CHAPTER 4

METHODOLOGY AND DATA DESCRIPTION

The methodology employed in the present work is three fold: First is the coefficient of variation computed as a ratio of standard deviation to arithmetic mean of observations. When multiplied by 100, the coefficient of variation value is interpreted as the extent of variation as a percentage of arithmetic mean. Second is construction of an index of financial inclusion. Construction of this index consists of two stages: In the first stage indices of various dimensions are constructed and in the second stage these indices are aggregated to give a composite index of financial inclusion. Finally, a technique of regression analysis is used to identify the determinants of financial inclusion.

Coefficient of variation

The coefficient of variation (C.V) is used to measure the extent of interstate disparities in respect of Financial Inclusion. The coefficient of variation is computed as a ratio of standard deviation to mean of the observations i.e.

$$\text{C.V.} = \frac{\text{Standard Divation}}{\text{Mean}}$$

The value of C.V. is interpreted as variation per unit of mean. When c.v. is multiplied by 100, the value represents variations as percentage of mean. It can be varied that in contrast to standard deviation, the coefficient of variation is free of units of measurement and therefore, it is preferable to use for comparing variability in two populations measured in dissimilar units.

Construction of index of Financial Inclusion (IFI)

As mentioned earlier, the construction of index of Financial Inclusion consists of two stages. In the first stage, we now construct of indexes of three component of Financial Inclusion. The government of India's 'Committee on Financial inclusion on India' defines financial inclusion as the process of ensuring access to financial services and timely adequate credit where needed by vulnerable groups such as weaker section and low income groups at an affordable cost.'[1]

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[1]Rangrajan committee Report,(2008), 'Financial Inclusion in India.' RBI

Since banks are the gateway to the most basic form of financial services, it is only the extent of accessibility, availability and usability of banking services[2] that has been treated as equivalent to financial inclusion for the purpose of present work.

In the present context, the study consider three basic components of an inclusive financial system, namely, availability of the banking services (c_1), banking penetration (c_2) and usage of banking system (c_3). These components are largely motivated by availability of relevant and consisting data for a large number of states in order to compute a comparable IFI.

Concerning availability of banking services, in an inclusive financial system banking services should be easily available to the users. Indicator of availability is banking outlets such as offices, branches, banking personal and so on. Thus availability of banking services can be indicated to the number of offices per adult population. It is being assumed that complete financial inclusion occurs when there is one office per adult person and there is no financial inclusion when there is no office per adult person.

Regarding banking penetration, an inclusive financial system should have as many users as possible, that is, an inclusive financial system should penetrate widely amongst its users. The size of the 'banked' population, for example the proportion of people having a bank account is a measure of the banking penetration of system. Thus, if every person in an economy has a bank account then the value of this measure would be 1. However, data on the number of the 'banked' people is not readily available and the absence of such data, we use no. of bank accounts of proportion to total adult population as an indicator of financial inclusion.

Again as far as usage is concerned, this component is motivated by notion of under banked and or marginally banked people, as observed by Kempson (2006). In highly banked states, people have high amount deposited and credited in banks. But merely having bank amount is not enough for an inclusive financial system; it is also imperative that the banking services are adequately utilized. Incorporation the usage dimension in our index, the study considers the two basic services of banking system- credit and deposit. Accordingly, the volume of credit and deposit per adult person of the population of a state has been used to measure this component.

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[26] There can be other indicators of financial inclusion such as no. of ATMs, Microfinance, post office and self-help groups etc.

Weights assigned to the dimensions: Assigning appropriate weight to the components index is a difficult task. But all the three components considered here are equally important for an inclusive financial system, the lack of adequate data on important indicator that completely characterize the availability and usage component and banking penetration renders us to give equal weight to these components in the present index. As far as availability of banking services concerned, many states have moved towards internet banking, thus reducing the importance of physical bank outlets. Some states also offer banking services through telephones. Thus, using data on only physical outlets for example bank branches account number can give an incomplete picture of the availability of banking services, Similarly, data on credit and deposit amount can only partial depict the usage of financial system as other services as other services of banking system, such as payment, transfer, remittances and can be number of ATM are not included. In the absence of such data, a complete characterization of these components is not possible.

In the present index, the study has provided the following weights- 1 for the index of banking penetration, availability of banking services and usages. In these three dimensions 0 will indicate the worst situation (complete financial exclusion) and 1 will indicate the best or ideal situation (complete financial inclusion) in the present index.

For the purpose of constructing index for each component of financial inclusion, we utilise an approach similar to that used by United Nation Development Programme (UNDP) for computation of some well-known development indexes[3] . The index of ith component of financial inclusion is computed as [4]

$$Ci = \frac{Ai-m}{Mi-mi}i = 1, 2, 3.$$

Where Ai is the actual value of the ith component, mi is the minimum value and Miis the maximum possible value of ith component. It can be varied from the above formula that index of

[3]UNDP (1990)
[28]Mandira's formulation reduces to the UNDP formula if weights are as assumed to be unity.

each component of financial inclusion varies between zero and one. Zero value corresponds to complete absence of financial inclusion and one correspond s to complete financial inclusion.

In the second stage, the three indexes c_1, c_2 & c_3 are combined into one. Since, the indexes of components separately do not satisfactorily denote financial inclusion. These component indexes should be aggregated into a single composite index of financial inclusion (IFI).

The index of financial inclusion, IFI, for a country, is then measured by the normalized inverse Euclidean distance of the point c= (from the ideal point I = (w_1, w_2, w_3). The exact formula is

$$\text{IFI} = 1 - \frac{\sqrt{(w_1-c_1)^2+(w_2-c_2)^2+(w_3-c_3)^2}}{\sqrt{(w_1{}^2+w_2{}^2+w_3{}^2)}}$$

In formula, the numerator of the second expression is the Euclidean distance of $c = (c_1, c_2, c_3)$ from the ideal point $w = (w_1, w_2, w_3)$, normalizing it by the denominator and subtracting from 1 gives the inverse normalized distance. The normalization is done in order to make the value lie between 0 and 1 and the inverse distance is considered so that higher value of the IFI corresponds to higher financial inclusion.

For simplification, if we consider all dimensions to be equally important in measuring the inclusiveness of a financial system, then $wi = 1$ for all i. In this case, the ideal situation will be represented by the point I = (1, 1, 1) in the n-dimensional space and the formula for IFI will be

$$\text{IFI} = 1 - \frac{\sqrt{(1-c_1)^2+(1-c_2)^2+(1-c_3)^2}}{\sqrt{3}} \ldots\ldots$$

It can be seen that the value of the index takes value zero for no financial inclusion and unity for complete financial inclusion. Major advantage of this index is that it can be used to compare extent of financial inclusion at different level of aggregation and different point of time.

Determinants of Financial Inclusion

For the purpose of identifying the factors which influence the extent of financial inclusion, this study utilizes various socio economic factors such as literacy, urbanisation, per capita income and poverty ratio as important determinants of financial inclusion.

'Literacy' plays very important role to increase the status of financial inclusion. It is expected to have positive relation with financial inclusion because literate people are more aware about financial and banking services. So they know the benefits of these services. So there are more livelihoods that they have account in banks.

'Urbanisation' is also the empirical part of financial inclusion. The people who live in urban areas have more access of financial services. They have easy access of banking facilities. The people who live in urban areas are more literate than rural areas. In this way urbanisation is supposed to have a relation with financial inclusion.

'Per capita income' is another important factor that influences financial inclusion. Those who have more per capita income that is above subsistence income are livelier to connect themselves to banks and they have excess income that is deposited in banks for future plans. This increases the status of financial inclusion. So per capita income is likely to be positively related with financial inclusion.

'Poverty' should be negatively related with financial inclusion. People are poor, they do not have enough money to save and hence are less likely to open an account. Because poor people have to face day to day expenditure and they can rarely fulfil their need. That's why; they cannot afford enough money to open an account. In this way poverty is expected to negatively related with financial inclusion.

For estimation of the effects of these socio economic factors, the study specifies and estimates a multiple linear regression model. By regressing composite index of financial inclusion (Y) on four variables X_1, X_2, X_3 and X_4 representing literacy rate, urbanisation, per capita income and poverty ratio respectively. The estimating equation can be written as,

$$Y_i = \alpha + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 x_{3i} + \beta_4 X_{4i} + u_i$$

Where $u_i \sim N(0, \sigma^2)$. I.e. The disturbance term is homoscedastic and non-auto correlated and distributed normally (N) with mean zero and variance σ^2.

Y_i = Financial inclusion index for the ith state

X_{1i} = Literacy Rate for the ith state

X_{2i} = Urbanisation level for the ith state

X_{3i} = Per Capita Income in the ith state

X_{4i} = Poverty Ratio for the ith state

This model is estimated by OLS method using cross-section of 32 states.[5]

Sources and Description of Data

For the purpose of fulfilment of the objectives of the study, secondary sources of data have been used. For the assessment of the extent of financial inclusion at the state level, the relevant data on the number of bank offices, number of bank accounts, and amount in lakh has been taken which furnish state wise information for the year 2011. The state wise population figures for the year 2011 are available from Census of India. The data on bank account, amount in (lakh) and offices has been taken from website of RBI on line available at www.rbi.org.com.The data on literacy, urbanisation has been taken from Rural Urban Distribution of Population- India, Census of India 2011 and Per capita income has been taken from http://pbplanning.gov.in/pdf and data on poverty ratio from the report of Suresh Tendulkar committee (2009-10) as reported in Partiyogita Darpan of May 2012 page number1799.This conclusion is based on per capita monthly consumption expenditure.

Since the size of state is not same, it would be erroneous to use the absolute figures for inter-state comparison. To avoid this inconsistency the data have been adjusted for the size by expressing the figures in terms per adult population.

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[5]The three Union Territories that have been excluded due to non- availability of the data on explanatory variables are Dadra Nagar Haveli, Daman & Diu and Lakshadweep.

All these measures provide important and useful indications about the outreach of the financial system of an economy when taken together. But while used individually, they provide only partial indication about financial inclusion and may, therefore, lead to misinterpretation of the extant of financial inclusion. Thus, a comprehensive measure which incorporates a number of measures representing several dimensions of financial inclusion preferable by, aggregating into a single number. Such as measure can be used to measure and compare the levels of financial inclusion across economies, across states. It can be used to evaluate the performance policy measures aimed at financial inclusion over a period of time.