17830985	21051914	13564584
Himachal Pradesh	1017	3824028	6563085	4193510
Jammu	1013	4977127	8832188	6526675
Punjab	3595	22845627	29754735	16741123
Rajasthan	4242	20104284	32696327	33963957
Chandigarh	326	7276697	2603454	639447
Delhi	2456	98656726	39555376	9357568
Arunachal Pradesh	80	526276	659306	655143
Assam	1477	6696035	14545782	16685186
Manipur	81	383466	723988	1460083
Meghalaya	213	960046	1154269	1337945
Mizoram	98	343036	442198	574837
Nagaland	90	545691	645004	1261627
Tripura	229	975272	2212077	2123651
Bihar	4142	12949166	33739790	48124358
Jharkhand	1862	8590672	15508009	16237135
Orissa	2876	12724417	22996650	24596788
Sikkim	74	430109	390148	415891
West Bengal	5368	44609052	55011844	53530792
Andaman Nikobar	37	220266	303179	252108
Chhattisgarh	1331	7275316	10667216	28526457
Madhya Pradesh	4270	18979942	34168346	37095607
Uttar Pradesh	10475	44738912	113127401	154919557
Uttrakhand	1204	5613271	8446567	5402373
Goa	443	3692890	3595254	1016442
Gujarat	4733	35571516	43103808	34046849
Maharashtra	8321	219885118	96530773	65778254
Dadra& Nagar	27	154230	257677	142732
Daman & Diu	19	143593	248243	115010
Andhra Pradesh	7132	51134907	80266405	51811882
Karnataka	6271	51460018	57510070	36004961
Kerala	4390	24810760	36603223	23544829
Tamil Nadu	6474	60653036	78001876	45694805
Lakshadweep	11	45968	51984	39916
Puduchery	145	961383	1548857	711659
All India	86960	790619837	853517023	737093741

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Contd. Table: 5.1

State wise Distribution In Number of Offices, Accounts, Amount and Adult Population (2011)

Standard deviation	1621.4	1192861	13790744	9088390.4
Average	1291.5	9396184	11300386	7138121.5
Coefficient variation	1.25544	1.26952	1.22038	1.27322

Note:

1. Amount is in lakh include deposit and credit amounts.

2. Accounts are the sum of deposit and credit account.

Source: Statistical Handbook of RBI (2011). www.rbi.com and Census of India.

The states/union territory-wise number of offices per adult persons, the amount of credit and deposit per adult person, and number of account per adult person have been shown in table 5.2. The table shows that the number of offices per adult varies from a minimum of .0001 for Rajasthan, Arunachal Pradesh, Assam, Manipur, Nagaland, Tripura, Bihar, Jharkhand, Orrisa, West Bengal, Andaman Nikobar, Chhattisgarh, Madhya Pradesh, Uttar Pradesh, Gujarat, Maharashtra, Andhra Pradesh and Tamil Nadu to a high of .0005 offices per adult person in Chandigarh followed by .0004 in Goa and .0003 in Delhi.

The interstate variation as depicted by the coefficient of variation is about 57 percent of the mean of the observations.

Regarding the amount of credit and deposits per adult person, the table shows that there are only four states/union Territories where the amount per adult person is higher than the all India mean of Rs. about 1.55 lakhs. These states are Chandigarh (11.4 lakh), Delhi (10.5 lakh), Goa (3.63 lakh) and Maharashtra (3.34 lakh). The amount of credit and deposit per adult person in rest of the states is below 1.55 lakh.

The interstate variation as exhibited by the coefficient of variation is of the order of 158 percent of the mean value. The variation ranges from a minimum of 0.26 lakhs in Manipur to a high of 11.4 lakhs in Chandigarh followed by Delhi with about 10.54 lakhs per adult person of the population.

As far as the number of the accounts per adult of the population in concerned, the table shows that there interstate variation in this respect also. The value of the coefficient of variation shows that interstate disparities in this respect are of the order of 62.3 percent of the mean. The number of accounts per adult person varies from a minimum of 0.37 in Chhattisgarh and about 0.50 in Manipur to a maximum of 4.23 in Delhi and about 4.07 in Chandigarh. It is also clear

from the table that interstate variation is highest in respect of amount of credit and deposit and minimum in respect of number of offices per adult.

Table: 5.2

Inter-State variations in Offices, Amount and Accounts per Adult Person (2011)

States	Number of offices per adult	Amount of Credit & Deposits per adult	Number of accounts per adult
Haryana	0.0002	1.3145	1.552
Himachal Pradesh	0.0002	0.9119	1.5651
Jammu	0.0002	0.7626	1.3532
Punjab	0.0002	1.3646	1.7773
Rajasthan	0.0001	0.5919	0.9627
Chhattisgarh	0.0005	1.1879	4.0711
Delhi	0.0003	10.543	4.2271
Karnataka	0.0002	1.4292	1.5973
Arunachal Pradesh	0.0001	0.8033	1.0064
Kerala	0.0002	1.0538	1.5346
Assam	0.0001	0.4013	0.8718
Tamil Nadu	0.0001	1.3274	1.707
Manipur	0.0001	0.2626	0.4959
Lakshadweep	0.0003	1.1516	1.3023
Meghalaya	0.0002	0.7176	0.8627
Puduchery	0.0002	1.3509	2.1764
Mizoram	0.0002	0.5068	0.7693
All India	0.0001	1.0726	1.1579
Nagaland	0.0001	0.4325	0.5112
Standard Deviation	0.0001	2.4593	0.899
Tripura	0.0001	0.4522	1.0416
Mean	0.0002	1.5526	1.4439
Bihar	0.0001	0.2691	0.7011
Coefficient. Variation	0.5703	1.584	0.6226
Jharkhand	0.0001	0.5291	0.9551
Orissa	0.0001	0.5173	0.9349
Sikkim	0.0002	1.0342	0.9381
West Bengal	0.0001	0.8333	1.0277
Andaman Nikobar	0.0001	0.8737	1.2026
Chhattisgarh	0.0000	0.255	0.3739
Madhya Pradesh	0.0001	0.5116	0.9211
Uttar Pradesh	0.0001	0.2888	0.7302
Uttrakhand	0.0002	1.039	1.5635
Goa	0.0004	3.6332	3.5371
Gujarat	0.0001	1.0448	1.266
Maharashtra	0.0001	3.3428	1.4675
Dadra& Nagar Haveli	0.0002	1.0806	1.8053
Daman & Diu	0.0002	1.2485	2.1584
Andhra Pradesh	0.0001	0.9869	1.5492

Note: 1. Amount is in lakh include deposit and credit amount.
2. Accounts is the sum of deposit and credit accounts.

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in each state/union territory have been shown of the extent of financial inclusion.

The table shows that the index value of c_1 (offices) varies from minimum 0.091 for Chhattisgarh and 0.109 for Manipur to maximum Chandigarh 1.000 followed by 0.855 in Goa and 0.540 in Lakshadweep. Nineteen states/union territories have minimum value that is less than mean value and 13 states/union territories have above the mean value.

The interstate variation as depicted by coefficient of variation is about 57 per cent of the mean of the observation in respect of offices.

Regarding the index value of c_2 (amount) the table shows that there are only four states/union territories where the index value of c_2 is higher than the all India mean value of about 0.136. These states /union territories are Chandigarh (1.000), Delhi (0.926), Goa (0.319) and Maharashtra (0.294). The index value of c_2 (amount) in rest of the states/union territories is below (0.136).

The interstate variation as exhibited by the coefficient of variation is of the order of 158 per cent of the mean value. The variation ranges from a minimum of 0.022 in Chhattisgarh followed by Manipur 0.023 and 0.024 Bihar to a high value of 1.000 in Chandigarh followed by Delhi with about 0.926

As far as the index value of c_3 (account) is concerned in the table shows that there interstate variation in this respect also. The value of the coefficient of variation shows that the interstate disparities in this respect are of the order of 63 per cent of the mean. The index value of the accounts (c_3) vary from a minimum of 0.374 in Chhattisgarh and 0.496 in Manipur to a maximum of 1.000 in Chandigarh, Delhi, Goa, Haryana, Himachal Pradesh , Jammu, Arunachal Pradesh, Tripura , West Bengal and 13 other states. It is also clear from the table that interstate variation is highest in

Table:5.3
Components and Composite Index of Financial Inclusion

States	C ₁ (Offices)	C ₂ (Amount)	C ₃ (Accounts)	IFI (Composite Index)
Haryana	0.352	0.116	1.000	0.367
Himachal Pradesh	0.476	0.080	1.000	0.389
Jammu	0.304	0.067	1.000	0.328
Punjab	0.421	0.120	1.000	0.392
Rajasthan	0.245	0.052	0.963	0.300
Chandigarh	1.000	1.000	1.000	1.000
Delhi	0.515	0.926	1.000	0.717
Arunachal	0.239	0.071	1.000	0.307
Assam	0.174	0.035	0.872	0.263
Manipur	0.109	0.023	0.496	0.183
Meghalaya	0.312	0.063	0.863	0.324
Mizoram	0.334	0.052	0.769	0.318
Nagaland	0.140	0.038	0.511	0.203
Tripura	0.211	0.040	1.000	0.283
Bihar	0.169	0.024	0.701	0.240
Jharkhand	0.225	0.046	0.955	0.290
Orissa	0.229	0.045	0.935	0.290
Sikkim	0.349	0.091	0.938	0.353
West Bengal	0.197	0.073	1.000	0.292
Andaman Nikobar	0.288	0.077	1.000	0.327
Chhattisgarh	0.091	0.022	0.374	0.149
Madhya Pradesh	0.226	0.045	0.921	0.289
Uttar Pradesh	0.133	0.025	0.730	0.231
Uttrakhand	0.437	0.091	1.000	0.383
Goa	0.855	0.319	1.000	0.598
Gujarat	0.273	0.092	1.000	0.328
Maharashtra	0.248	0.294	1.000	0.404
Dadra& Nagar	0.371	0.095	1.000	0.364
Daman & Diu	0.324	0.110	1.000	0.355
Andhra Pradesh	0.270	0.087	1.000	0.325
Karnataka	0.342	0.126	1.000	0.368
Kerala	0.366	0.093	1.000	0.361
Tamil Nadu	0.278	0.117	1.000	0.341
Lakshadweep	0.540	0.101	1.000	0.417
Puduchery	0.400	0.119	1.000	0.385
All India	0.231	0.094	1.000	0.314
Mean	0.327	0.136	0.915	0.356

Standard Devi.	0.186	0.216	0.163	0.152
Coefficient-variation	0.570	1.584	0.178	0.426

Table:5.4
Rank of States on Basis of Dimensions and Composite Index.

States	C ₁	C ₂	C ₃	IFI
Haryana	11	9	1	11
Himachal Pradesh	5	17	1	7
Jammu	17	20	1	17
Punjab	7	6	1	6
Rajasthan	23	22	2	23
Chandigarh	1	1	1	1
Delhi	4	2	1	2
Arunachal Pradesh	24	19	1	22
Assam	30	27	7	28
Manipur	34	30	13	31
Meghalaya	16	21	8	20
Mizoram	14	22	9	21
Nagaland	32	26	12	31
Tripura	28	25	1	27
Bihar	31	29	11	29
Jharkhand	27	23	3	25
Orissa	25	24	5	25
Sikkim	12	15	4	15
West Bengal	29	18	1	24
Andaman Nikobar	18	17	1	18
Chhattisgarh	35	31	14	32
Madhya Pradesh	26	24	6	26
Uttar Pradesh	33	28	10	30
Uttrakhand	6	15	1	9
Goa	2	3	1	3
Gujarat	20	14	1	17
Maharashtra	22	4	1	5
Dadra& Nagar	9	12	1	12
Daman & Diu	15	10	1	14
Andhra Pradesh	21	16	1	19
Karnataka	13	5	1	10
Kerala	10	13	1	13
Tamil Nadu	19	8	1	16
Lakshadweep	3	11	1	4
Puduchery	8	7	1	8

c_2 (amount) 158 per cent followed by 57 per cent in c_1 (offices) and 18 per cent in c_3 (accounts).

Regarding the composite index (IFI) value the table shows that highest value (1.000) of Chandigarh followed by Delhi (0.717) and minimum value in Chhattisgarh of 0.149 followed by 0.183 in Manipur. The interstate variation as depicted by coefficient of variation is about 43 per cent of the mean of the observations.

In respect of composite index, 13 states/union territories have the above value of mean value (0.356) and rest of the states have less value than mean value. As stated in the table 5.4 ranking of the states/union territories have been shown on the basis of Financial Inclusion. As the ranking of c_1 (offices), Chandigarh has the 1st rank followed by Goa 2nd rank and Lakshadweep 3rd rank. On the other hand Chhattisgarh has the lowest rank 35th followed by Manipur 34th and Uttar Pradesh 33rd rank.

Regarding the amount (c_2), Chandigarh has the highest 1st rank followed by Delhi 2nd and Goa 3rd rank. On the other hand the lowest rank is of Chhattisgarh 31st rank followed by Manipur 30th and Bihar 29th. Andaman Nikobar and Himachal Pradesh have the same rank 17th.

Similarly stated about c_3 (account), many states/union territories have the 1st (highest rank) that are Chandigarh, Delhi, Punjab, Rajasthan, Jammu, Haryana, Himachal Pradesh, West Bengal, Andaman Nikobar and 11 other states. On the other hand Chhattisgarh has 14th rank that is lowest followed by Manipur 13th, Nagaland 12th and Bihar 11th rank.

Regarding the composite index (IFI), the highest rank 1st is of Chandigarh followed by Delhi 2nd and Goa 3rd rank. On the other hand Chhattisgarh has the lowest rank of 32nd, Manipur 31st and Uttar Pradesh 30th rank.

Determinants of Financial inclusion

To know about the factor that influences the extent of financial inclusion, the study considered four factors are: literacy rate, urbanisation, per capita income, and poverty index in different states and union territories. The knowledge and identification of factors effecting the financial inclusion is important for formulation and implementation of policy measures aimed at increasing the extent of financial inclusion and thereby reducing poverty and ensuring inclusive economic growth. For this the composite index of financial inclusion(IFI) IS regressed on the

above mentioned variables literacy rate (X_1), urbanisation (X_2), per capita income (X_3) and poverty index (X_4). The regression equation has been estimated from a sample of 32 cross section data taking state/union territories as a unit of observation applying ordinary least squares method.

The estimates of correlation coefficients among the explanatory variables are shown in table 5.5. The table shows that literacy is correlated with urbanisation and per capita income. Urbanisation is associated with per capita income. Poverty is negatively associated with literacy rate, urbanisation and per capita income though the association is weak. Since intercorrelations are not very high, the problem of multicollinearity may not interfere with the OLS estimates may not interfere with the OLS estimates required for the study of determinants.

Table: 5.5

Matrix of Correlation Coefficient Estimates

Variables	Literacy	Urbanisation	Income	Poverty
Literacy (X_1)	1.000	0.565	0.658	-0.204
Urbanisation (X_2)	0.565	1.000	0.786	-0.168
Income (X_3)	0.658	0.786	1.000	-0.302
Poverty (X_4)	-0.204	-0.168	-0.302	1.000

The estimate of parameters along with their standard errors, t-values and coefficient of determination is shown in table 5.6. The table shows that the model explains about 74.5 per cent of variation in the mean value of index of financial inclusion. The result also shows that urbanisation and per capita income have significant and positive influence on the extent of financial inclusion. The results are on expected lines. However, the impact of literacy is significant and negative on the extent of financial inclusion. This result is not expected theoretically as it is expected that education should lead to more awareness and hence should promote financial inclusion. It is difficult to explain the negative and significant at all conventional levels of significance.

To see whether poverty index interferes with the impact of per capita income on financial inclusion, variable representing the poverty index was dropped and the index of financial inclusion was regressed on literacy rate, urbanisation, and per capita income.

Table: 5.6
Ordinary Least Squares Estimates of Equation:
 $Y_i = \alpha + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} + \beta_4 X_{4i} + u_i$

Dependent Variable: Y				
Method: Least Squares				
Number of observations: 32				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
Literacy (X ₁)	-0.5766	0.257	-2.2439	0.0332
Urbanisation (X ₂)	0.4931	0.1196	4.1222	0.0003
Income (X ₃)	0.1303	0.056	2.3254	0.0278
Poverty ratio (X ₄)	-0.0055	0.0976	-0.0563	0.9556
Intercept α	-0.7478	0.52	-1.438	0.1619
Mean dependent var	0.3540	F-statistic		19.7125
S.D. dependent var	0.1584	Prob (F-statistic)		0.0000
R-Squared	0.7449	Durbin-Watson stat		1.8570

The results are shown in the table 5.7. The table shows that dropping of the variable representing the poverty index has no appreciable impact on the results. The goodness of fit remains same at about 74.5 per cent and the value of the impact and significance of the rest of the variables on the extent of financial inclusion also remain unaffected.

Thus, the result signifies the fact that urbanisation and percapita income have positive and significant influence on the financial inclusion in India. Thus, the policies aimed at urbanisation and economic growth should lead to financial inclusion.

Table 5.7
Ordinary Least Squares Estimates of Equation:
 $Y_i = \alpha + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} + u_i$

Dependent Variable: Y				
Method: Least Squares				
Number of observations: 32				
Variable	Coefficient	Std. Error	t-statistic	Prob.

Literacy (X ₁)	-0.5763	0.2523	-2.2843	0.0301
Urbanisation (X ₂)	0.4923	0.1166	4.2207	0.0002
Income (X ₃)	0.1311	0.0533	2.4582	0.0204
Intercept α	-0.7574	0.4824	-1.5699	0.1277
Mean dependent var	0.354	F-statistic		27.253
S.D. dependent var	0.1584	Prob (F-statistic)		0.000
R-Squared	0.7449	Durbin-Watson test		1.857

Effect of Socioeconomic Factors on Financial Inclusion

Urbanization and Per capita income have the positive and significant effect on financial inclusion. Literacy has significant result but Poverty has negative and insignificant effect on financial inclusion. Chandigarh and Delhi have 1st and 2nd rank because of good performance in literacy, urbanization, per capita income and poverty ratio is also very low. On the other hand Chhattisgarh, Nagaland and Manipur have low rank due to lower literacy rate, low per capita income, low urbanization and high poverty ratio. R-Square has very significant value 0.75 different from zero.