

WP-2012-013

Income Related Inequality in Financial Inclusion and Role of Banks: Evidence on Financial Exclusion in India

Rama Pal and Rupayan Pal



Indira Gandhi Institute of Development Research, Mumbai

June 2012

<http://www.igidr.ac.in/pdf/publication/WP-2012-013.pdf>

Income Related Inequality in Financial Inclusion and Role of Banks: Evidence on Financial Exclusion in India

Rama Pal and Rupayan Pal

Indira Gandhi Institute of Development Research (IGIDR)

General Arun Kumar Vaidya Marg

Goregaon (E), Mumbai- 400065, INDIA

Email (corresponding author): rupayan@igidr.ac.in

Abstract

This paper analyzes income related inequality in financial inclusion in India using a representative household level survey data, linked to State-level factors. It shows that (a) the extent of financial exclusion is quite severe among households across all income groups, (b) income related inequality in financial inclusion varies widely across sub-national regions in India, but it is quite high in most of the cases, (c) income related inequality in financial inclusion cannot be considered as synonymous to income inequality. A notable result is that greater availability of banking services fosters financial inclusion, particularly among the poor. This paper also provides estimates of the effects of various socio, economic and demographic characteristics of households on propensity of a household to use formal financial services, and compare that for rural and urban sectors.

Keywords: Financial inclusion, inequality, concentration index, banks.

JEL Code: D3; O16; O17; G2; G21

Acknowledgements: We would like to thank Satya R. Chakravarty for discussions and comments on an earlier draft. We are also grateful to the participants in the ‘Workshop on Measuring Financial Inclusion from the Demand Side’, conducted by the Center for Advanced Financial Research and Learning (CAFRAL) at NIBM, Pune, for helpful discussions.

Rama Pal (ramajoglekar128@gmail.com) is with Tata Institute of Social Sciences (TISS), Mumbai, India

Income Related Inequality in Financial Inclusion and Role of Banks: Evidence on Financial Exclusion in India

Rama Pal[‡] and Rupayan Pal^{††}

[‡]Tata Institute of Social Sciences (TISS), Mumbai, India

^{††}Indira Gandhi Institute of Development Research (IGIDR), Mumbai, India

1. Introduction

This paper attempts to analyze the distribution of financially included households across income groups, using large scale household level survey data from India, and the role of the banking sector to shape this distribution. We are primarily interested to answer the following questions. What is the extent of income related inequality in financial inclusion? Does that vary across sub-national regions? What are the factors associated with the income related inequality in financial inclusion? Can greater availability of banking services foster financial inclusion, particularly among the poorer households?

Finance matters for both economic growth and development. There is substantial evidence that financial development, which refers to effective financial intermediation and markets that provide deep and broad access to formal financial services to economic agents (Roubini and Bilodeau 2008), promotes growth.¹ It is also well documented that financial development plays crucial role in moving households out of poverty – indirectly by stimulating growth and directly by providing savings and credit services to the poor. Jeanneney and Kpodar (2011) find that, in case of developing countries, the direct effect of financial development on poverty reduction is

Corresponding Address: Rupayan Pal, Indira Gandhi Institute of Development Research (IGIDR), Film City Road, Gen A. K. Vaidya Marg, Goregaon (East), Mumbai 400065, India.

E-mails: ^{††}rupayan@igidr.ac.in, rupayanpal@gmail.com; [‡] ramajoglekar128@gmail.com.

Telephone: +91-22-28416545, Fax: +91-22-28402752.

¹ See, for example, Rajan and Zingales (1998), Cetorelli and Gambera (2001), Beck and Levine (2002), Carlin and Mayer (2003), Fisman and Love (2003), Abu-Bader and Abu-Qarn (2008), Yang and Yi (2008), Pal (2011) and Kendall (2012), to name a few.

stronger than its indirect effect through accelerating growth, and the benefit of financial development for the poor is greater than the associated cost.²

While the empirical literature on finance and development has largely focused on depth of financial system, the distribution of access to formal financial services has drawn attention of the researchers only recently (Beck et al 2007b).³ Using firm level data from 80 developed and developing countries around the world, Ayyagari et al. (2008) demonstrate that lack of access to finance restricts the growth of firms significantly. Further, lack of access to adequate finance disproportionately hurts smaller firms (Beck et al. 2005). It implies that lack of access to finance restricts growth, and indirectly widens inequality by hurting the smaller firms more and discouraging new entrepreneurs. It is also increasingly recognized that greater access to formal financial services leads to higher income of households, including that of the poor households. For example, analyzing state level macro panel data, Burgess and Pandey (2005) document that state-led bank branch expansion program in rural unbanked areas in India during 1977-1990 led to decline in poverty headcount ratio. Results obtained from more disaggregated (district level) data from the state of Uttar Pradesh in India reinforces the argument that social banking program in India helped to reduce poverty (Kochar 2011). Moreover, it is well argued that lack of access to safe and affordable financial services is the root cause of persisting income inequality in many countries (Beck et al. 2009).⁴The underlying reason is, access to finance plays crucial role in determining productivity and welfare of households (Banerjee and Duflo 2005). Therefore, the

² See, for example, Dollar and Karray (2002), Jalilian and Kirkpatrick (2005), Honohan (2004), Beck et al. (2007), Odhiambo (2009, 2009b) and Littlefield et al (2003), to name a few, for further evidence of poverty reducing effect of financial development.

³The ratio of (private) credit to gross domestic product is the widely used indicator of depth of financial system.

⁴ We note here that Greenwood and Jovanovic (1990) argued that income inequality first increases and then decreases as financial sector becomes more and more developed. Therefore, we may observe increased inequality at the early stages of financial development, which may justify the inequality widening effect of social banking in Uttar Pradesh as found by Kochar (2011). However, subsequent theoretical models by Galor and Zeria (1993), Banerjee and Newman (1993) and Aghion and Bolton (1997) predict that financial development disproportionately helps the poor. This latter prediction has received considerable empirical support (see, for example, Li et al. 1998; Clarke et al. 2006; Beck et al, 2007; Ang 2010 and Shahbaz and Islam 2011, to name a few). However, these studies have focused on depth of financial development, not the access to finance. See Demirguc-Kunt and Levine (2007) and Claessens and Perotti (2007) for excellent reviews of (a) theoretical links between finance and inequality and (b) the empirical literature on nexus between financial development and income inequality, respectively.

distribution of access to formal financial services across different segments of the population deserves special attention, particularly in case of developing countries, like India, in order to design policies to facilitate much desired inclusive growth. In this context, estimates of income related inequality in access to formal financial services assumes importance in order to appropriately gauge the extent of concentration of formal financial services among the rich in any economy. However, to the best of our knowledge, analysis of distribution of formal financial services across income groups has not received much attention in the literature so far. This paper is perhaps the first study that measures income related inequality in financial inclusion. It also attempts to examine the factors associated with the households' use of formal financial services and the role of banks.

We note here that most of the existing studies have considered access to finance and actual use of finance synonymously, primarily due to dearth of adequate data on actual use of financial services by households and firms (Honohan 2008, Beck et al 2009, Jeanneney and Kpodar 2011). However, there is clear distinction between access to formal finance and use of formal financial services. While access refers to timely availability of adequate financial services at a reasonable cost, use refers to the actual consumption of financial services. One may not use formal financial services, even if there is access, because of low reservation cost of informal financial services and/or high relative prices of financial services compared to the prices of other goods (Kochar 1997, Claessens 2006). Needless to mention here that, unless formal financial service is available, one cannot use it. In other words, access to formal financial services is a necessary, but not sufficient condition for use of formal financial services. Only those who use formal financial services can be referred as financially included, rest are financially excluded.⁵ Thus, it is more appropriate to consider the data on use of formal financial services, not the mere access to finance, in order to measure the level of financial inclusion as well as concentration index of financial inclusion.

⁵ We note here that, in theory, sometimes distinction is being made between two types of financial exclusion. The set of economic agents/households who have access but do not use formal financial services are referred as 'voluntarily excluded', and those who do not have access to formal financial services are referred as 'involuntarily excluded'. However, given the unavailability of individual/household level data on both use and access, it is not possible to make such distinctions operational.

This paper measures the extent of financial exclusion and income related inequality in financial inclusion, i.e., concentration index of financial inclusion, across sub-national regions in India, using the representative household level survey data. Moreover, this paper examines the role of banking services to foster financial inclusion across income groups. It also provides estimates of the effects of various socio, economic and demographic characteristics of households on propensity of a household to use formal financial services, and compare that for rural and urban sectors.

We consider both formal credit services and formal savings services for the purpose of the present analysis. This is because, not only the formal credit services, formal savings services also has significant impact on long term asset growth in an economy (Kaboski and Townsend 2005; Ashraf et al 2006). Moreover, access to formal savings services enables the poor to make productive investment, to be less vulnerable to health shocks and to smooth consumption expenditure (Dupas and Robinson 2009). However, substantial portion of the poor people are savings constrained in developing countries (Johnston and Morduch, 2008; Bauer et al 2010; Dupas and Robinson 2009). It implies that the role of formal savings services should not be undermined in any analysis of financial inclusion. Given this backdrop, for the purpose of the present analysis we consider that a household is financially included if that household uses at least one of the formal financial services; otherwise that household is financially excluded.

The choice of India for the purpose of this analysis rests on several considerations. First, India is an emerging economy that has experienced a rapid economic growth rate since the initiation of major economic reform in 1991. However, still large segments of the population suffer from poverty in India and economic inequality is widening over time (Datt and Ravallion 2002; Deaton and Drèze 2002; Dev and Ravi 2007; Suryanarayana 2008; Cain et al 2010). Therefore, it seems that careful examination of the extent of financial exclusion across income groups in countries like India is of paramount importance. Second, India is the world's largest democracy and is federal in structure. Indian states are empowered with partial policy autonomy and there is diverse pattern of growth and development across states, which makes it more interesting to

examine the issue of financial inclusion in India at the sub-national level. Third, India is one of the few emerging economies for which large scale representative survey data on actual consumption of financial services at household level is available.

We find that the extent of financial exclusion is quite severe in India, particularly among the poor households. Nonetheless, significant proportion of rich households is also found to be financially excluded in both rural and urban sectors. Levels of financial exclusion as well as income related inequality in financial exclusion vary widely across States and sectors in India. While the percentage of financially included households is lower in rural sectors, income related inequality in financial inclusion is higher in urban sectors. However, results of this analysis indicate that an increase in level of financial inclusion can have differential consequence on income related inequality in financial inclusion across sectors. It also demonstrates that that income inequality and concentration index of financial inclusion cannot be viewed as synonymous.

Econometric analysis of this paper reveals that per-capita income is a major determinant of a household's propensity to use formal financial services. It also shows that greater availability of banking services can foster financial inclusion, particularly among the poor households. Moreover, we find that the association of availability of banking services with the propensity to use financial inclusion by a household is stronger than that of other State level factors under consideration. These results are not sensitive to the alternative measures of availability of banking services in a State.

We also find that education, employment status and household size also significantly affect the probability of a household to be financially included, in both rural and urban sectors. Household income and employment status seem to have stronger effect on an urban household's propensity to be financially included compared to that of a rural household. Interestingly, we find that the probability of a rural household to use formal financial services is greater than that of an urban household, when we control of other household characteristics and State level factors. Further, it turns out that the gender of household head and social groups do not have any significant effect

on use of formal financial services by urban households, unlike as in case of rural households. Our results seem to be useful to design appropriate policies to foster equitable financial inclusion.

Rest of the paper is organized as follows. The next section provides an overview of utilization of formal financial services in India. Section 3 plots the concentration curves of financial inclusion, estimates concentration index of financial inclusion for sub-national regions in India and analyzes its correlation with the level of financial inclusion and other developmental indicators. Section 4 presents the econometric analysis of the household's propensity to be financially included and discusses the results. Section 5 concludes.

2. Utilization of Formal Financial Services: An Overview

In this section, we provide an overview of utilization of formal financial services in India, using the household level data from All India Debt and Investment Survey (AIDIS) for the year 2002-03, which was collected as a part of the 59th round of the National Sample Survey (NSS), conducted by the Central Statistical Organization, Ministry of Statistics and Program Implementation, Government of India. This is the latest representative survey data available for India, which provides micro-level information on households' savings and borrowings along with socioeconomic characteristics of households.⁶

We categorize households in to two groups: (a) households utilizing formal financial services and (b) households not utilizing formal financial services. Formal financial services include both formal credit services and formal savings services. The data set provides detailed information on sources of borrowings and savings instruments used by the households. Out of fifteen different sources of borrowings provided in the data set, we consider the institutional sources of borrowings, namely, government, cooperative society, commercial bank, insurance, provident fund, financial corporation, financial company and other institutional agencies, to estimate utilization of formal credit services. Similarly, households' savings with the institutional

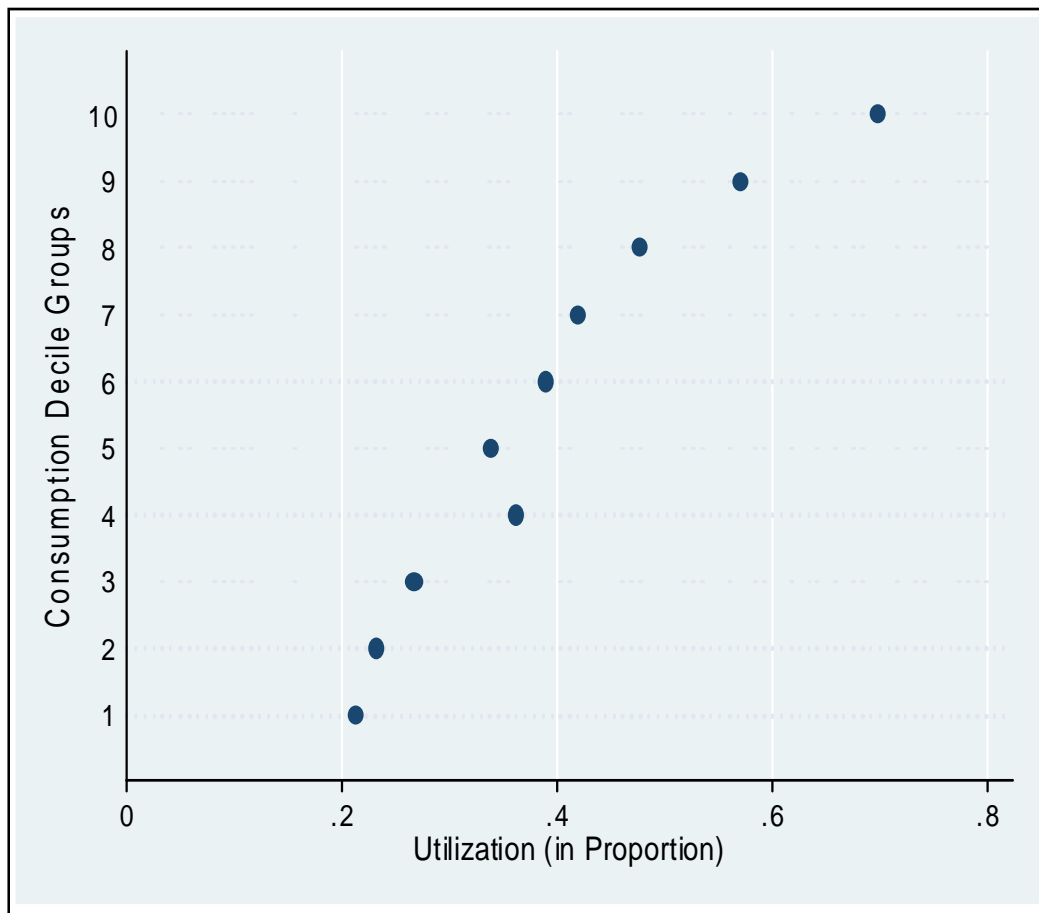
⁶For more information on the dataset see GoI (2005).

agencies, namely, government or reserve bank of India certificates and bonds, deposits in post office, cooperative society/bank, commercial bank and Non-banking Company, and insurance premium, annuity certificates and provident fund, are considered as formal savings. If a household reports either borrowing from at least one institutional source or savings with at least one institutional agency or both, we categorize that household in the first group – ‘households utilizing formal financial services’. Alternatively, if a household does not report use of any of the financial services, credit or deposit, provided by the institutional agencies, we categorize that household in the second group – ‘households not utilizing formal financial services’.

Needless to mention here that the second group of households, i.e., the households that do not use any of the formal financial services, can be referred as completely financially excluded. However, the first group of households, i.e., the households that use at least one of the formal financial services, are not necessarily fully financially included. In a strong sense, a household can be said to be fully financially included, if the need of that household for financial services is completely served by the formal financial agencies. It is quite possible that the need for formal financial services of some households of the first group is met only partially by the formal financial services. For simplicity of exposition, we refer the first group of households as financially included households.

To examine the distribution of ‘households utilizing formal financial services’ across income groups, we consider the monthly per capita expenditure (MPCE) of households based on 30 day recall period as a proxy for income. Figure 1 depicts the proportion of ‘households utilizing formal sector financial services’ across consumption decile groups in India. It is evident that the extent of financial exclusion is quite severe in India. Only 26.86 percent of households from the poorest group utilize at least one of the formal financial services. That is, for the poorest group, as many as 73.14 percent of households are completely financially excluded. Though the proportion of financially excluded households is lower for higher income groups, significant proportion of households across all income groups are found to be completely financially excluded. Surprisingly, even for the richest group, as high as 25.97 percent of households are completely out of formal financial system in India.

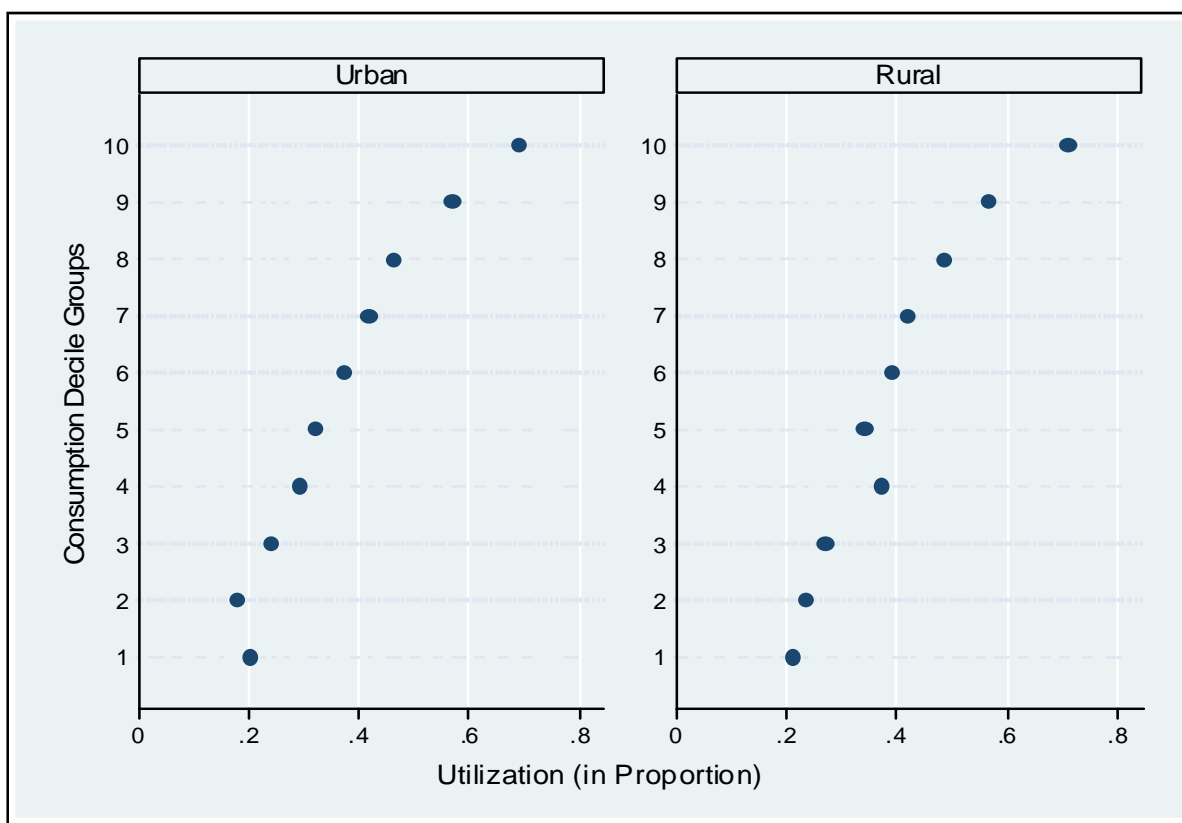
Figure 1: Proportion of Households Utilizing Formal Financial Services in India



Source: Estimation based on All-India Debt and Investment Survey, 2002-03

We find similar pattern of financial exclusion in rural and urban sectors as well (see Figure 2). Nonetheless, there are some differences in utilization at lower consumption decile groups in rural India from that in urban India. The first four consumption decile groups show marginally higher utilization rate in the rural sector compared to that in the urban sector. For instance, for the first two consumption decile groups, utilization rate is 21.39 and 23.65 percent, respectively, in rural sector. The corresponding figures for the urban sector are 20.46 and 17.9 percent, respectively.

Figure 2: Proportion of Households Utilizing Formal Financial Services – Urban and Rural

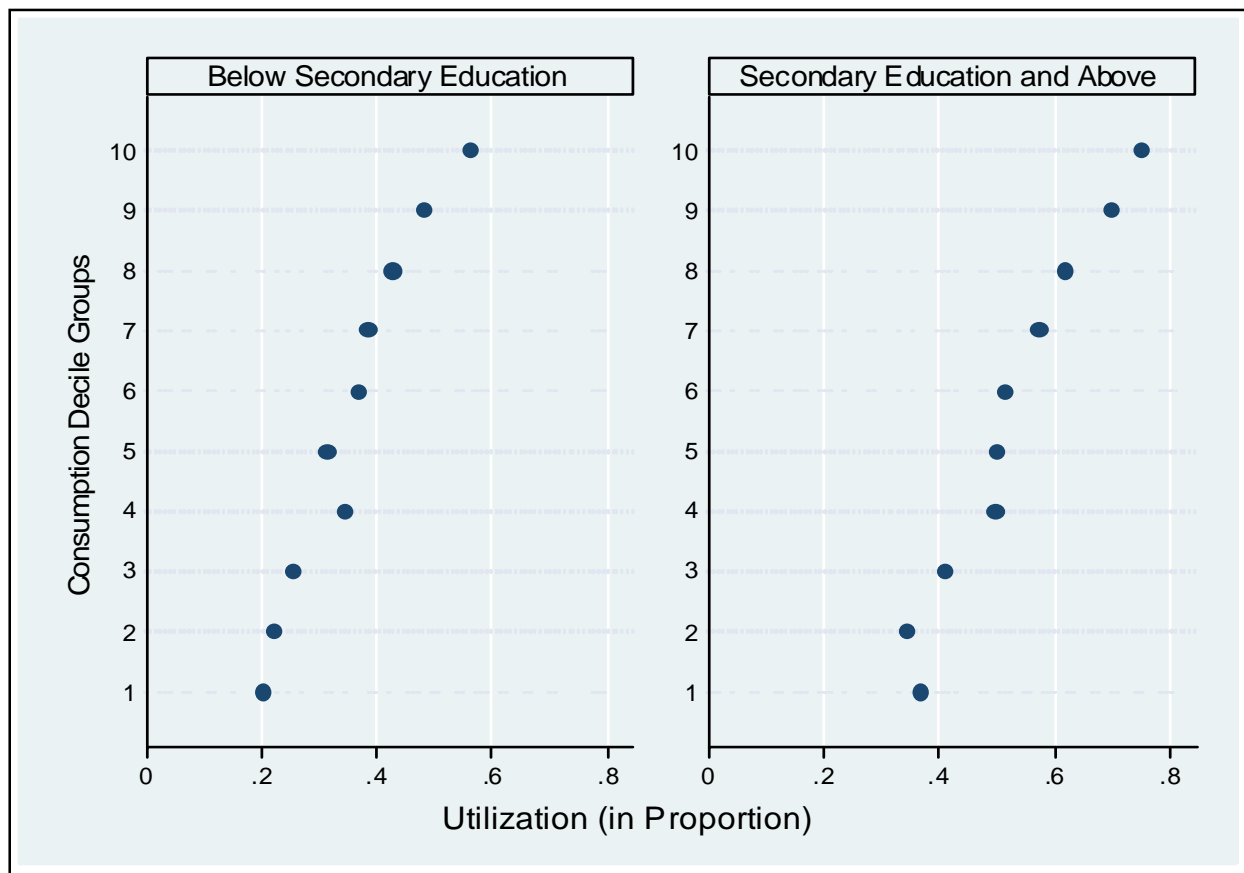


Source: Estimation based on All-India Debt and Investment Survey, 2002-03

It is often argued that lack of education acts as a barrier to access formal financial services. That is, utilization of formal financial services may improve with education. To examine whether there is any change in utilization rate due to education, we plot the utilization across consumption decile groups for two categories: (a) households with the household head having education below secondary level and (b) households with the household head having secondary or any higher level education. Figure 3 depicts the distribution of utilization across consumption decile groups for these two categories of households. The results show increase in utilization with higher education. Out of total households in the first decile group with education level of the household head lower than secondary education, only 20.48 percent use at least one of the formal financial services. On the other hand, for households with higher education level of the household head the utilization rate is around 36.84 percent. At the same time, higher level of education (secondary and above) does not ensure universal use of formal financial services even by the rich households. For instance, 24.56 percent of the richest households with higher

education are completely financially excluded, in terms of utilization of formal financial services.

Figure 3: Proportion of Households Utilizing Formal Financial Services (Household head with below secondary education and above secondary education)

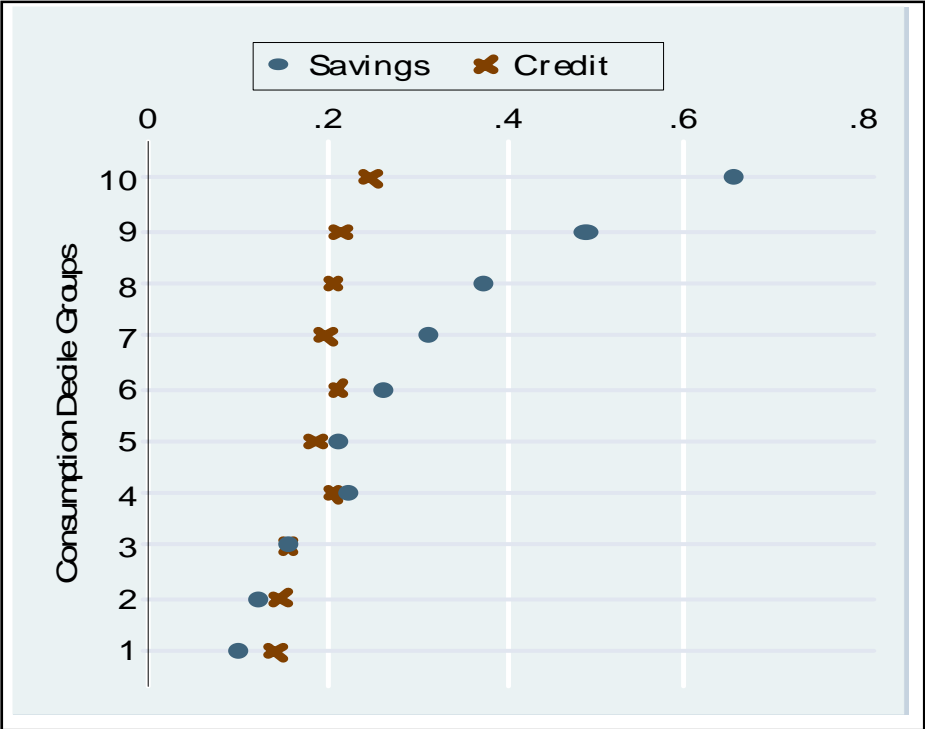


Source: Estimation based on All-India Debt and Investment Survey, 2002-03

Next, we turn to examine whether there is any difference between the distributions of use of formal deposit services and formal credit services across consumption groups. We plot these two distributions in Figure 4. It seems that both the proportion of households utilizing at least one of the formal deposit services and the proportion of households utilizing at least one of the formal credit services are increasing in income. However, the increase in use of credit services is not as much as in case of deposit services. It may be due to the fact that the need for credit services is relatively lower than the need for deposit services by the richer households. As expected, of the bottom two consumption decile groups, greater proportion of households utilize formal credit

services compared to that for formal deposit services. This trend is reversed for upper consumption decile groups. Nonetheless, it is evident that even the utilization of formal deposit services is far from universal. Even more than 31 percent of richest households do not use formal deposit services in India. The picture becomes more severe as we move down along the consumption decile groups.

Figure 4: Percentage of Households Utilizing Formal Savings and Credit Services



Source: Estimation based on All-India Debt and Investment Survey, 2002-03

3. Income Related Inequality in Financial Inclusion: Method and Estimates

From the discussion in Section 2 it appears that there is inequality in use of formal financial services across various consumption groups, i.e., there is income related inequality in financial inclusion in India. As noted before, it is difficult to judge the extent of such inequality from standard cross-tabulations or two-way graphical representations as in Section 2. However, from policy point of view, it seems to be important to examine the extent of such inequality to

promote financial inclusion, particularly among the poor. The reason is, required policy measure in case of uniform distribution of usage of formal financial services across various income groups likely to be different from that in case of non-uniform distribution. Further, any two non-uniform distributions can be very different from each other. Therefore, it is important to quantify income related inequality in financial inclusion, which would also be useful to compare the performances of different geographical regions in terms of financial inclusion. In this section, we first describe the methodology to quantify income related inequality in financial inclusion. Next, we present the estimates of income related inequality in financial inclusion for India and her States and discuss the results.

3.1 Methodology

Income related inequality in financial inclusion, i.e., income related inequality in use of formal financial services can be measured using the concentration curves and concentration indices. The concentration curve is the generalized Lorenz curve (Kakwani, 1977).⁷ In the present case, the concentration curve plots cumulative percentage of households that use formal financial services against cumulative percentage of households arranged according to MPCE, which is similar to the widely used concentration curve to depict socioeconomic inequality in health (Wagstaff et al 1991 and O'Donnell et al 2008). Clearly, the concentration curve provides the graphical representation of income-related inequality in financial inclusion. On the other hand, the concentration index (CI) measures the degree of this inequality. The CI is a bivariate measure that quantifies inequality in use of formal financial services across the distribution of households based on MPCE, which is considered as the proxy for household's income.

Let x be the income and $y = g(x)$ be the utilization of formal financial services by the income unit (i.e., household) with income x , where the function $y = g(x)$ is defined as follows.

⁷Initial application of the concentration curves may be found in Mahalanobis (1960).

$$y = g(x) = \begin{cases} 1, & \text{if the household uses at least one of the formal financial services} \\ 0, & \text{otherwise} \end{cases}$$

Let $F(x)$ be income distribution function, which represents the proportion of income units having income less than or equal to x , and $f(x)$ be the probability density function of x . Now, the proportion of households having income less than or equal to x and using formal financial services, out of total number of households using formal financial services, can be represented by $F_1[g(x)]$ as follows.

$$F_1[g(x)] = \frac{1}{E[g(x)]} \int_0^x g(x) f(x) dx = \frac{1}{E[y]} \int_0^x y f(x) dx = \frac{1}{\mu} \int_0^x y f(x) dx, \text{ where } \mu = E(y).$$

Clearly, $F_1[g(x)]$ is monotonically increasing. The relation between $F_1[g(x)]$ and $F_1(x)$ can be called as the concentration curve of y , i.e., concentration curve of financial inclusion.

Therefore, the concentration index of financial inclusion (C) is given by one minus twice the area under the concentration curve for financial inclusion. Formally,

$$C = 1 - 2 \int_0^{\infty} F_1[g(x)] f(x) dx = \frac{1}{\mu} Cov(y, r) = \frac{2}{n\mu} \sum_{i=1}^n (y_i r_i) - 1, \dots \dots \dots (1)$$

where $\mu = E(y)$, r denotes the individual's fractional rank in the income distribution and n is number of households in the sample.

Wagstaff (2005) shows that, since y_i is binary, the minimum value and the maximum value of the concentration index, C , are $(\mu - 1 + \frac{1}{n})$ and $(1 - \mu + \frac{1}{n})$, respectively. For large samples, as in the present case, the $(1/n)$ term tends to zero, thus, the lower and upper bounds of C can be considered as $(\mu - 1)$ and $(1 - \mu)$, respectively. Therefore, the bounds of concentration index shrinks as the average value increases. It implies that the concentration index for financial inclusion may turn out to be low, if the average number of financially included households is high, even though inequality in financial inclusion is high. So, to meaningfully compare the estimates of the concentration index for different regions, it is suggested to divide the original

concentration index by $(1 - \mu)$ (Wagstaff, 2005, 2009). The modified concentration index (C_w) can be written as follows.

$$C_w = \frac{2}{n\mu(1-\mu)} \sum_{i=1}^n (y_i - r_i) - 1 \dots\dots\dots(2).$$

It is evident that, for any value of μ , we have $-1 \leq C_w \leq 1$. Therefore, for the purpose of the present analysis, we consider the formulation of the concentration index as given by (2).⁸

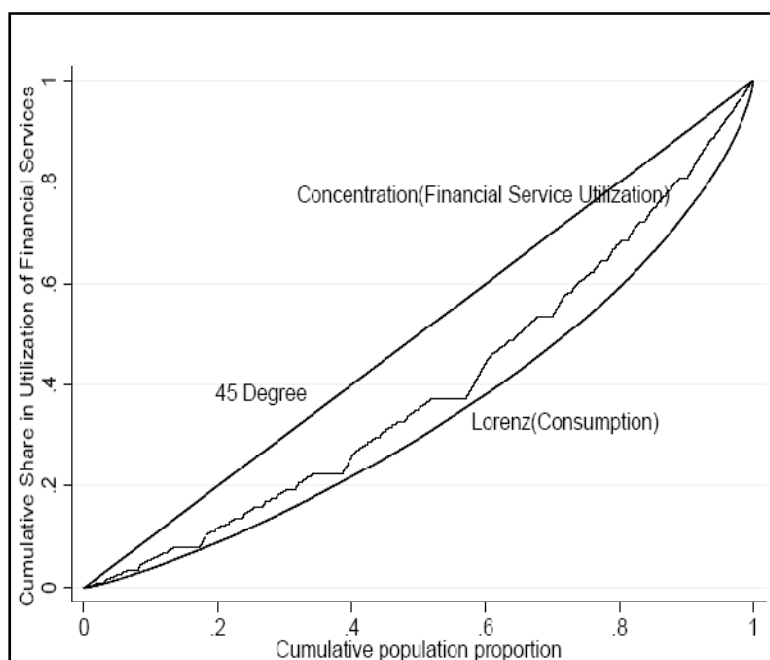
Note that lower absolute value of the modified concentration index, C_w , of financial inclusion indicates lesser extent of income related inequality in financial inclusion. And, negative (positive) value of the concentration index of financial inclusion implies that the use of formal financial services is concentrated among the poorer (richer) households.

3.2 Concentration Curves and Estimates of Concentration Index of Financial Inclusion across States and Sectors in India

Let us now turn to examine the extent of income related inequality in financial inclusion, i.e., income related inequality in utilization of formal financial services, in India. First, we plot the concentration curve of financial inclusion. As mentioned before, we consider household’s MPCE as the proxy for income. In order to understand the relative difference between inequalities in financial inclusion and in economic wellbeing, we also plot the Lorenz curve for MPCE along with the concentration curve of financial inclusion. Figure 5 plots these two curves for all India.

⁸ We note here that there is ongoing debate about the correct formulation of concentration index in case of binary variable, which seems to be far from reaching the consensus shortly (Erreygers, 2009; 2009b; Wagstaff, 2009).

Figure 5: Concentration Curve of Financial Inclusion and Lorenz Curve of Consumption Expenditure (All-India)



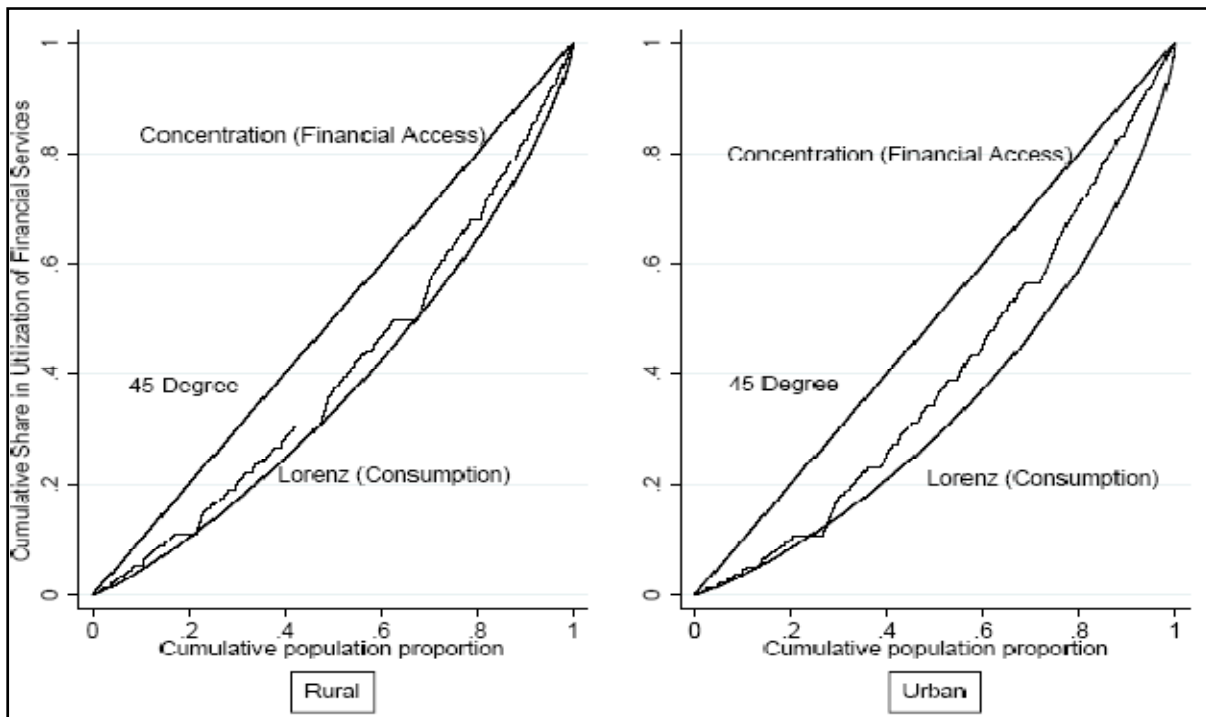
Source: Estimation based on All-India Debt and Investment Survey, 2002-03

Note that, if the utilization of formal financial services is spread evenly across households, then the concentration curve of financial inclusion will be 45° line. So, the 45° line is the line of equality. As we can see from Figure 5, the concentration curve of financial inclusion lies everywhere below the 45° line, but it lies everywhere above the Lorenz curve for MPCE. Therefore, we can say that there is income related inequality in financial inclusion in India, and the income-related inequality in financial inclusion is lower than inequality in consumption expenditure.

Further, it seems that both income related inequality in financial inclusion and inequality in MPCE differ across sectors, rural and urban, in India. In particular, it may be observed from Figure 6 that (a) inequality in MPCE is higher in urban India than that in rural India and (b) the concentration curve of financial inclusion is relatively closer to the Lorenz curve of MPCE for rural India as compared to that for urban India. It seems to indicate that income related inequality in financial inclusion closely follow inequality in MPCE in rural sector, but not so in urban

sector. However, from Figure 6, it is difficult to assess whether the concentration curve of financial inclusion is further below the 45° line in urban sector compared to that in rural sector. In other words, from the plots of concentration curve of financial inclusion, it is difficult to assess the relative position of rural India in terms of income related inequality in financial inclusion vis-à-vis that of urban India.

Figure 6: Concentration Curves of Financial Inclusion and Lorenz Curves of Consumption Expenditure for Rural and Urban Sectors in India



Source: Estimation based on All-India Debt and Investment Survey, 2002-03

As discussed before, the concentration curve of financial inclusion provides only visual presentation of income related inequality in financial inclusion. However, from policy point of view, it is important to quantify the utilization inequality in India and examine its variation across states and sectors. We, thus, estimate the modified concentration index of financial inclusion (C_w), using the formula as given by equation (2).

Table 1: State-wise Estimates of Concentration Index of Financial Inclusion

State/UT	Percentage of Households Using Formal Financial Services	Concentration Index	Average MPCE	Gini Coefficient
Andaman & Nicobar (UT)	62.3	0.092	1047.52	0.226
Andhra Pradesh	37.8	0.267	635.78	0.322
Arunachal Pradesh	22.4	0.112	632.22	0.364
Assam	31.8	0.355	563.94	0.264
Bihar	18.4	0.298	426.96	0.241
Chandigarh(UT)	66.9	0.612	1497.54	0.372
Chattisgarh	29.7	0.374	443.60	0.313
Daman and Diu (UT)	46.8	0.243	958.21	0.350
Delhi	28.9	0.277	1175.82	0.321
Dadra Nagar Haveli (UT)	57.0	-0.066	955.89	0.195
Goa	47.6	0.262	992.37	0.346
Gujarat	44.7	0.465	771.03	0.321
Haryana	45.6	0.195	824.98	0.287
Himachal Pradesh	62.5	0.291	773.95	0.300
Jharkhand	27.5	0.444	501.23	0.320
Jammu & Kashmir	40.8	0.393	771.78	0.229
Karnataka	36.1	0.296	670.52	0.310
Kerala	73.5	0.184	792.60	0.300
Lakshadweep(UT)	51.0	0.228	996.32	0.197
Maharashtra	50.2	0.307	752.03	0.343
Manipur	25.5	0.490	644.76	0.191
Meghalaya	22.7	0.624	724.32	0.230
Mizoram	22.4	0.503	983.13	0.229
Madhya Pradesh	37.8	0.428	535.37	0.305
Nagaland	37.5	0.351	964.52	0.204
Orissa	31.7	0.318	402.24	0.320
Pondicherry(UT)	52.9	0.449	885.21	0.329
Punjab	46.2	0.438	894.05	0.281
Rajasthan	30.1	0.234	607.19	0.278
Sikkim	36.9	0.532	710.64	0.308
Tamil Nadu	41.4	0.293	719.84	0.321
Tripura	34.3	0.339	561.01	0.287
Uttar Pradesh	35.3	0.259	516.17	0.284
Uttaranchal	47.7	0.179	1034.07	0.516
West Bengal	41.2	0.328	598.99	0.323
All-India	38.8	0.345	634.90	0.333

'(UT)' indicates union territory. Source: Estimation based on All-India Debt and Investment Survey, 2002-03

Table 1 reports the estimates of concentration index of financial inclusion, along with the percentage of households using formal financial services, average MPCE and Gini coefficient of MPCE, for India as well as for each of the 35 States and Union Territories (UTs) in India. Estimated concentration index of financial inclusion for all India is found to be 0.345, which

implies that financial inclusion is concentrated among richer households. In other words, financial exclusion is disproportionately higher among the relatively poor households compared to their richer counterparts. It is also evident that there is considerable variation in terms of income related inequality in financial inclusion across Indian States and UTs. The range of concentration index of financial inclusion is as high as 0.69. In 14 out of 35 States and UTs the estimated concentration index is greater than that for all India. The concentration index is highest, 0.624, in Meghalaya; which is followed by Chandigarh, Sikkim, Mizoram, Manipur and Gujarat. Whereas, it is lowest in Dadra Nagar Haveli; which is followed by Andaman and Nicobar Island, Arunachal Pradesh, Uttarakhand, Kerala and Haryana. Interestingly, in Dadra Nagar Haveli the financial inclusion is more concentrated among poorer households, which is clearly an exception. However, the extent of income related inequality in financial inclusion is quite low, -0.066, in Dadra Nagar Haveli. Also, note that although only 22.4 percent of households in Arunachal Pradesh use formal financial services, income related inequality in financial inclusion is quite low in this State. On the contrary, in Chandigarh, 66.9 percent households use formal financial services, but its estimated concentration index is as large as 0.612. Also, note that there is no significant relation between the percentage of households using formal financial services and concentration index of financial inclusion (the correlation coefficient between these two variables is negative, -0.28, but not significant at 10 percent level). Therefore, it seems that increase of the proportion of households using formal financial services in a State/UT need not necessarily reduce inequality in financial inclusion across income groups or foster financial inclusion among the poor households in that State/UT.

We also find that the correlation coefficients between concentration index of financial inclusion and average MPCE is negative, but very low (-0.017) and not significant at 10 percent level. That is, income related inequality in financial inclusion does not appear to be significantly associated with overall economic wellbeing. However, there is significant (at one percent level) and positive correlation between the percentage of households using formal financial services and average MPCE across States and UTs, which seems to be in line with the results from cross-country studies (Honohan, 2004; Beck et al., 2009). Therefore, it seems that higher level of economic wellbeing is positively associated with higher level of financial inclusion on an

average, but not necessarily with higher level of financial inclusion among the relatively poor households.

Table 2: State-wise and Sector-wise Estimates of Concentration Index of Financial Inclusion

State/UT	Rural				Urban			
	Utilization*	Concentration Index	Average MPCE	Gini Coefficient	Utilization*	Concentration Index	Average MPCE	Gini Coefficient
Andaman & Nicobar (UT)	74.0	-0.130	946.20	0.196	78.4	0.654	1238.23	0.246
Andhra Pradesh	32.6	0.202	520.83	0.252	43.2	0.421	958.91	0.356
Arunachal Pradesh	20.3	0.010	557.57	0.316	41.1	0.297	1112.09	0.487
Assam	31.3	0.278	520.04	0.234	63.1	0.481	916.79	0.269
Bihar	24.3	0.257	391.15	0.199	37.0	0.336	717.31	0.311
Chandigarh (UT)	60.7	-0.240	1028.39	0.213	75.7	0.823	1544.69	0.374
Chhattisgarh	36.6	0.325	384.72	0.258	52.9	0.710	764.75	0.348
Daman and Diu (UT)	49.1	0.163	876.03	0.330	83.9	0.541	1720.71	0.315
Delhi	29.6	0.296	782.67	0.202	29.2	0.259	1243.22	0.323
Dadra Nagar Haveli (UT)	64.3	-0.082	899.20	0.159	77.7	0.043	1070.18	0.252
Goa	61.9	0.080	822.16	0.332	64.3	0.756	1191.72	0.330
Gujarat	40.3	0.427	610.37	0.266	58.6	0.600	1055.23	0.314
Haryana	47.0	0.099	708.13	0.232	53.8	0.441	1127.92	0.332
Himachal Pradesh	62.1	0.294	712.33	0.279	74.7	0.481	1254.07	0.276
Jharkhand	27.4	0.287	393.33	0.226	57.8	0.235	923.00	0.302
Jammu & Kashmir	42.4	0.442	694.80	0.205	61.9	0.137	1021.12	0.219
Karnataka	36.5	0.227	511.87	0.220	51.4	0.426	989.50	0.306
Kerala	66.5	0.134	703.97	0.257	73.2	0.201	1046.22	0.348
Lakshadweep (UT)	55.4	0.390	1004.22	0.225	71.4	0.208	989.91	0.171
Maharashtra	53.9	0.367	524.59	0.263	63.1	0.320	1053.02	0.305
Manipur	19.8	0.450	598.89	0.174	47.3	0.450	764.43	0.195
Meghalaya	17.2	0.592	653.17	0.193	44.3	0.416	1110.46	0.219
Mizoram	22.6	0.620	874.86	0.206	49.6	0.403	1159.90	0.230
Madhya Pradesh	36.5	0.327	432.46	0.225	57.1	0.544	856.64	0.325
Nagaland	33.6	0.353	848.08	0.157	60.7	0.224	1170.14	0.226
Orissa	34.6	0.266	334.71	0.240	52.7	0.490	830.68	0.358
Pondicherry (UT)	48.2	0.358	672.43	0.245	53.2	0.494	1007.84	0.345
Punjab	44.4	0.430	800.88	0.259	52.2	0.517	1064.30	0.292
Rajasthan	31.3	0.094	516.72	0.220	45.3	0.361	896.94	0.303
Sikkim	46.6	0.651	640.41	0.277	71.4	0.358	1144.14	0.321
Tamil Nadu	36.4	0.216	577.12	0.255	49.2	0.379	1007.87	0.336
Tripura	43.7	0.338	489.17	0.234	61.3	0.615	1005.93	0.291
Uttar Pradesh	36.1	0.209	448.47	0.231	42.1	0.426	755.44	0.329
Uttaranchal	52.2	0.112	1063.42	0.551	64.4	0.535	920.27	0.325
West Bengal	40.7	0.270	477.45	0.242	57.2	0.363	955.49	0.337
All-India	34.9	0.290	508.80	0.268	49.2	0.374	970.85	0.331

‘(UT)’ indicates union territory. * Utilization refers to percentage of households using formal financial services.
Source: Estimation based on All-India Debt and Investment Survey,2002-03

Further, we find that there is very weak correlation between concentration index of financial inclusion and Gini coefficient of MPCE (the correlation coefficient is -0.037, which is not significant at 10 percent level). Nonetheless, high income inequality may coexist with low income related inequality in financial inclusion in some cases, as observed in case of Uttaraanchal and Arunachal Pradesh (Manipur, Meghalaya and Punjab). Clearly, income inequality and concentration index of financial inclusion cannot be viewed as synonymous. It seems to indicate that the policy measures that are effective to reduce income inequality may not prove to be equally effective in reducing income related inequality in financial inclusion.

Considering rural sector and urban sector separately, we find that both the percentage of households using formal financial services and the concentration index of financial inclusion are lower in rural India compared to that in urban India (see Table 2). This is similar to the rural-urban comparisons average MPCE and Gini coefficient of MPCE in India. The utilization rate, i.e., percentage of households using formal financial services, and concentration index are, respectively, about 41 percent and 29 percent higher in urban India compared to that in rural India. Clearly, there is rural-urban divide both in terms of use of formal financial services and income related inequality in financial inclusion. Nonetheless, more than 50 percent households are completely excluded from the formal financial system even in urban India.

As before, there is considerable variation both in terms of percentage of households using formal financial service and concentration index of financial inclusion in both rural and urban sectors across States and UTs. It seems to be important to note that the range of concentration index of financial inclusion across States and UTs is much higher in both rural sector (0.89) compared to that in urban sector (0.78). Also note that, the percentage of households using formal financial services is higher in urban sectors than in rural sectors of each of the States and UTs, except in Delhi, as in case of all India.⁹ However, concentration index of financial inclusion is higher in rural sector, compared to that in urban, of ten States and UTs (Dadra Nagar Haveli, Delhi, Jammu & Kashmir, Jharkhand, Lakshadweep, Maharashtra, Meghalaya, Mizoram, Nagaland and Sikkim), and in Manipur there is no difference between the sectors. Also, only in three UTs

⁹ In Delhi the percentage figure is marginally in favor of the rural sector.

(Andaman and Nicobar Island, Chandigarh and Dadra Nagar Haveli) the concentration index of financial inclusion is negative. That is, only in these three UTs utilization of formal financial services is concentrated among relatively poor households.

We also find that the correlation coefficient between the concentration index of financial inclusion and the percentage of households using formal financial services is negative, -0.4806, and significant (at one percent level) in case of rural sector. However, in case of urban sector there is no significant correlation between those two variables, as observed in case of both the sectors combined. It implies that increase in financial inclusion can have differential consequence on income related inequality in financial inclusion across sectors.

There is positive and significant, at one percent level, correlation between average MPCE and percentage of households using formal financial services in both rural sectors (0.55) and in urban sector (0.52), as in case of both the sectors combined (0.56). However, there is no significant (at ten percent level) correlation (a) between concentration index of financial inclusion and average MPCE and (b) between concentration index of financial inclusion and Gini coefficient of MPCE, even when we consider rural and urban sectors separately. These results strengthen the arguments that, though higher level of per capita income may be positively associated with higher level of financial inclusion, (a) higher level of per capita income in a region need not necessarily be associated with lower level of income related inequality in financial inclusion and (b) income related inequality in financial inclusion should be treated differently from income inequality.

4. Determinants of Use of Formal Financial Services by Households: Role of Banks

Finally, we turn to examine the factors associated with the use of formal financial services by the households. The focus of this section is to examine whether greater availability of banking services is linked to higher level of financial inclusion, particularly among the poor households. We note here that using cross-country data Beck et al. (2007) demonstrate that indicators of outreach of banking services are positively associated with hard-to-collect micro-level statistics

on household use of formal financial service. However, to the best of our knowledge, the issue of whether such positive association is uniform across different income groups of households or not has not received much attention in the literature so far. In this section, we attempt to fill this gap. Moreover, we attempt to analyze the impacts of various socio, economic and demographic characteristics of households on household use of formal financial services.

For the purpose of the present analysis we carry out an econometric analysis using data from various sources. Household level data on use of formal financial services and data on various socio, economic and demographic characteristics of households come from All India Debt and Investment Survey (AIDIS) for the year 2002-03, which was collected as a part of the 59th round of the National Sample Survey (NSS) conducted by the Central Statistical Organization (CSO), Ministry of Statistics and .Program Implementation, Government of India. The AIDIS, which is based on a stratified multistage sampling design, is the only nationally representative survey in India that collects household level information on debt and investments. Data on banking services is collated from Basic Statistical Returns of Scheduled Commercial Banks, published by the Reserve Bank of India. Data on per capita net State domestic product (NSDP) come from CSO. The source of data on State-wise teledensity is the annual report of the Department of Telecommunications, Ministry of Communications & Information Technology, Government of India. State-wise population, land-area and urbanization data come from Census of India. Based on availability of required data we consider all 29 States in India, but leave out all the UTs, for the purpose of the present analysis. Nonetheless, the 29 States cover more than 99 (98) percent of land-area (population) of India.

4.1 Variables

Dependent Variable: The dependent variable is an indicator variable taking value one if a household use at least one of the formal financial services and the value zero otherwise. That is, as noted before, if a household is completely excluded from the formal financial system, the dependent variable takes the value zero for that household. Alternatively, if for a household the dependent variable takes the value one, that household is refereed as financially included household.

Table 3: Variables Associated with Household Use of Formal Financial Services

State-level Variables	Household Characteristics	
Availability of Banking Services	Income	Social Group
Infrastructure	Employment Status	Gender
Urbanization	Education	Place of Residence
	Household Size	

Explanatory Variables: The variables associated with the household use of formal financial services can be classified broadly into two categories, namely, State-level factors and household characteristics, as indicated in Table 3. Definitions of explanatory variables are detailed in Appendix. Table 4 presents the summary statistics used in the present analysis.

We consider MPCE as the proxy for income, and categorize the households based on MPCE quintile groups. In order to examine whether household income is associated with the use of formal financial services we consider the dummy variables *Consumption2*, *Consumption3*, *Consumption4* and *Consumption5*, which are constructed on the basis of MPCE quintile groups, as explanatory variables in the regression (*Consumption1* corresponds to the lowest quintile group and serves as the base category). It seems to be useful to note here that 28.27 percent households in India were found to be poor in 2004-05 (Dev and Ravi 2007). This estimate of poverty headcount is on the basis of poverty lines Rs 359.89 and Rs. 523.18 MPCEs in rural and urban sectors, respectively. Clearly, all households in the 1st quintile group are poor and the 2nd quintile group seems to consist of poor and marginally non-poor households.

Other than income, employment type (i.e. source of earnings) of a household might also affect its probability to use formal financial services. We can categorize the households according to the type of primary employment, which is the main source of income, into three groups, namely, salaried, self employment and casual labor. We consider the dummy variables *Self Employed* and *Laborer* as explanatory variables (*Salaried* serves as the base category) in the regression.

Summary statistics shows that 48.8 percent households earn their livelihood through self employment, which is the largest in size out of three broad categories. In contrast, only 21 percent households' principal earnings come from salaried employment. The probability to use formal financial services is expected to be lowest (highest), if a household is primarily dependent on casual labor supply (salaried employment).

Table 4: Summary Statistics of Explanatory Variables

Variable	Mean	Standard Deviation	Minimum	Maximum
<i>Consumption1</i>	0.212	0.409	0	1
<i>Consumption2</i>	0.205	0.404	0	1
<i>Consumption3</i>	0.199	0.399	0	1
<i>Consumption4</i>	0.202	0.401	0	1
<i>Consumption5</i>	0.182	0.386	0	1
<i>Salaried</i>	0.210	0.408	0	1
<i>Self Employed</i>	0.488	0.500	0	1
<i>Laborer</i>	0.302	0.459	0	1
<i>Illiterate</i>	0.408	0.491	0	1
<i>Literate</i>	0.119	0.324	0	1
<i>Primary</i>	0.137	0.344	0	1
<i>Middle</i>	0.136	0.342	0	1
<i>Secondary and above</i>	0.200	0.400	0	1
<i>Female</i>	0.110	0.313	0	1
<i>Household Size</i>	4.885	2.524	1	35
<i>General</i>	0.305	0.460	0	1
<i>SC</i>	0.208	0.406	0	1
<i>ST</i>	0.081	0.273	0	1
<i>OBC</i>	0.407	0.491	0	1
<i>Rural</i>	0.747	0.435	0	1
<i>Bank Penetration</i>	7.789	3.981	3.57	24.64
<i>Outreach Index</i>	0.226	0.144	0.02	0.64
<i>Outreach Index PCA</i>	0.161	0.138	0.01	0.61
<i>Teledensity</i>	4.767	3.040	1.10	15.25
<i>Urbanization</i>	25.795	11.069	9.79	49.77
<i>Number of Observations</i>			129026	

Monthly Per-capita Consumption Expenditure (MPCE) across Quintile Groups

Quintile Group	Mean MPCE (in Rupees)	Minimum MPCE (in Rupees)	Maximum MPCE (in Rupees)
<i>Consumption1</i>	270.13	0.00	333.33
<i>Consumption2</i>	390.33	333.34	440.00
<i>Consumption3</i>	500.08	440.18	566.67
<i>Consumption4</i>	674.47	566.70	800.00
<i>Consumption5</i>	1360.78	800.02	98666.80

As discussed before, the use of formal financial services is higher among households with relatively higher level of education, though a significant proportion of households with higher education (secondary and above) are found to be financially excluded (see Figure 3). In order to control for possible effect of household's education on use of formal financial services, we construct the variables *Illiterate*, *Literate*, *Primary* and *Middle, Secondary and above*, based on highest level of education of household head. Summary statistics reveals that in Indian States only 20 percent households' heads were having secondary or higher level of education in 2002-03; whereas 40.8 percent households have illiterate head. It is also expected that female headed households are more vulnerable and are less likely to be financially included, compared to the male headed households. Therefore, we expect to have negative effect of the variable *Female* on probability to use formal financial services. In order to control for the size of the households, we consider the variable *Household Size* as an explanatory variable.

Households belonging to socially disadvantaged communities are expected to have lower propensity to be financially included, because of possible unfair discrimination against them in the formal sector and/or due to societal culture. In India socially disadvantaged communities are identified on the basis of casts. These are: scheduled casts (SC); scheduled tribes (ST); and other backward classes (OBC). Rest are considered as general cast (General). So we use dummy variables *SC*, *ST* and *OBC* as explanatory variables in the regression to assess the impact of social groups. To control for the possible effect of the place of residence, we consider the dummy variable *Rural*. We observe that in India, on an average, lower percentage of rural households use formal financial services compared to that of urban households (see Table 2). It is also well documented that rural sectors are lagging behind urban sectors in terms of infrastructural facilities, per capita income, level of education, etc. Also, occupational structure of households in rural sector is quite different from that in urban sector. Therefore, when we control for these factors, a positive (negative) coefficient of the variable *Rural* would imply that the unobserved sector specific effects positively (negatively) affect the use of formal financial services by the rural households.

The household-level data are linked to State-level measures of (a) availability of banking services, (b) level of infrastructural facilities and (c) urbanization. We consider the variable *Bank Penetration*, which is defined as the number of bank offices per lakh population, as a measure of availability of banking services. In order to avoid possible endogeneity problem, we use one year lagged values of *Bank Penetration* in the regression. Higher *Bank Penetration* implies greater access to formal financial services. Therefore, it is expected that *Bank Penetration* would be positively associated with the household use of formal financial services. However, it is not clear whether greater availability of banking services would have symmetric effects on households belonging to different income groups or not. It is often argued that there is need to enhance the supply of banking services in order to promote financial inclusion particularly among the poor. However, for such policies to be effective, availability of banking services should have differential impact on use of formal financial services by the households across income groups, with positive bias to the relatively poor households. In order to examine whether that is indeed true or not, we introduce interaction variables $(Bank\ Penetration) * Consumption_j$, $j = 2, 3, 4,$ and 5 , in the regression. Table 4 shows that in the sample States the average number of bank offices per lakh population was 7.79, which seems to be quite low. Also, there was considerable variation in terms of Bank Penetration across States in India. Bank Penetration was lowest (3.57) in Nagaland and highest (24.64) in Goa during the period of study.

It may be argued that the variable *Bank Penetration* controls for only one aspect of availability of banking services, namely, demographic penetration of bank offices. And, thus, geographic bank penetration, which is defined as number of bank offices per thousand square kilometer area, per-capita availability of deposit services and per-capita availability of credit services should also be considered as indicators of outreach of banking services, which measures different aspects of availability of banking services. To check the robustness of our results we consider two alternative variables, (a) *Outreach Index* and (b) *Outreach Index PCA*, in place of *Bank Penetration* in separate regressions. *Outreach Index* and *Outreach Index PCA* are two indices of banking sector's outreach. Each of these two indices combine the above mentioned four indicators, including demographic penetration, into a single measure of banking sector's outreach by employing (i) the method of Chakravarty and Pal (2010) and (ii) principal

component analysis, respectively, as described in the Appendix.¹⁰ Both the indices are bounded between zero and one. The average values (standard deviations) of *Outreach Index* and *Outreach Index PCA* were, respectively, 0.226 and 0.144 (0.161 and 0.138) in the year 2001 (see Table 4). Clearly, the overall measures of banking sector's outreach also indicate that, during the period of study, supply of banking services was quite low on an average and varied widely across states in India. We also control for possible implications of the level of infrastructural facilities and extent of urbanization in a State, by considering the variables *Teledensity* and *Urbanization* as explanatory variables.

4.2 Econometric Model

The reduced form model depicting the use of formal financial services by households can be written as follows.

$$Y_i^* = \alpha + Z_i' \beta + u_i, \quad i = 1, 2, \dots, N; \quad (3)$$

$$y_i = I(Y_i^* > 0), F(u_i) = \frac{e^{u_i}}{1 + e^{u_i}}.$$

The net benefit of household i from using formal financial services is captured by the latent variable Y_i^* , and whether household i use formal financial services or not is indicated by the dummy variable y_i . $I(Y_i^* > 0)$ is an indicator function taking the value one if $Y_i^* > 0$ and the value zero otherwise. $F(u_i)$ is the cumulative distribution function (CDF) of the error term u_i , which has logistic distribution. Z_i is the vector of exogenous explanatory variables (State-level factors and household characteristics, as described before), α is the constant term, and β is the vector of unknown parameters to be estimated. Clearly, the probability that household i uses formal

$$\text{financial services is } p_i = E(y_i = 1 | Z_i) = \frac{e^{\alpha + Z_i' \beta}}{1 + e^{\alpha + Z_i' \beta}}.$$

¹⁰The correlation coefficient of ranks of states based on *Bank Penetration* and *Outreach Index* (*Bank Penetration* and *Outreach Index PCA*) is 0.8473 (0.8690), which is significant at one percent level. Therefore, it seems that *Bank Penetration* is a good proxy of availability of banking services.

We estimate model (3), using the alternative sets of explanatory variables as discussed before, by maximum likelihood method with robust standard errors, and compute marginal effects of explanatory variables, $\frac{\partial p_i}{\partial x_j} = \frac{e^{\alpha+Z_i\beta}}{(1+e^{\alpha+Z_i\beta})^2} \beta_j$ ($j = 1, 2 \dots K$), for continuous variables, and discrete changes for dummy variables from zero to one.¹¹

First, we estimate model (3) by considering the explanatory variables pertaining to household characteristics using full sample, results of which are reported in Table 5. Second, we estimate model (3) separately for rural and urban sectors, to check whether association of household characteristics with the dependent variable varies across sectors (see Table 6). In both the first and second regressions, we control for State specific unobserved factors using dummy variables for States appropriately. Third, we drop the State dummies and introduce the State level factors (*Bank Penetration*, *Teledensity* and *Urbanization*) in the regression (see Model I in Table 7). It helps us to examine the association of specific State level variables of interest with the dependent variable.¹² Fourth, we consider interaction of the variable *Bank Penetration* with the dummy variables *Consumption2*, *Consumption3*, *Consumption4* and *Consumption5*, in order to examine whether there is any differential impact of availability of banking services on use of formal financial services by households from different income class (see Model II in Table 7). Since required data to measure availability of banking services in rural and urban sectors separately is not available, we consider the full sample to estimate the model when State-level variables are also considered as explanatory variables. Fifth, to check the sensitivity of our results to the measure of availability of banking services considered, we re-estimate the last two specifications of the model by replacing the variable *Bank Penetration* with alternative measures of availability of banking services, *Outreach Index* and *Outreach Index PCA*, separately (see Table 8 and Table

¹¹ As indicated by the methodology of the survey, we use sampling weights to compute descriptive statistics and to estimate the model.

¹² Needles to mention here, we cannot consider State level variables along with the State dummies, since that would lead to the problem of multicollinearity.

9). In order to avoid possible endogeneity problem, we consider lagged values of the State level variables in the regression.¹³

4.3 Estimation Results

The econometric analysis throws up several interesting results. First and foremost, a household's propensity to use formal financial services increases at an increasing rate with the increase in income. The coefficients of the dummy variables *Consumption2– Consumption5* are positive and significant at one percent level, and the difference between the marginal effects of two consecutive MPCE quintile groups is greater for higher quintile groups (see Table 5). This result remains valid, if we estimate the model separately for rural and urban sectors or consider alternative specifications of the model (see Table 6 – Table 9). That is, significant variations in terms of percentage of financially included households across income groups, with higher financial inclusion among higher income groups, persist among otherwise homogeneous households living in the same sector of a state as well. In other words, this result indicates that larger proportion of poor households do not use formal financial services, compared to that of relatively rich households, just because they are poor. It strengthens the findings of Section 3 that there is income related inequality in financial inclusion and larger proportion of relatively poor households are financially excluded compared to their relative rich counterparts in India.

¹³ We note here that possible endogeneity problem may not be fully avoided by considering the lagged values of explanatory variables always. However, note that the focus of this analysis is to examine the association of State-level explanatory variables with the dependent variable, not the causal effects. Therefore, it seems that the issue of endogeneity does not deserve much attention in the present context.

Table 5: Determinants of Use of Formal Financial Services by Households

<i>Explanatory Variables</i>	<i>Coefficient</i>	<i>Marginal Effect</i>	<i>p-value</i>
<i>Consumption2</i>	0.343	0.068	0.000
<i>Consumption3</i>	0.628	0.125	0.000
<i>Consumption4</i>	0.983	0.196	0.000
<i>Consumption5</i>	1.606	0.320	0.000
<i>Self Employed</i>	-0.179	-0.036	0.000
<i>Laborer</i>	-0.571	-0.114	0.000
<i>Literate</i>	0.363	0.072	0.000
<i>Primary</i>	0.460	0.092	0.000
<i>Middle</i>	0.585	0.116	0.000
<i>Secondary and above</i>	0.977	0.194	0.000
<i>Female</i>	-0.092	-0.018	0.023
<i>Household Size</i>	0.145	0.029	0.000
<i>SC</i>	-0.169	-0.034	0.000
<i>ST</i>	-0.376	-0.075	0.000
<i>OBC</i>	-0.136	-0.027	0.000
<i>Rural</i>	0.328	0.065	0.000
<i>Constant</i>	-2.222		0.000
No. Observations		129026	
Wald chi2(18)		3913.01	
Prob> chi2		0.000	
Log pseudo likelihood		-106100000	
Pseudo R ²		0.118	

Note: State dummies are included in the regression analysis.

Moreover, we find that the estimated coefficient of the *Bank Penetration* variable is positive and significant at one percent level (see Model I in Table 7). It implies that availability of banking services is positively associated with a household's propensity to use formal financial services. Interestingly, we also find that the marginal effects of (*Consumption3*Bank Penetration*), (*Consumption4*Bank Penetration*) and (*Consumption5 *Bank Penetration*) are negative and significant, but the marginal effect of (*Consumption1*Bank Penetration*) is insignificant; while the marginal effects of *Consumption2 – Consumption5* and *Bank Penetration* continue to be positive and significant (see Model II in Table 7). Therefore, we can say that the positive association of availability of banking services in a state with the propensity to use formal financial services by a household is stronger if that household belongs to either 1st or 2nd MPCE quintile group, than if that household belongs to 3rd or higher MPCE quintile groups. Therefore,

it seems that banking services play significant role to promote financial inclusion, particularly among the poor households. These results hold true, if we consider *Outreach Index* or *Outreach Index PCA* in place of *Bank Penetration* (see Model I and Model II in Table 8 & 9). In other words, our results are robust to consideration of alternative measures of availability of banking services.

Table 6: Sector Wise Determinants of Use of Formal Financial Services by Households

<i>Explanatory Variables</i>	Rural			Urban		
	<i>Coefficient</i>	<i>Marginal Effect</i>	<i>p-value</i>	<i>Coefficient</i>	<i>Marginal Effect</i>	<i>p-value</i>
<i>Consumption2</i>	0.332	0.065	0.000	0.451	0.091	0.000
<i>Consumption3</i>	0.602	0.119	0.000	0.847	0.171	0.000
<i>Consumption4</i>	0.953	0.188	0.000	1.225	0.247	0.000
<i>Consumption5</i>	1.542	0.304	0.000	1.861	0.375	0.000
<i>Self Employed</i>	-0.024	-0.005	0.613	-0.363	-0.073	0.000
<i>Laborer</i>	-0.433	-0.085	0.000	-0.769	-0.155	0.000
<i>Literate</i>	0.381	0.075	0.000	0.365	0.074	0.000
<i>Primary</i>	0.474	0.093	0.000	0.500	0.101	0.000
<i>Middle</i>	0.560	0.110	0.000	0.750	0.151	0.000
<i>Secondary and above</i>	0.847	0.167	0.000	1.271	0.256	0.000
<i>Female</i>	-0.122	-0.024	0.014	0.054	0.011	0.442
<i>Household Size</i>	0.127	0.025	0.000	0.206	0.042	0.000
<i>SC</i>	-0.226	-0.045	0.000	0.027	0.005	0.664
<i>ST</i>	-0.445	-0.088	0.000	-0.146	-0.029	0.298
<i>OBC</i>	-0.158	-0.031	0.000	-0.075	-0.015	0.124
<i>Constant</i>	-1.864		0.000	-2.865		0.000
No. Observations	84411			44615		
Wald chi2(18)	2323.04			1902.36		
Prob> chi2	0.000			0.000		
Log pseudo likelihood	-78640822			-27123534		
Pseudo R ²	0.096			0.149		

Note: State dummies are included in the regression analysis.

The econometric analysis also shows that there is positive (negative) and significant association of the level of infrastructural facilities (urbanization) in a State with the probability to use formal financial services by a household in that State. Interestingly, we find that the marginal effect of availability of banking services is greater than that of level of infrastructural facilities or of urbanization. It seems to indicate that the association of availability of banking services is

stronger, than that of other state level variables, with a household's propensity to use formal financial services.

Table 7: Availability of Banking Services and Use of Formal Financial Services

<i>Explanatory Variables</i>	Model I			Model II		
	<i>Coefficient</i>	<i>Marginal Effect</i>	<i>p-value</i>	<i>Coefficient</i>	<i>Marginal Effect</i>	<i>p-value</i>
<i>Consumption2</i>	0.318	0.063	0.000	0.313	0.061	0.019
<i>Consumption3</i>	0.564	0.111	0.000	0.760	0.149	0.000
<i>Consumption4</i>	0.876	0.173	0.000	1.529	0.300	0.000
<i>Consumption5</i>	1.469	0.290	0.000	2.655	0.521	0.000
<i>Self Employed</i>	-0.170	-0.034	0.000	-0.160	-0.031	0.000
<i>Laborer</i>	-0.626	-0.123	0.000	-0.640	-0.126	0.000
<i>Literate</i>	0.353	0.070	0.000	0.350	0.069	0.000
<i>Primary</i>	0.431	0.085	0.000	0.426	0.084	0.000
<i>Middle</i>	0.565	0.111	0.000	0.567	0.111	0.000
<i>Secondary and above</i>	0.987	0.194	0.000	0.981	0.193	0.000
<i>Female</i>	-0.163	-0.032	0.000	-0.166	-0.033	0.000
<i>Household Size</i>	0.144	0.028	0.000	0.145	0.029	0.000
<i>SC</i>	-0.141	-0.028	0.000	-0.144	-0.028	0.000
<i>ST</i>	-0.332	-0.065	0.000	-0.345	-0.068	0.000
<i>OBC</i>	-0.107	-0.021	0.000	-0.108	-0.021	0.000
<i>Rural</i>	0.295	0.058	0.000	0.308	0.060	0.000
<i>Bank Penetration</i>	0.088	0.017	0.000	0.168	0.033	0.000
<i>Consumption2* Bank Penetration</i>				-0.004	-0.001	0.857
<i>Consumption3* Bank Penetration</i>				-0.039	-0.008	0.057
<i>Consumption4* Bank Penetration</i>				-0.106	-0.021	0.000
<i>Consumption5* Bank Penetration</i>				-0.174	-0.034	0.000
<i>Teledensity</i>	0.052	0.010	0.000	0.057	0.011	0.000
<i>Urbanization</i>	-0.016	-0.003	0.000	-0.016	-0.003	0.000
<i>Constant</i>	-2.490		0.000	-2.995		0.000
No. Observations		129026			129026	
Wald chi2(18)		4256.32			4421.12	
Prob> chi2		0.000			0.000	
Log pseudo likelihood		-105200000			-104900000	
Pseudo R ²		0.125			0.127	

Note: Regression analysis includes all Indian states.

Let us now consider the other characteristics of households. We find that the coefficients of *Self Employed* and *Laborer* are negative and significant at one percent level, and the absolute value of the marginal effect of *Laborer* is greater than that of *Self Employed* (see Table 5 – Table 9). It confirms that (a) principal economic activity of a household plays crucial role in determining whether that household would use formal financial services or not and (b) the propensity to use formal financial services is highest for households with salaried employment as the main source of income and lowest for households who are primarily dependent on casual labor supply, ceteris paribus. The econometric analysis also reveals that the probability of a household to be financially included increases at an increasing rate with the increase in level of education of the household head. In other words, as expected, greater proportion of households with relatively lower level of education are financially excluded. Interestingly, we find that the marginal effect of *Household Size* is always positive and significant. It implies that, ceteris paribus, the probability to use formal financial services is higher for larger households. It may be because the possibility to use formal financial services by at least one member of a household increases with the increase in number of members in that household and/or the possibility of within household risk-sharing and, thus, less vulnerability of joint families compared to that of smaller households.

Note that the coefficient of the dummy variable *Rural* is positive and significant (see Table 5). However, descriptive statistics in Table 2 shows that lower proportion of rural households are financially included compared to that of urban households. Therefore, it seems that the effects of sector specific unobserved factors are positively biased towards rural sector. Breaking the dependent variable into two, we observe that formal savings (credit) services are utilized by 40.05 percent and 21.38 percent (13.54 percent and 19.45 percent) of urban and rural households, respectively. That is, while higher percentage of urban households use formal savings services than that of rural households, utilization of formal credit services is greater in the rural sector compared to urban sector. Therefore, it seems that rural bias of government credit policy (such as, priority sector lending norms, Kisan credit card scheme, etc.) has facilitated financial inclusion in rural sector vis-à-vis urban sector.

Table 8: Availability of Banking Services and Use of Formal Financial Services: Sensitivity Analysis I

<i>Explanatory Variables</i>	Model I			Model II		
	<i>Coefficient</i>	<i>Marginal Effect</i>	<i>p-value</i>	<i>Coefficient</i>	<i>Marginal Effect</i>	<i>p-value</i>
<i>Consumption2</i>	0.331	0.065	0.000	0.254	0.050	0.009
<i>Consumption3</i>	0.589	0.116	0.000	0.792	0.155	0.000
<i>Consumption4</i>	0.914	0.180	0.000	1.552	0.303	0.000
<i>Consumption5</i>	1.523	0.300	0.000	2.674	0.522	0.000
<i>Self Employed</i>	-0.172	-0.034	0.000	-0.158	-0.031	0.000
<i>Laborer</i>	-0.628	-0.124	0.000	-0.652	-0.127	0.000
<i>Literate</i>	0.357	0.070	0.000	0.354	0.069	0.000
<i>Primary</i>	0.432	0.085	0.000	0.423	0.083	0.000
<i>Middle</i>	0.562	0.111	0.000	0.570	0.111	0.000
<i>Secondary and above</i>	0.983	0.193	0.000	0.985	0.192	0.000
<i>Female</i>	-0.176	-0.035	0.000	-0.185	-0.036	0.000
<i>Household Size</i>	0.148	0.029	0.000	0.151	0.030	0.000
<i>SC</i>	-0.145	-0.028	0.000	-0.152	-0.030	0.000
<i>ST</i>	-0.254	-0.050	0.000	-0.256	-0.050	0.000
<i>OBC</i>	-0.105	-0.021	0.001	-0.105	-0.021	0.001
<i>Rural</i>	0.303	0.060	0.000	0.317	0.062	0.000
<i>Bank Penetration</i>	3.698	0.728	0.000	6.226	1.216	0.000
<i>(Consumption2* Outreach Index)</i>				0.136	0.027	0.788
<i>(Consumption3* Outreach Index)</i>				-1.393	-0.272	0.004
<i>(Consumption4* Outreach Index)</i>				-3.352	-0.655	0.000
<i>(Consumption5* Outreach Index)</i>				-5.276	-1.030	0.000
<i>Teledensity</i>	0.007	0.001	0.544	0.011	0.002	0.314
<i>Urbanization</i>	-0.023	-0.005	0.000	-0.020	-0.004	0.000
<i>Constant</i>	-2.377		0.000	-2.950		0.000
No. Observations		129026			129026	
Wald chi2(18)		4151.55			4553.99	
Prob> chi2		0.000			0.000	
Log pseudo likelihood		-105100000			-104500000	
Pseudo R ²		0.126			0.131	

Note: Regression analysis includes all Indian states.

Negative and significant marginal effect of the dummy variable *Female*, when we estimate the model using full sample, seems to imply that the propensity of female headed households to use formal financial services is less than the male headed households in India (see Table 5). However, separate estimates for the two sectors, rural and urban, reveals that the gender of

household head plays significant role only in rural India, not in urban India (see Table 6).¹⁴In other words, unlike as in case of rural India, female headed households are not significantly different from male headed households as far as utilization of formal financial services is concerned. We find similar results for households belonging to socially disadvantaged communities. The marginal effects of *SC*, *ST* and *OBC* are negative and significant, if we consider both rural and urban sectors together or consider only rural sector. On the other hand, in case of urban sector, marginal effects of *SC* and *ST* turn out to be insignificant, while the marginal effect of *OBC* is negative and significant at 5% level. It implies that, in urban India, the propensity to use formal financial services is lower for OBCs, not for SCs and STs, compared to the general category households. However, in rural India the propensity to use formal financial services is lowest for ST households, second lowest for SC households and third lowest for OBC households, ceteris paribus (see Table 6).

There are differences between the two sectors, rural and urban, in terms of magnitudes of marginal effects of other household characteristics as well. It is easy to observe that marginal effects of Consumption2 – Consumption5 are greater in urban sector than that in rural sector. It justifies the higher concentration index of financial inclusion in urban India compared to that in rural India, as observed in Section 3. Effects of employment status and household size are also stronger in urban sector compared to that in rural sector. Rural-urban comparison of the marginal effects of dummy variables for educational levels leads to mixed results. We find that the effects of *Primary*, *Middle*, and *Secondary and above* are stronger in urban sector than in rural sector, but the effect of *Literate* is stronger in rural sector than in urban sector.

¹⁴ The marginal effect of *Female* in case of urban sector is negative but not significant at 5% level.

Table 9: Availability of Banking Services and Use of Formal Financial Services: Sensitivity Analysis II

<i>Explanatory Variables</i>	Model I			Model II		
	<i>Coefficient</i>	<i>Marginal Effect</i>	<i>p-value</i>	<i>Coefficient</i>	<i>Marginal Effect</i>	<i>p-value</i>
<i>Consumption2</i>	0.329	0.065	0.000	0.276	0.054	0.000
<i>Consumption3</i>	0.586	0.116	0.000	0.735	0.144	0.000
<i>Consumption4</i>	0.909	0.179	0.000	1.396	0.273	0.000
<i>Consumption5</i>	1.512	0.298	0.000	2.389	0.467	0.000
<i>Self Employed</i>	-0.172	-0.034	0.000	-0.158	-0.031	0.000
<i>Laborer</i>	-0.619	-0.122	0.000	-0.646	-0.126	0.000
<i>Literate</i>	0.356	0.070	0.000	0.353	0.069	0.000
<i>Primary</i>	0.434	0.086	0.000	0.424	0.083	0.000
<i>Middle</i>	0.562	0.111	0.000	0.568	0.111	0.000
<i>Secondary and above</i>	0.980	0.193	0.000	0.982	0.192	0.000
<i>Female</i>	-0.163	-0.032	0.000	-0.177	-0.035	0.000
<i>Household Size</i>	0.145	0.029	0.000	0.149	0.029	0.000
<i>SC</i>	-0.149	-0.029	0.000	-0.155	-0.030	0.000
<i>ST</i>	-0.289	-0.057	0.000	-0.281	-0.055	0.000
<i>OBC</i>	-0.111	-0.022	0.000	-0.111	-0.022	0.000
<i>Rural</i>	0.303	0.060	0.000	0.317	0.062	0.000
<i>Bank Penetration</i>	2.580	0.509	0.000	6.091	1.191	0.000
<i>(Consumption2* Outreach Index PCA)</i>				0.015	0.003	0.979
<i>(Consumption3* Outreach Index PCA)</i>				-1.756	-0.343	0.002
<i>(Consumption4* Outreach Index PCA)</i>				-4.019	-0.786	0.000
<i>(Consumption5* Outreach Index PCA)</i>				-6.051	-1.184	0.000
<i>Teledensity</i>	0.046	0.009	0.000	0.037	0.007	0.001
<i>Urbanization</i>	-0.021	-0.004	0.000	-0.019	-0.004	0.000
<i>Constant</i>	-2.140		0.000	-2.609		0.000
No. Observations		129026			129026	
Wald chi2(18)		4147.88			4538.18	
Prob> chi2		0.000			0.000	
Log pseudo likelihood		-105300000			-104600000	
Pseudo R ²		0.124			0.130	

Note: Regression analysis includes all Indian states.

5. Conclusion

This paper analyzes income related inequality in financial inclusion across sub-national regions in India using a representative survey data, linked to State-level factors. The main contributions of this paper are fourfold. First, this paper is perhaps the first to study income related inequality in financial inclusion. Second, to the best of our knowledge, this is the first attempt to usefully apply the concepts of concentration curves and concentration index in the context of financial inclusion. Third, it provides empirical evidence of the household's propensity to use formal financial services in a developing country using a representative data set. Fourth, it provides an assessment of the role of banking services to promote financial inclusion, particularly among the poor households.

We find that the extent of financial exclusion is quite severe in India. Financial exclusion is disproportionately higher among the relatively poor households compared to their richer counterparts. Nonetheless, a significant percentage of rich households in India are also found to be financially excluded.

We also find that there is considerable variation in terms of concentration index of financial inclusion, i.e. in terms of income related inequality in financial inclusion, and the level of financial inclusion across Indian States and UTs as well as across sectors – rural and urban. Both the level of financial inclusion and estimated concentration index of financial inclusion are lower in rural sectors compared to that in urban sectors. Nonetheless, about a half of the urban households are financially excluded. Further, we find that there is negative and significant (no significant) correlation between concentration index of financial inclusion and the percentage of households using formal financial services in rural (urban) sectors. It seems to indicate that increase in level of financial inclusion can have differential consequence on income related inequality in financial inclusion across sectors.

Though there is positive correlation between overall economic wellbeing and the percentage of financially included households in a State, there is no significant correlation of concentration index of financial inclusion with overall economic wellbeing or with the percentage of financially included households. Further, we demonstrate that income inequality and

concentration index of financial inclusion cannot be viewed as synonymous. Therefore, it seems that income related inequality in financial inclusion deserves special attention of the policy makers.

Econometric analysis of this paper reveals that larger proportion of poor households do not use formal financial services, compared to that of rich households, just because they are poor. It also shows that availability of banking services is positively associated with a household's propensity to use formal financial services, and the degree of association is higher for the poor and marginally non-poor households. It indicates that greater availability of banking services can foster financial inclusion, particularly among the low income households. Moreover, compared to the availability of infrastructural facilities and extent of urbanization in a State, availability of banking services in a State is more strongly associated with the propensity of a household to be financially included. These results are robust to alternative measures of availability of banking services.

We also find that the level of education, employment status and household size significantly affects the use of formal financial services by a household in both rural and urban sectors. Rural-urban comparison of the effects of households characteristics indicate that income and employment status have stronger effect on an urban household's propensity to be financially included, compared to that of a rural household. Further, it seems that the credit policies targeted to rural sector has played positive role to promote financial inclusion among rural households vis-à-vis urban households.

Interestingly, we find that the gender of household head and social group do not have significant effect on use of formal financial services by urban households. However, in rural India, the probability to use formal financial services by a female headed household is significantly lower than a male headed household. Also, the probability to use formal financial services by a household is less, if that household resides in rural area and belongs to more disadvantageous social group. In urban India, only the OBC households have higher probability to be financially

excluded compared to the households belonging to other social groups including general category households.

Note that in this paper we consider that a household is financially excluded if that household does not use any of the financial services provided by institutional agencies; otherwise that household is considered as financially included. That is, we do not distinguish between partial and complete financial inclusion of a household. In order to assess the extent of financial inclusion of a household, it is important to appropriately estimate the need of different financial services by that household, which is beyond the scope of the present paper. It might also be interesting to assess the implications of different policies on dynamics of socio-economic inequality in financial inclusion. We leave these for future research.

References

- Abu-Bader, S. and Abu-Qarn, A. S. (2008) “Financial development and economic growth: The Egyptian experience,” *Journal of Policy Modeling*, 30(5), 887–898
- Aghion, Philippe and Bolton, Patrick(1997)“A theory of trickle-down growth and development,” *Review of Economic Studies*, 64(2), 151–172
- Ang, James B. (2010) “Finance and Inequality: The Case of India,” *Southern Economic Journal*, 76(3), 738-761
- Ashraf, N., Karlan, D. S. and Yin, W. (2006) “Tying Odysseus to the Mast: Evidence from a Commitment Savings Product in the Philippines,” *Quarterly Journal of Economics*, 121(2), 635-672.
- Ayyagari. M.; Demirgüç-KuntA. And Maksimovic, V.(2008) “How Important Are Financing Constraints? The Role of Finance in the Business Environment,” *World Bank Economic Review*, 22(3), 483-516
- Banerjee, A. V., and Newman, A. F.(1993)“Occupational choice and the process of development,” *Journal of Political Economy*,101(1), 274-98
- Banerjee, A. and Duflo, E. (2005) “Growth theory through the lens of development economics,” In: *Handbook of Economic Growth*, Vol. 1, 473–552
- Bauer, M., Chytilová, J. and Morduch, J. (2010) “*Behavioral Foundations of Microcredit: Experimental and Survey Evidence*,” IZA Discussion Paper No. 4901
- Beck, T. and Levine, R. (2002) “Industry growth and capital allocation: does having a market- or bank-based system matter?”*Journal of Financial Economics*, 64(2), 147–180

- Beck, T., Demirgüç-Kunt, A. and Maksimovic, V. (2005) "Financial and legal constraints to growth: Does firm size matter?" *Journal of Finance*, 60 (1), 137–177
- Beck, T., Demirgüç-Kunt, A. and Levine, R. (2007) "Finance, inequality, and the poor," *Journal of Economic Growth*, 12 (1), 27–49
- Beck, T., Demirguc-Kunt, A. and Martinez-Peria, M. S. (2007b) "Reaching out: Access to and use of banking services across countries," *Journal of Financial Economics*, 85(1), 234-266
- Beck, T., Demirgüç-Kunt, A. and Honohan, P.(2009) "Access to Financial Services: Measurement, Impact, and Policies," *World Bank Research Observer*, 24(1), 119-145
- Burgess R. and Pande, R. (2005) "Do Rural Banks Matter? Evidence from the Indian Social Banking Experiment," *American Economic Review*, 95(3), 780-795
- Cain, J. S., Hasan, R., Magsombol, R. and Tandon, A. (2010) "Accounting for Inequality in India: Evidence from Household Expenditures," *World Development*, 38(3), 282 – 297
- Carlin, W. and Mayer, C. (2003) "Finance, investment and growth," *Journal of Financial Economics*, 69(1), 191-226
- Cetorelli, N. and Gambera, M. (2001) "Banking market structure, financial dependence and growth: international evidence from industry data," *Journal of Finance*, 56(2), 617–648
- Chakravarty, Satya. R., and Pal, Rupayan (2010) "*Measuring Financial Inclusion: An Axiomatic Approach*," IGIDR-WP-2010-003, Indira Gandhi Institute of Development Research, India.
- Claessens, S. (2006) "Access to financial services: A review of the issues and public policy objectives," *World Bank Research Observer*, 21 (2), 207–240
- Claessens, S. and Perotti, E. (2007) "Finance and inequality: Channels and evidence," *Journal of Comparative Economics* 35(4), 748–773
- Clarke, George R. G., Xu, Lixin C. and Zou, H. (2006) "Finance and Income Inequality: What Do the Data Tell Us?" *Southern Economic Journal*, 72(3), 578-596
- Datt, G. and Ravallion, M. (2002) "Is India's Economic Growth Leaving the Poor Behind?," *Journal of Economic Perspectives*, 16(3), 89 – 108
- Deaton, A. and Drèze, J. (2002) "Poverty and Inequality in India – A Re-Examination," *Economic and Political Weekly*, 37(36), pp. 3729–3748
- Demirgüç-Kunt, A. and Levine, R. (2007) "Finance and opportunity: Financial systems and intergenerational persistence of relative incomes," Mimeo. <http://www.growthcommission.org/storage/cgdev/documents/MacroWorkshop/Asli%20Demirguc%20Background%20Paper%201.pdf>
- Dev, M. S. and Ravi, C. (2007) "Poverty and Inequality: All-India and States, 1983-2005," *Economic and Political Weekly*, 42(6), 509 – 521
- Dollar, D. and Kraay, A. (2002) "Growth is good for the poor," *Journal of Economics Growth*, 7(3), 195–225

- Dupas P. and Robinson, J. (2009) "Savings Constraints and Microenterprise Development: Evidence from a Field Experiment in Kenya," NBER Working Papers 14693, National Bureau of Economic Research
- Erreygers, G. (2009) "Correcting the Concentration Index", *Journal of Health Economics*, 28(2), 504-515.
- Erreygers, G. (2009b) "Correcting the Concentration Index: A Reply to Wagstaff", *Journal of Health Economics*, 28(2), 521-524.
- Fisman, R. and Love, I. (2003) "Trade credit, financial intermediary development and economic growth," *Journal of Finance*, 58(1), 353-374
- Galor, O. and Zeira, J. (1993) "Income distribution and macroeconomics," *Review of Economic Studies*, 60(1), 35-52
- Greenwood, J. and Jovanovic, B. (1990) "Financial Development, Growth, and the Distribution of Income," *Journal of Political Economy*, 98(5), 1076-1107
- Government of India. (2005) *Household Assets and Liabilities in India: NSS 59th Round*. National Sample Survey Organisation, Ministry of Statistics and Programme Implementation. New Delhi.
- Honohan, P. (2004) "Financial development, growth and poverty: how close are the links?" World Bank Policy Research Working Paper 3203, Washington, World Bank
- Honohan, P. (2008) "Cross-country variation in household access to financial services," *Journal of Banking and Finance*, 32(11), 2493-2500
- Jalilian, H. and Kirkpatrick, C. (2005) "Does financial development contribute to poverty reduction," *Journal of Development Studies*, 41(4), 636-656
- Jeanneney, S. G. and Kpodar, K. (2011) "Financial Development and Poverty Reduction: Can There be a Benefit without a Cost?" *Journal of Development Studies*, 47(1), 143-163
- Johnston, D. Jr. and Morduch, J. (2008) "The Unbanked: Evidence from Indonesia," *World Bank Economic Review*, 22 (3), 517-537
- Kaboski, J. and Townsend, R. (2005) "Policies and Impact: An Analysis of Village-Level Microfinance Institutions," *Journal of the European Economic Association*, 3(1), 1-50
- Kakwani, N.C. (1977) "Applications of Lorenz Curves in Economic", *Econometrica*, 45(3), 719-728
- Kendall, J. (2012) "Local financial development and growth," *Journal of Banking and Finance*, 36(5), 1548-1562
- Kochar, Anjini (1997) "An empirical investigation of rationing constraints in rural credit markets in India" *Journal of Development Economics*, 53 (2), 339-371
- Kochar, Anjini (2011) "The Distributive Consequences of Social Banking: A Micro-empirical Analysis of the Indian Experience," *Economic Development and Cultural Change*, 59(2), 251-280
- Li, H., Squire, L. and Zou, H. (1998) "Explaining International and Intertemporal Variations in Income Inequality," *Economics Journal* 108(446), 26-43

- Littlefield, E., Morduch, J. and Hashemi, S. (2003) “*Is microfinance an effective strategy to reach the millennium development goals,*” CGAP, <http://www.assortis.com/newsletter/download/mcf001021.pdf>
- Mahalanobis, P.C. (1960) “A Method of Fractile Graphical Analysis”, *Econometrica*, 28(2), 325-351.
- Odhiambo, N. M. (2009) “Financial deepening and poverty reduction in Zambia: an empirical investigation,” *International Journal of Social Economics*, 37(1), 41 – 53
- Odhiambo, N. M. (2009b) “Finance-growth-poverty nexus in South Africa: A dynamic causality linkage,” *Journal of Socio-Economics*, 38(2), 320-325
- O’Donnell, O., van-Doorslaer, E., Wagstaff, A. and Lindelow, M. (2008) *Analyzing Health Equity Using Household Survey Data: A Guide to Techniques and Their Implementation*, World Bank, Washington, D.C.
- Pal, Rupayan (2011) “The Relative Impacts of Banking, Infrastructure and Labour on Industrial Growth: Evidence from Indian States”, *Macroeconomics and Finance in Emerging Market Economies*, 4(1), 101-124
- Rajan, R, and Zingales, L. (1998) “Financial dependence and growth,” *American Economic Review*, 88(3), 559-86
- Roubini, N. and Bilodeau, J. (2008) “The Financial Development Index: Assessing the World’s Financial Systems” in *The Financial Development Report 2008*, World Economic Forum, Geneva, Switzerland
- Shahbaz, M. and Islam, F. (2011) “Financial Development and Income Inequality in Pakistan: An Application of ARDL Approach,” *Journal of Economic Development*, 36(1), 35-58
- Suryanarayana, M.H. (2008) “What is Exclusive about ‘Inclusive Growth’?”, *Economic and Political Weekly*, XLIII(43), 93-101.
- Wagstaff, A. (2005) “The bounds of the concentration index when the variable of interest is binary, with an application to immunization inequality,” *Health Economics*, 14(4), 429–432
- Wagstaff, A. (2009) “Correcting the Concentration Index: A Comment”, *Journal of Health Economics*, 28(2), 516-520.
- Wagstaff, A., Paci, P. and van-Doorslaer, E. (1991) “On The Measurement of Inequalities in Health”, *Social Science and Medicine*, 33(5), 545-557.
- Yang, Y. Y. and Yi, M. H. (2008) “Does financial development cause economic growth? Implication for policy in Korea,” *Journal of Policy Modeling*, 30(5), 827–840

APPENDIX

EXPLANATORY VARIABLES: DEFINITIONS AND DATA SOURCES

Variable	Definition	Data Source
Household Characteristics		
Income:		
Consumption1 (Base category)	It takes the value 1 if the household belongs to the first consumption quintile group based on MPCE; otherwise 0.	AIDIS, 2002-2003
Consumption2	It takes the value 1 if the household belongs to the second consumption quintile group based on MPCE; otherwise 0.	
Consumption3	It takes the value 1 if the household belongs to the third consumption quintile group based on MPCE; otherwise 0.	
Consumption4	It takes the value 1 if the household belongs to the fourth consumption quintile group based on MPCE; otherwise 0.	
Consumption5	It takes the value 1 if the household belongs to the fifth consumption quintile group based on MPCE; otherwise 0.	
Employment Status:		
Salaried (Base category)	It takes the value 1 if the household's principal earning is from salaried employment; otherwise 0.	-do-
Self Employed	It takes the value 1 if the household's principal earning is from self employment; otherwise 0.	
Laborer	It takes the value 1 if the household's principal earning is from casual/agricultural/non-agricultural labor; otherwise 0.	
Education:		
Illiterate(Base category)	It takes the value 1 if head of household is illiterate; otherwise 0.	-do-
Literate	It takes the value 1 if head of household is literate; otherwise 0.	
Primary	It takes the value 1 if highest education completed by head is primary; otherwise 0.	
Middle	It takes the value 1 if the highest education completed by head is middle level; otherwise 0.	
Secondary and above	It takes the value 1 if the highest education completed by head is secondary level or above; otherwise 0.	-do-
Gender:		
Female (Ref: Male)	It takes the value 1 if the household head is female; otherwise 0.	-do-
Household Size	The variable 'Household Size' is defined as the number of members in the household	-do-
Social Group:		
General (Base category)	It takes the value 1 if household belongs to General category; otherwise 0.	-do-
SC	It takes the value 1 if household belongs to Scheduled Caste; otherwise 0.	
ST	It takes the value 1 if household belongs to Scheduled Tribes; otherwise 0.	
OBC	It takes the value 1 if household belongs to Other Backward Castes; otherwise 0.	
Place of Residence:		
Rural (Ref: Urban)	It takes the value 1 if household resides in rural area; otherwise 0.	-do-

APPENDIX (Continued)

Variable	Definition	Data Source
State Level Factors		
Availability of Banking Services:		
Bank Penetration	The variable 'Bank Penetration' is measured as number of bank offices per lakh population. (1 lakh =100000)	Basic Statistical Returns of Scheduled Commercial Banks, Reserve Bank of India. (Data on population and land area comes from Census of India).
Outreach Index	The variable 'Outreach Index' is the index of outreach of banking services, which is constructed by considering (a) number of bank offices per lakh population, (b) number of bank offices per thousand square kilometer area, (c) the number of deposit accounts per thousand population and (d) number of credit accounts per thousand people as indicators of outreach of banking services employing the formula, as in Chakravarty and Pal (2010), $(\text{Outreach Index } 1) = \frac{1}{k} \sum_{i=1}^k \left(\frac{x_i - m_i}{M_i - m_i} \right)^r$, where $r=0.75$, $k=4$, x_i denotes the value of the i -th indicator, m_i (M_i) denotes the minimum (maximum) value of the i -th indicator.	
Outreach Index PCA	The variable 'Outreach Index PCA' is the index of outreach of banking services constructed by employing well-known principal component analysis (PCA), by considering the following four indicators of outreach of banking services: (a) number of bank offices per lakh population, (b) number of bank offices per thousand square kilometer area, (c) the number of deposit accounts per thousand population and (d) number of credit accounts per thousand people.	
Infrastructure: Teledensity	The variable 'Teledensity', which is a proxy for infrastructural facility, is defined as the number of telephones per hundred population.	Department of Telecommunication, Ministry of Communications & Information Technology, Government of India.
Urbanization	The variable 'Urbanization' is measured as the percentage of urban population to total population.	Census of India