

DVARA RESEARCH

A Demand-Side Approach to Measuring Financial Inclusion: Going Beyond Bank Account Ownership¹

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Abstract

Access to finance is a critical mechanism in generating income equality and economic growth. Despite the role of inclusive finance, the extent to which households access and use formal financial services is not fully understood, largely due to gaps in existing measures of financial inclusion. The objective of this paper is to contribute to the literature on the measurement of financial inclusion. We do this by creating a composite demand-side financial inclusion index. We validate this approach by measuring the differences in dimensions of financial inclusion, such as access to and usage of financial products by regions, both rural versus urban as well as state-wise differences. We argue that the composite index is a superior method over other existing approaches to measure financial inclusion and find that an index based solely on bank account ownership tends to overestimate levels of financial inclusion. Our analysis also finds that financial inclusion, in terms of access, usage, as well as the overall financial inclusion index scores, are higher for urban regions compared to rural regions, indicating that levels of financial inclusion are unevenly spread in rural and urban regions of India and that using a geographic lens is indeed a useful way to identify areas of priority for strategic policymaking in financial inclusion.

Dvara Research Working Paper Series No. WP-2021-05

July 2021

Version 1.0

¹We wish to thank colleagues from Dvara Research, particularly Indradeep Ghosh and Monami Dasgupta for their continuous feedback throughout the course of this study as well as Niyati Agrawal and Rakshith S Ponnathpur, Research Associates with the Household Finance Practice at Dvara Research for their research assistance. We would also like to thank Susan Thomas, Researcher, xKDR and Research Professor of Business at Jindal Global University who suggested the idea that we closely examine the levels of financial inclusion in rural versus urban India. Finally, we would like to thank Rati Sharma who helped us understand and navigate the methodology of the index used in this paper.

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1. Introduction

Access to finance is a critical mechanism for generating income equality and economic growth. It enables households and enterprises to manage their day-to-day finances, build resilience and invest in promising growth opportunities (Beck et al., 2009). Several empirical studies have found positive impacts of access to finance on poverty reduction (Burgess and Pande, 2005), women’s empowerment (Field et al., 2019), increased household savings and consumption (Ashraf, Karlan and Yin, 2006) and growth in business investments (Banerjee and Duflo, 2004). Beck et al., (2009) note that in the absence of a well-functioning financial system, individuals, households, and enterprises would have to rely on their social network, personal wealth or other informal arrangements. These approaches greatly limit the quantum of investments that such individuals, households, and enterprises can make in business and/or human capital, limiting the possibilities of overall economic growth.

Despite the role of inclusive finance, the extent to which households access and use formal financial services is not fully understood. This is largely due to gaps in existing measures of financial inclusion that often view financial inclusion as a one-dimensional concept. In addition to this, there is a lack of consensus on a single definition of financial inclusion among policymakers and researchers. Park and Mercado (2018) summarise the different approaches used by researchers for defining financial inclusion, highlighting that the concept of financial inclusion has been defined in the context of either (i) social inclusion, or (ii) access, availability and usage or (iii) voluntary or involuntary exclusion. While at the heart of inclusive finance lies the idea of including all individuals under the ambit of formal financial services, there are several nuances involved in this idea that must be accounted for in the measurement of financial inclusion.

In the Indian context, The Reserve Bank of India (RBI), which has been at the forefront of financial inclusion policy in India, defines⁴ financial Inclusion as “the process of ensuring access to appropriate financial products and services needed by all sections of the society in general and vulnerable groups such as weaker sections and low-income groups in particular at an affordable cost in a fair and transparent manner by mainstream institutional players” (RBI, 2016)⁵.

In this paper, we argue that for greater outreach and inclusivity of formal financial services, policymakers must ensure ‘meaningful’ access to a range of financial products and services to meet basic financial needs such as managing risks, smoothening consumption and creating wealth over a lifecycle. By ‘meaningful’ access, we mean not just ownership of financial products but also ease of accessing these products and services reliably and

⁴RBI’s thinking on defining financial inclusion has evolved with time. The RBI first articulated its definition of financial inclusion in the Committee on Financial Inclusion (2006), chaired by Dr. C. Rangarajan as ‘the process of ensuring access to financial services and timely and adequate credit where needed by vulnerable groups such as weaker sections and low-income groups at an affordable cost’. In the Committee on Financial Sector Reforms (2009), chaired by Dr. Raghuram G. Rajan, it defined financial inclusion as ‘universal access to a wide range of financial services at a reasonable cost. These include not only banking products but also other financial services such as insurance and equity products’. In 2014, RBI further revised its definition of financial inclusion in its Annual Report of 2013-14, which can be accessed [here](#).

⁵RBI’s Definition of Financial Inclusion as quoted by RBI Deputy Governor, 2016 can be found [here](#)

conveniently either through physical proximity of financial services from place of residence/workplace, or through digital modes or human-assisted models, depending on the requirements and circumstances of the individual or household. Additionally, access to financial services is irrelevant if these services are not being used by individuals. Therefore, we emphasise two key points: first, inclusive finance is about ‘access’ and ‘usage’ and second, inclusive finance refers to access to and usage of a range of products and not just a single financial product. This is an important nuance worth highlighting, as often the mainstream conversation around financial inclusion is restricted to ownership of bank accounts (ignoring usage of these accounts as well as ignoring ownership and usage of a whole range of products such as retirement accounts, health and life insurance, savings and investments in both risk-free and risky assets).

The objective of this paper is to contribute to the literature on the measurement of financial inclusion by creating a composite demand-side financial inclusion index (FII) using the Centre for Monitoring Indian Economy’s Consumer Pyramids Household Survey (CMIE-CPHS), a large-scale longitudinal survey of sample households that were surveyed repeatedly over time. We include dimensions pertaining to both access and usage across a range of products, thereby incorporating the multi-dimensionality of financial inclusion in our index. We contrast the results of the composite index with an index based solely on bank account ownership. We call this the ‘Bank- Financial Inclusion Index’ (Bank-FII) and make a case for the superiority of the Composite- Financial Inclusion Index (Composite-FII). We then validate the Composite-FII method by measuring financial inclusion at the state level for rural and urban regions separately, given the differential levels of financial development⁶ across states and regions. Using this method, the paper highlights gaps across dimensions (issues of access and use across a range of products) and regions (rural versus urban and state-wise differences), thereby, identifying areas of priority for strategic policymaking in financial inclusion.

We find that the bank-based index tends to overestimate levels of financial inclusion and presents an incomplete picture of financial inclusion, without incorporating access to and usage of a range of financial products. Differences in the levels of financial inclusion, when measured using the Composite-FII and Bank-FII, indicate that mere bank account ownership is not a strong proxy for complete financial inclusion. At an all-India level, financial inclusion in terms of access, usage and the overall FII scores, is higher for urban regions than rural regions. Rural geographies have a lower median and range of values for usage score than access score, while for urban geographies, the median for both access and usage scores remains the same. There are also considerable differences in the access and usage scores within and across states. A state-wise comparison of scores and rankings based on high and low performing states for rural and urban geographies, separately, shows disparities, indicating that levels of financial inclusion are not evenly spread across regions of states and require targeted efforts in increasing financial inclusion in underserved geographies. Comparing these rankings with the supply-side rankings shows a further mismatch, suggesting that increased supply of financial services is not a strong predictor of demand for formal finance. Finally, in terms of percentage contribution of various dimensions to the overall FII score both in urban and rural India, bank account

⁶Financial development is broadly understood as a multi-dimensional concept that includes measures of depth, access, efficiency and stability (Kumar and Baby, 2016).

ownership stands out as an important variable. Products that contribute the least to the overall FII score are risky assets (such as mutual funds, Demat and listed shares), health insurance and provident fund, suggesting the need for targeted efforts to increase the demand for and take-up of these products.

The rest of the paper is structured as follows. Section 2 lays out the rationale for using a demand-based index instead of a supply-based one, followed by research questions for this study. Section 3 describes the data and research methodology used for this analysis. Section 4 presents and discusses the results, and Section 5 concludes.

2. Financial Inclusion Index: A Supply Versus Demand-Side Approach

Financial inclusion is a multi-dimensional phenomenon, as has been noted prominently by Beck et al., (2007), Beck et al., (2009) and Chakravarty and Pal (2013). Therefore, its measurement too should reflect this multi-dimensionality. Using an index is, thus, a desirable way to measure financial inclusion given the different dimensions as well as the variation in these dimensions across geographical regions and over time (Chakravarty and Pal, 2013).

Chakravarty and Pal (2013) note that in order to capture a diversified picture of the financial system along various dimensions, it is important to “design a financial inclusion index that assesses a) the overall performance of the financial system in an economy in terms of financial inclusion, b) its dynamics and c) its variation across geographical regions”. Most indices and studies that measure financial inclusion use supply-side information such as branch penetration, number of credit/deposit accounts per population, etc., in a given area. A serious limitation of measuring financial inclusion using supply-side information is that not only can this result in overestimation of financial inclusion since an individual may hold multiple bank accounts, but it also remains opaque on the extent of usage of financial services (Mukhopadhyay, 2016).

There are three notable studies from India that use a supply-side approach to measure financial inclusion. Sarma (2008) uses three basic parameters to measure the performance of banking services: banking penetration (no. of bank accounts as a proportion of population), availability of banking services (no. of banking points of service per 1000 population), and usage of banking system (credit to GDP and deposit to GDP), and develops a cross-country multi-dimensional composite index of financial inclusion (IFI). Her methodology is similar to the methodology used by the United Nations Development Programme (UNDP) to compute the Human Development Index (HDI). The index score for any country is computed as the Euclidean distance from an ideal state of financial inclusion and lies between zero and 1, with higher index scores implying greater financial inclusion.

Building on Sarma (2008), Chakravarty and Pal (2013) construct a financial inclusion index using an axiomatic approach. The authors note that an “axiomatic approach entails formal definitions of important postulates of an index (that is, the axioms) and then identifies the index making use of such postulates”. Using this approach allows the authors to calculate the percentage contributions made by different dimensions to the overall level of financial inclusion. This, in turn, enables them to “identify the dimensions of inclusion that are more or less susceptible to overall inclusion and hence to isolate the dimensions that deserve attention from a policy perspective”.

Finally, Credit Rating Information Services of India Limited (CRISIL) has developed an annual financial inclusion index (the CRISIL Inclusix) using supply-side information. This is also based on the UNDP methodology for the calculation of HDI. Variables used for the CRISIL Inclusix 2018 index include branch penetration (no. of branches per lakh of population in a district), credit penetration (no. of loan accounts per lakh of population in a district), deposit penetration (no. of deposit accounts per lakh of population in a

district) and insurance penetration (no. of life insurance policies per lakh of population in a district). For each district, these parameters are normalised to a value between 0 and 100, after which each district's financial inclusion levels are evaluated as the Euclidean distance from the ideal state of all four parameters (100,100,100,100), and the inverse of the Euclidean distance renders the Inclusix score for that district.

Previous attempts to develop a financial inclusion index for India using demand-side information have primarily focused on dimensions such as reported access to bank accounts (where individuals in a household report if they have access to a bank account or not). However, these attempts fall short since they only take ownership of bank accounts into consideration, whereas households must have access to a wide range of financial products, namely, savings, investment, credit and insurance products tailored to their needs in order to smoothen consumption patterns via sustainable savings, future planning, building assets and risk mitigation (Brune et al. 2013; Cole et al. 2013; Dupas and Robinson 2013; Ruiz 2013). Therefore, the measurement of inclusivity of finance too should incorporate these dimensions.

Mukhopadhyay (2016) attempts to develop a composite state-level index for India that captures demand-side information in addition to supply-side information following the axiomatic approach developed by Chakravarty and Pal (2013). This work computes a composite score based on several dimensions of financial inclusion since the status of a particular state could be "quite good in one dimension of financial inclusion but not in another" (Chakravarty and Pal, 2013). Mukhopadhyay (2016) uses three dimensions of banking services to compute the composite index as follows: 1. Accessibility measured by the proportion of individuals reporting to have access to a bank account in a state 2. Usage measured by the proportion of individuals reporting to have ever used a bank account for any financial activity 3. Availability measured by the proportion of individuals who had access to a banking point of service within a kilometre of place of stay. Mukhopadhyay's approach does not, however, capture access and usage of products beyond bank account. Moreover, his analysis uses 'individual' as a unit of analysis, instead of 'household'. This could result in an inaccurate picture of the level of financial inclusion, as the financial lives, circumstances, levels of access to and usage of formal financial services of individual members within a household are likely to be intertwined.

We believe that a multi-dimensional demand-side index that quantifies both access to and usage of a suite of financial products and that captures the variation across socio-economic and geographical variation (across states, across urban and rural regions) will help to render a more holistic picture of the levels of financial inclusion in India.

2.1 Research Questions

We ask the following research questions in our study:

Question 1: Are there differences in the levels of financial inclusion when measured through the composite index versus the bank-based index?

- Our null hypothesis is that financial inclusion, when measured using a bank-based index, overestimates the actual levels of financial inclusion when compared to the composite index.

Question 2: Do rural geographies have lower levels of access to and usage of formal financial services compared to urban geographies at an all-India level?

- Our null hypothesis is that access to and usage of formal financial services in rural households across India is lower than in urban households.

Question 3: Are there differences in states' performance levels of attainment of financial inclusion by rural versus urban regions?

- Our null hypothesis is that access to and usage of formal financial services in rural households in a state is lower than urban households in the same state.

Question 4: Are there differences in states' ranking of financial inclusion as per the demand-side versus the supply-side index?

- Our null hypothesis is that state-wise rankings will differ when measured using the demand-side versus the supply-side index.

Question 5: Across various dimensions of financial inclusion, are there dimensions that play a larger role in influencing the overall financial inclusion score?

- Our null hypothesis is that bank account ownership is the most dominant factor in terms of percentage contribution to the overall financial inclusion score.

3. Data and Research Methodology

For our analysis, we use the Centre for Monitoring Indian Economy’s Consumer Pyramid Household Survey (CMIE-CPHS) dataset⁷. The CMIE-CPHS is a large-scale longitudinal survey of sample households surveyed repeatedly over time, allowing for a high-frequency portrayal of the living standards of Indian households. The survey was launched in January 2014. Each year’s data consists of three waves of data collection, wave 1 spanning January to April, wave 2 spanning May to August and wave 3 spanning September to December. In this paper, we use the CMIE-CPHS data for 2019, consisting of 1,74,405 households, with 36% of the sample comprising rural households and 64% of the sample comprising urban households. The CMIE-CPHS assigns weights to each household to make the data representative at the population level. Applying these weights produces a dataset covering approximately 306 million households (practically the entire population of India) across 28 states and Union territories⁸. Further, once weights are applied, 68% and 32% of the households covered are classified as rural and urban households, respectively⁹. Specifically, we examine the data on whether households have current savings, investments and outstanding borrowings across a variety of financial assets and liabilities, as well as household ownership of financial instruments.

The CMIE-CPHS enables us to examine the levels of household ownership of a range of financial products, including outstanding savings and investments across a spectrum of financial products and services such as bank accounts, health insurance, life insurance, risky investment products and outstanding borrowings from formal and informal sources of finance. Using this information, we develop a composite Financial Inclusion Index (FII) for each region (rural and urban) of the state that determines region and state-wise scores on access and usage, and assigns a total score based on 12 different dimensions.

3.1 Index Methodology

The axiomatic approach developed by Chakravarty and Pal (2013) lays out the following approach to developing a financial inclusion index (FII)

If there are n dimensions of the financial inclusion such that $n \geq 1$ and each dimension “ i ” refers to a “functioning” of a particular financial product or service, then the indicator of the performance of a state, both in rural and urban regions, in terms of dimension “ i ” can be computed using the following function:

$$A(x_i, m_i, M_i) = \left(\frac{x_i - m_i}{M_i - m_i} \right)^r \quad (1)$$

⁷Details about the CMIE-CPHS dataset can be found [here](#)

⁸CMIE-CPHS does not collect data from the following states and union territories- Arunachal Pradesh, Mizoram, Manipur, Nagaland, Andaman & Nicobar Islands, Dadra & Nagar Haveli, Daman & Diu, and Lakshadweep

⁹This data is based on the September to December 2019 wave of CMIE Household Assets and Amenities and People of India datasets. The coverage of CMIE has increased over time both in terms of number of households and the states and union territories that it samples, hence these figures show the latest data that has been used here for the analysis

where $i = 1, 2, \dots, n$ and r is a constant such that $0 < r < 1$; x_i denotes the level of attainment of a particular state in i and the lower and upper bounds of x_i are denoted by m_i and M_i respectively ($m_i < M_i$). $A(x_i, m_i, M_i)$,

A is continuous in its arguments, and r is the “inclusion sensitivity parameter” such that $A(x_i, m_i, M_i)$ increases as the value of r decreases for given values of x_i , m_i , and M_i . FII for a state can be computed by averaging individual indicators as given below:

$$FII(A(x_1, m_1, M_1), \dots, A(x_n, m_n, M_n)) = \frac{1}{n} \sum_{i=1}^n \left(\frac{x_i - m_i}{M_i - m_i} \right)^r \quad (2)$$

The FII as calculated above lie between 0 and 1, and higher FII values imply a better state of financial inclusion¹⁰.

For our analysis, we chose $n=12$ dimensions to measure access to financial services and 5 dimensions to measure usage of financial services. These dimensions are described as follows:

Measure of access to financial services:

1. Household ownership of at least one bank account (A1): The input for this dimension is the CMIE survey question that asks whether a member of a household holds a personal bank account in his/her name that s/he can access.
2. Household ownership of at least one health insurance (A2): The input for this dimension is the CMIE survey question that asks whether a member of a household holds a health insurance policy.
3. Household ownership of at least one life insurance (A3): The input for this dimension is the CMIE survey question that asks whether a member of a household holds a life insurance policy.
4. Household ownership of at least one employee provident fund account (A4): The input for this dimension is the CMIE survey question that asks whether a member of a household holds a provident fund account in his/her name.
5. Outstanding investment in a risk-free asset at a household level (risk-free assets comprise fixed deposit, Kisan Vikas Patra, national savings certificate, and post office savings account) (A5): The input to this dimension is the CMIE survey question that asks whether a household has any outstanding savings in the above-mentioned risk-free assets.
6. Outstanding investment in risky asset at a household level (risky assets comprise mutual funds, Demat and listed shares) (A6): The input to this dimension is the CMIE survey question that asks whether a household has any outstanding savings in the above-mentioned risky assets.
7. Access to formal borrowing (A7): The input to this dimension is the CMIE survey question that asks whether a household has any outstanding borrowing from a

¹⁰For further details on the properties of this index, refer to Chakravarty and Pal (2013)

formal source where formal sources include banks, self-help groups, microfinance institutions, and credit cards.

Measure of usage of financial services¹¹:

The input to the usage dimension is the CMIE survey question that asks whether a household has saved in the said financial product and borrowed from the said formal financial service provider in the last 120 days. For each usage dimension, we assign a value of 1 (0) to each household if they have used (not used) that particular product in the last 120 days. We repeat this exercise for all households for all three waves of 2019. We then add all the values for each household by each usage dimension. The maximum value a household can receive for a given product is 3, implying that they have used the product thrice a year, while the lowest value a household can receive for a given product is 0, implying that they have not used the product even once in a year. This method allows us to calculate the frequency of usage of a given product. We then create a binary variable that takes the value 1 if our frequency variable registers a number greater than 0 and 0 otherwise. The list of usage questions in the CMIE-CPHS dataset includes:

1. Household has saved in a risk-free asset at least once in the last one year (risk-free assets comprise fixed deposit, Kisan Vikas Patra, national savings certificate, and post office savings account) (A8): The input to this dimension is the CMIE survey question that asks whether a household has saved in the above risk-free assets in the last 120 days.
2. Household has saved in a risky asset at least once in the last one year (risky assets comprise mutual funds, Demat and listed shares) (A9): The input to this dimension is the CMIE survey question that asks whether a household has saved in the above risky assets in the last 120 days.
3. Household has saved or invested in life insurance at least once in the last one year (A10): The input to this dimension is the CMIE survey question that asks whether a household has invested in life insurance in the last 120 days
4. Household has saved or invested in the provident fund at least once in the last one year (A11): The input to this dimension is the CMIE survey question that asks whether a household has invested in the provident fund in the last 120 days.
5. Household has borrowed at least once in the last year from a formal source (A12): The input to this dimension in the CMIE survey question that asks whether a household has any outstanding borrowing from a formal source where formal sources include banks, self-help groups, microfinance institutions, and credit cards.

To calculate the percentage contribution of each dimension to the overall financial inclusion score, we use the following formula given as per Chakravarty and Pal (2013) :

$$\text{Percentage contribution of a dimension } i = \frac{A(x_i, m_i, M_i) * 100}{FII \text{ score} * n} \quad (3)$$

¹¹Measures of usage does not include dimensions of usage of bank account and usage of health insurance account as this data is not available in the CMIE-CPHS dataset.

As per the CMIE-CPHS dataset, each state is divided into one or more homogenous regions. A homogenous region (HR) is defined as “a cluster of neighbouring districts that share agroclimatic conditions, having relatively similar levels of urbanisation and female literacy compared to other neighbouring districts and all belong to the same state”. A homogenous region never crosses state (region) boundaries and belongs to one state (one region- either urban or rural). The survey selects samples from the rural and urban regions of each homogenous region.

For the purpose of our analysis, for each HR, we take the percentage of respondents who respond in the affirmative to the input survey questions for each of the twelve dimensions. We compute the state level minimum (m_i), maximum (M_i) and average (x_i) (i.e. the HR with the minimum percentage of respondents who respond in the affirmative, the HR with the maximum percentage of respondents who respond in the affirmative, and the average percentage of respondents who respond in the affirmative across all HRs, respectively) for each region (urban and rural) separately. We compute the A value using the formula in Equation (1). The value of the inclusion sensitivity parameter ‘r’ used is 0.5¹². Since the survey selects samples from rural and urban regions of each homogenous region, we compute FII scores for rural regions and urban regions of each state separately, using the formula in equation (2). For states having only one HR, we calculate the minimum, maximum and average values for each district (each HR comprises one or more districts). States/UTs with only one district, such as Puducherry, is dropped from the FII calculations. When there were instances of no data (NA) for certain HRs and/or districts, they are dropped in the FII computation o for that particular state and region. Given these data limitations, we are able to calculate the FII for a total of 24 states and UTs.

¹²We have not replicated the analysis using other values of ‘r’ because the relative ranking of states will remain the same for different values of ‘r’.

4. Results

4.1 Bank-based versus Composite Financial Inclusion Index

Figures 1 and 2 present the Financial Inclusion Index (FII) based on bank account ownership (referred to as Bank-FII), and a set of 12 indicators (referred to as Composite-FII), respectively. When we compare these two figures, we see that the Bank-FII scores for all-India-urban is 0.81, while the Composite-FII scores for the same region is lower at 0.61. The Bank-FII all-India-rural score is 0.84 compared to the Composite-FII score of 0.55 for the equivalent region. Thus, we see from these figures that there are disparities in financial inclusion when measured using the two approaches. These disparities are not small: there is a 20-point difference for urban geographies, and a 30-point difference for rural geographies.

A visual inspection shows that the median and range of Bank-FII scores both in rural and urban geographies is higher than Composite-FII scores. However, contrary to our expectations, the range of Bank-FII scores for rural geographies is higher than urban geographies, while as per the Composite-FII, the range of scores for rural geographies is lower than urban geographies. This leads us to believe that while bank account ownership is an important starting point in an individual or household's journey towards achieving financial inclusion, mere bank account ownership is not a strong proxy for measuring complete financial inclusion.

The emphasis on measurement of financial inclusion using bank account ownership could be attributed to two factors. One, the percentage of Indian adults with a bank account has increased from 35% in 2011 to 80% in 2017, as per the Global Findex Database¹³. Given the low levels of bank account ownership, to begin with, there is a greater emphasis on measuring financial inclusion through access to a bank account. Two, bank account ownership is viewed as a 'critical gateway' to access a range of formal financial products such as insurance, pensions, credit and investment accounts. While this could be true conceptually, the difference in the Bank-FII and Composite-FII highlights the gap in the reality about financial inclusion. This leads us to believe that the Composite-FII is a more realistic measure of financial inclusion than the Bank-FII.

¹³The Global Findex Database 2017 report can be found [here](#)

FIGURE 1: Bank-FII: Rural and Urban

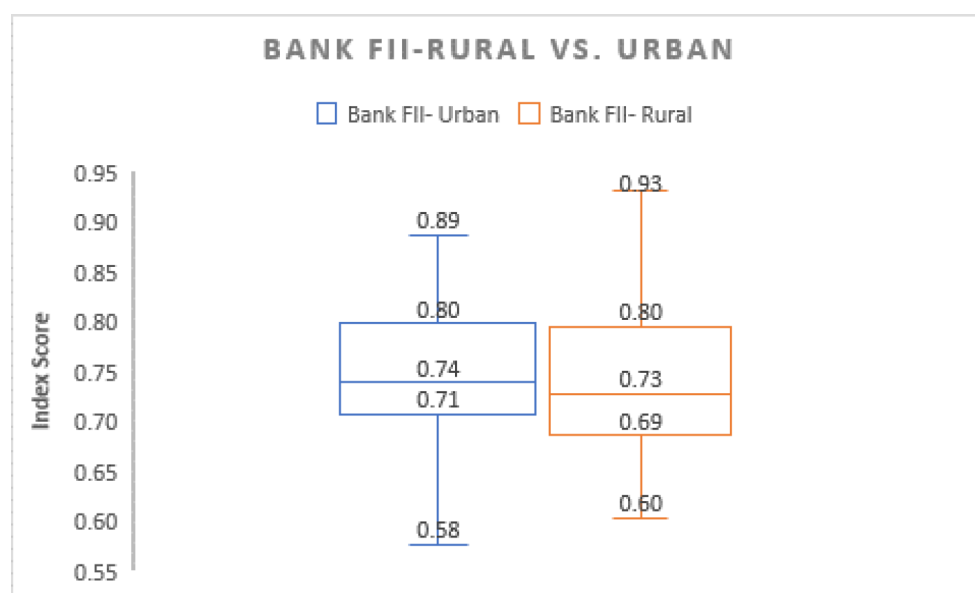
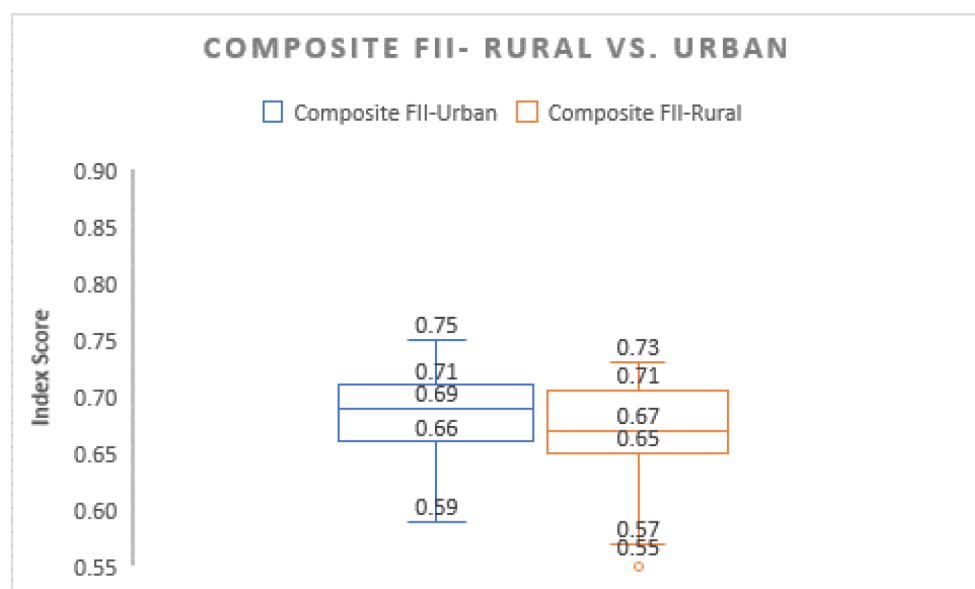


FIGURE 2: Composite-FII: Rural and Urban

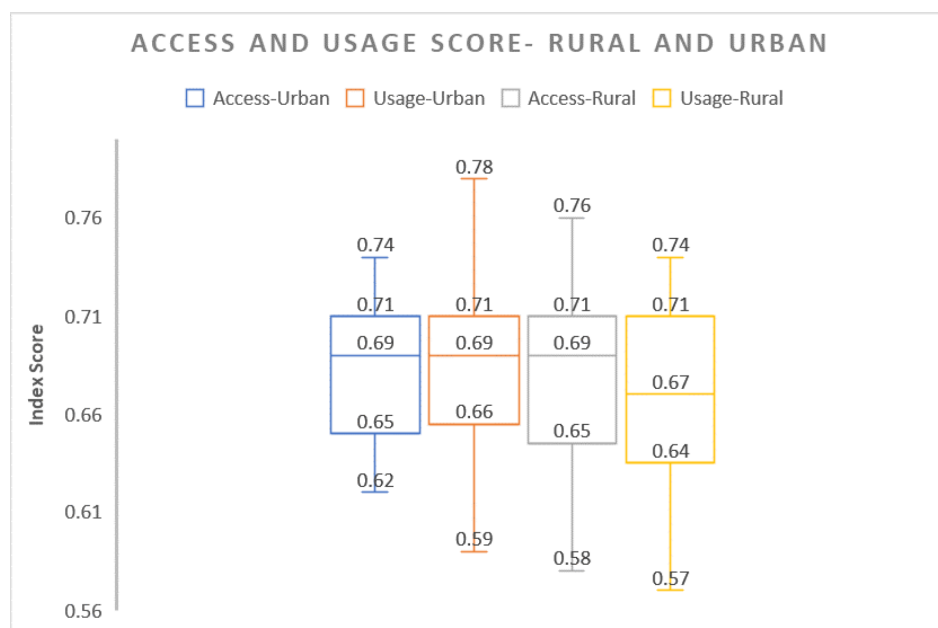


4.2 Comparison of Rural and Urban Financial Inclusion by Access and Usage

We next analyse our findings by disaggregating the Composite-FII score by access and usage. Figure 3 presents the access and usage score calculated separately. We expect the Composite-FII score for access to be higher than usage both in rural and urban areas. Our hypothesis is true for rural geographies with a lower median and range of values for the usage score compared to the access score. For urban geographies, however, the range of values is marginally lower for the access score compared to the usage score, although the median for both access and usage scores for urban geographies remains the same. There is a five-point difference in the all-India score for access between urban (0.63) and rural

geographies (0.58), and an eight-point difference in the all-India score for usage between urban (0.59) and rural geographies (0.51). There are also considerable differences in the access and usage scores within and across states (Table 2).

FIGURE 3: Access and Usage Score based on Composite-FII: Rural and Urban



4.3 Comparison of Rural and Urban Financial Inclusion by State

Figures 4 and 5 show the state-wise Composite-FII score for urban and rural geographies, respectively. In the case of urban geographies, Punjab and Assam have the highest score while Uttar Pradesh, Bihar, Jharkhand and Madhya Pradesh have the lowest score. In the case of rural geographies, Himachal Pradesh and Haryana have the highest score, while Maharashtra and Uttar Pradesh have the lowest score.

Figure 6 presents a two-by-two matrix of the performance of states across rural and urban geographies, measured by Composite-FII scores. We define a state as high (low) performing if their Composite-FII score is above (below) the median Composite-FII score. The top right quadrant refers to states that do well both in rural and urban areas. This quadrant includes Himachal Pradesh, Jammu & Kashmir, Rajasthan, Goa, Tripura and Odisha. The top left quadrant refers to states that do well in urban but poorly in rural geographies. This quadrant includes Assam, Telangana, Chhattisgarh, Delhi. The bottom right quadrant refers to states that do well in rural but poorly in urban geographies. This quadrant includes Andhra Pradesh, Uttarakhand, Bihar, Jharkhand. Finally, the bottom left quadrant refers to states that do poorly both in rural and urban geographies. This quadrant includes Maharashtra, Uttar Pradesh, Gujarat, Madhya Pradesh. States in this last category deserve the highest policy attention, followed by states in the top left quadrant, from the perspective of accelerating inclusive finance in rural geographies.

FIGURE 4: State-wise FII Score- Urban

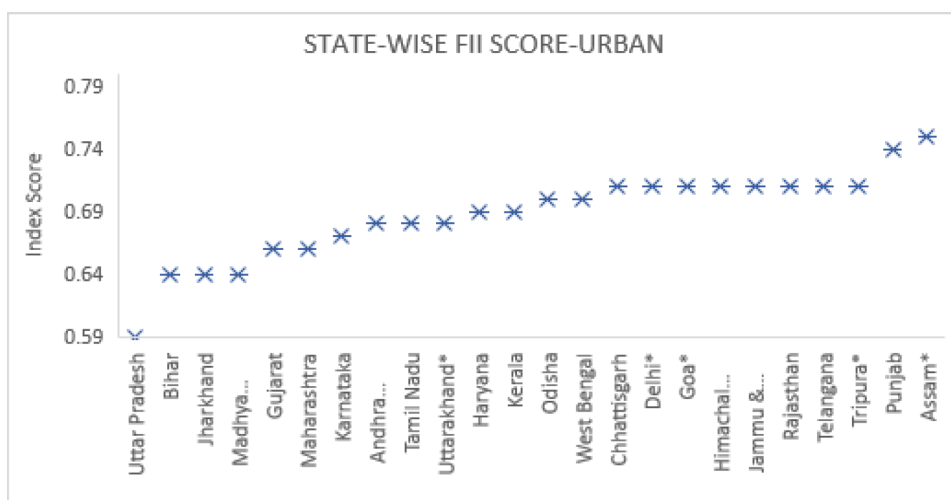


FIGURE 5: State-wise FII Score- Rural

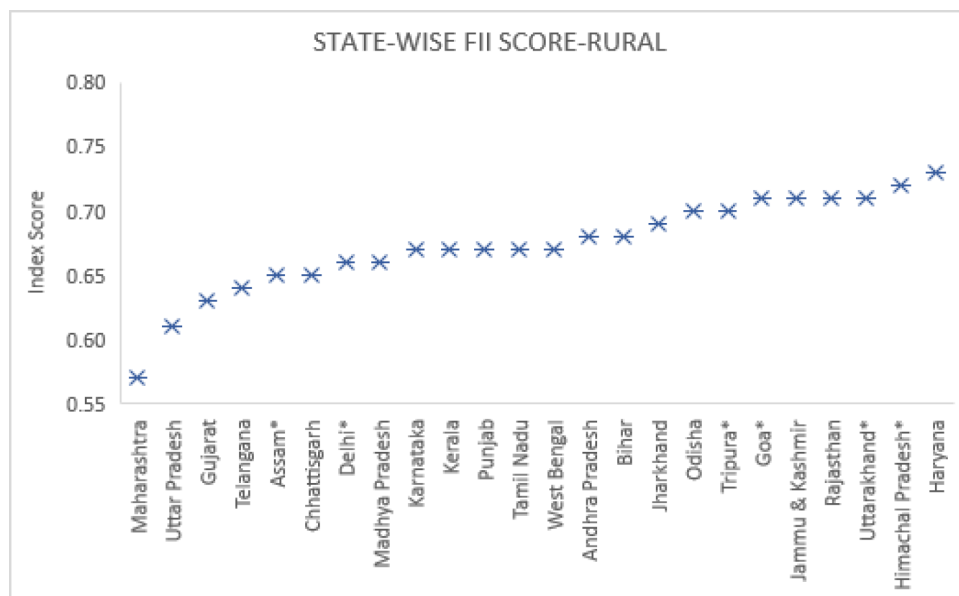
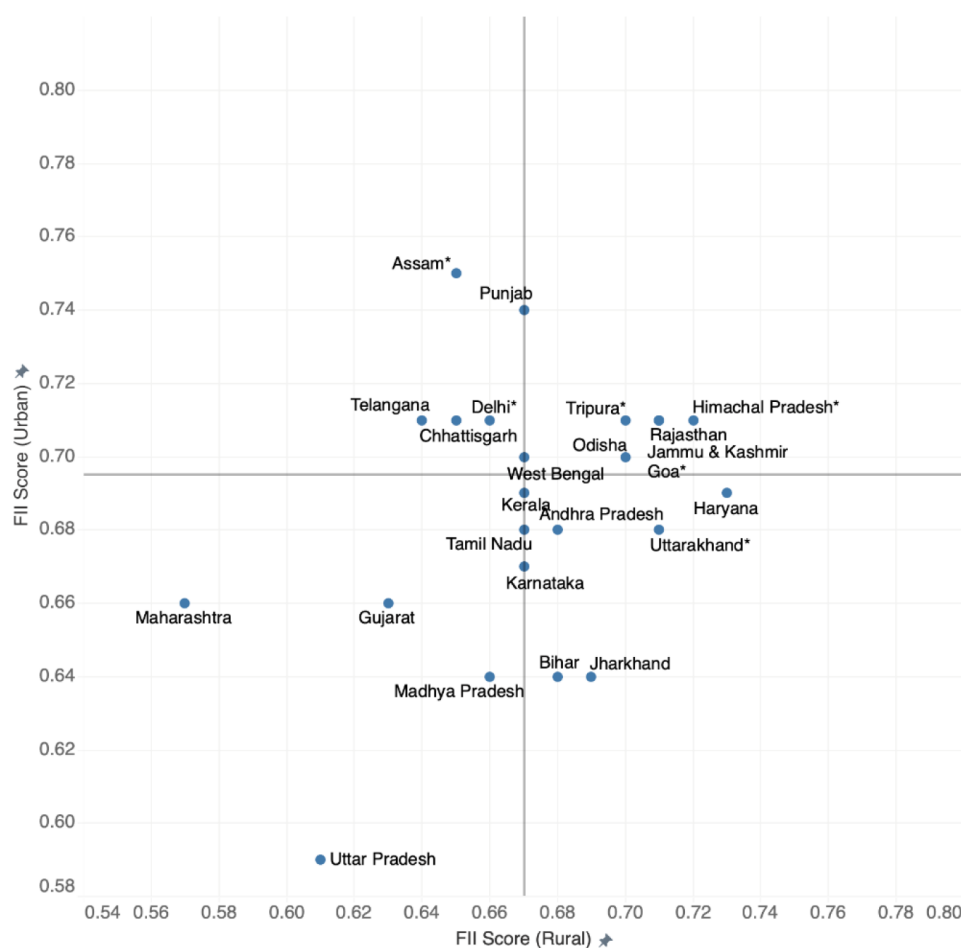


FIGURE 6: Two-by-Two Matrix of State-wise Rural and Urban Scores



4.4 Contribution of Dimensions to Measuring Financial Inclusion

We next evaluate which dimensions contribute the most to the overall levels of financial inclusion. This will allow us to “identify the dimensions of inclusion that are more or less susceptible to overall inclusion and hence to isolate the dimensions that deserve attention from a policy perspective” Chakravarty and Pal (2013).

We find that in terms of contribution towards access in, both urban and rural India, household ownership of bank account matters the most. One reason could be due to the Pradhan Mantri Jan Dhan Yojana (PMJDY) that has played a crucial role in expanding access to bank accounts. In some states, such as Karnataka, Odisha and Uttarakhand, household ownership of life insurance contributes the highest to the overall financial inclusion score.

We repeat the analysis for usage scores and see no major pattern emerge in urban India with fairly uniform contribution by each of the 5 usage dimensions. Urban regions of Gujarat, Madhya Pradesh, Haryana and West Bengal see a higher percentage contribution

to the overall usage score from the usage of life insurance and urban regions of Jharkhand, Karnataka, Kerala, Rajasthan and Uttar Pradesh from the use of the provident fund.

The picture is slightly different for rural India. The use of formal borrowing constitutes a dominant dimension towards the overall usage score in Andhra Pradesh, Bihar, Kerala, Madhya Pradesh, Meghalaya, Punjab and West Bengal. At an all-India level, the percentage contribution of dimensions of access to and usage of risky assets for both rural and urban India is lowest, followed by access to health insurance in urban India and access to and usage of provident fund in rural India. This suggests that policy initiatives in these dimensions could have a material and positive impact on financial inclusion in these regions.

4.5 Comparison with Supply-Side Financial Inclusion Index

In this section, we compare our findings with CRISIL Inclusix's supply-based financial inclusion index¹⁴ (hereafter referred to as 'Inclusix'). Inclusix was launched in 2013 with the objective of 'creating a dependable yardstick that would become a policy input to further the cause of financial inclusion'. For the purpose of our comparison with the composite demand-based FII score, we use data from CRISIL's latest Inclusix Report dated February 2018¹⁵.

In the previous section, we found disparity in financial inclusion across the rural and urban regions in different states. The rank correlation coefficient between the state ranks of rural and urban geography is as low as 0.15. A comparison of these ranks with the Inclusix ranks shows a similar disparity. The rank correlation coefficient between the composite FII-rural and Inclusix is 0.13, whereas the rank correlation coefficient between the composite FII-urban and Inclusix is slightly higher at 0.23.

A finding that is worth noting is the difference in the ranking of southern states by demand versus the supply-based index. In Inclusix 2018, the southern states feature in the top 5 rankings, whereas these states don't feature in the top five ranking (barring urban Telangana) either in the urban Composite-FII score or rural Composite-FII score (Table 3). Inclusix 2018 highlights a significantly higher penetration of deposit, credit, insurance and bank branches in southern regions as compared to remaining regions of the country, implying higher levels of availability of financial services in these regions and thereby higher scores. On the other hand, when measured from a demand-side perspective, some regions in the north such as urban Punjab, urban Assam, rural Himachal Pradesh and rural Haryana perform better in terms of access to, and active usage of financial services compared to southern states. Interestingly, three states that consistently receive very poor ranking across Composite-FII-urban, Composite-FII-rural and Inclusix are Gujarat, Uttar Pradesh and Maharashtra and therefore require targeted efforts in accelerating financial inclusion.

¹⁴CRISIL Inclusix February 2018, Volume 4 can be found [here](#)

¹⁵It is important to note a key caveat of this comparison, which is that while our Composite-FII was constructed using CMIE-CPHS data from 2019, the CRISIL Inclusix is based on 2016 data. While it is true that household portfolios have changed during this period (2016 to 2019), nevertheless, a comparison of states based on these two approaches lends an interesting perspective on the links between supply of and demand for financial services.

Overall, our results suggest that the supply of formal financial services is not a strong predictor of demand for these services and that there are other factors influencing demand for formal finance. While determinants of access to and usage of formal financial services are outside the scope of this study, recent research points us towards what these factors might be. Kamath et al., (2010) find a weak relationship between the levels of access to institutional finance (a proxy for supply of formal financial services) and the fraction of households that have outstanding debt (a proxy for demand for formal financial services). They find factors such as occupation, landholding, and other socio-economic factors to correlate strongly with the demand for formal financial services. Kumar et al., (2018) find that *“while availability of banking services has a significant positive effect on usage of formal financial services, its contribution in inducing households to use formal financial services is as small as 15% compared to the contribution of household factors (85%), such as education, income, employment status, gender and social norms”*.

Our findings suggest a further nuanced policy strategy to increasing financial inclusion in India. Financial inclusion can benefit by varying interventions by states, depending on the gaps across regions and products, rather than implement the same strategy for all states, as also noted by Kamath et al. (2010).

5. Conclusion

The motivation for this paper emerged from the need to arrive at a realistic measure of financial inclusion by capturing its multi-dimensionality. We go beyond the mainstream approach of measuring financial inclusion through bank account ownership and instead examine the levels of access to and usage of a suite of products, namely, bank accounts, saving and investment products, life and health insurance, provident fund and formal credit to arrive at a comprehensive measurement of financial inclusion that incorporates a range of products needed to meet the financial requirements of a household.

Given the multi-dimensionality of financial inclusion and the variation in these dimensions across regions and over time, we use an index-based approach to measure the levels of financial inclusion in rural and urban India. We use data from a nationally representative household survey; wherein households report details about their access to and use of a range of financial products and services. Given the nature of this dataset, our index, which we call the Composite- Financial Inclusion Index (FII), is therefore a demand-based index. We argue that this approach is methodologically stronger compared to a bank-based index that measures financial inclusion solely on bank account ownership. We also argue for the superiority of this method over a supply-based measurement of financial inclusion, which can result in an overestimation of the levels of financial inclusion owing to factors such as multiple accounts (bank or other financial products) held by the same individuals and inactive use of these accounts. While a supply-based measurement can be useful to assess the performance or progress of a financial system, a demand-based measurement is more appropriate when measuring the outreach and inclusivity of financial products and services.

We find that the bank-based index tends to overestimate levels of financial inclusion and presents an incomplete picture of financial inclusion, without incorporating access to and usage of a range of financial products. At an all-India level, financial inclusion in terms of access, usage and the overall FII scores, is higher for urban regions compared to rural regions. There are also considerable differences in the access and usage scores within and across states. A state-wise comparison of scores and rankings based on high and low performing states for rural and urban geographies, separately, shows disparities, indicating that levels of financial inclusion are not evenly spread across regions of states and require targeted efforts in increasing financial inclusion in under-served geographies. Comparing these rankings with the supply-side rankings shows a further mismatch, suggesting that increased supply of financial services is not a strong predictor of demand for formal finance.

Finally, in terms of percentage contribution of various dimensions to the overall FII score both in urban and rural India, bank account ownership stands out as an important variable. Products that contribute the least to the overall FII score are risky assets (such as mutual funds, Demat and listed shares), health insurance and provident fund, suggesting the need for targeted efforts to increase the demand for and take-up of these products.

Despite the granularity of the data used for this analysis, there are some caveats of our measurement that are worth highlighting. Firstly, data on the frequency of bank

account usage as well as usage of other products is not available. Secondly, while access is measured through ownership of various products and services as well as outstanding savings and investments across products, mere owning an account is a necessary but not a sufficient condition for ‘meaningful’ access. A household could own a bank account, yet may choose not to use it, due to various barriers to banking (Mowl and Boudot, 2014). Therefore, ownership of financial products could be an underestimate or overestimate of meaningful access.

Similarly, a household may not have an outstanding debt with a formal financial institution and yet could access formal credit if needed. Therefore, outstanding debt could be an underestimate of meaningful access to formal credit. These limitations are worth noting as they provide insights into how financial inclusion measurement could be further strengthened by collecting data that measures financial inclusion more accurately.

To the best of our knowledge, our study is the first attempt to measure financial inclusion in India using a comprehensive demand-side index, thereby incorporating the multi-dimensionality of financial inclusion. We believe that our measurement is conceptually sounder compared to previous attempts in this topic, that either use a supply-based measurement or use a narrow definition of financial inclusion, when conducting a demand-based assessment. Our intention is for these results and the said approach of measuring financial inclusion to be used by policymakers in order to identify gaps in inclusive finance across products and regions.

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Appendix- List of Tables

TABLE 1: Bank-Based versus Composite Financial Inclusion Index- Urban and Rural

State	Bank FII-	Bank FII-	Composite FII-	Composite FII-
	Urban	Rural	Urban	Rural
Andhra Pradesh	0.80	0.69	0.68	0.68
Assam	0.58	0.70	0.75	0.65
Bihar	0.72	0.75	0.64	0.68
Chhattisgarh	0.79	0.71	0.71	0.65
Delhi	0.62	0.74	0.71	0.66
Goa	0.71	NA	0.71	0.71
Gujarat	0.79	0.77	0.66	0.63
Haryana	0.60	0.81	0.69	0.73
Himachal Pradesh	0.71	0.93	0.71	0.72
Jammu & Kashmir	0.71	0.71	0.71	0.71
Jharkhand	0.80	0.76	0.64	0.69
Karnataka	0.75	0.78	0.67	0.67
Kerala	0.80	0.70	0.69	0.67
Madhya Pradesh	0.68	0.68	0.64	0.66
Maharashtra	0.78	0.83	0.66	0.57
Odisha	0.72	0.65	0.70	0.70
Punjab	0.74	0.60	0.74	0.67
Rajasthan	0.82	0.68	0.71	0.71
Tamil Nadu	0.80	0.87	0.68	0.67
Telangana	0.75	0.63	0.71	0.64
Tripura	0.71	0.80	0.71	0.70
Uttar Pradesh	0.89	0.78	0.59	0.61
Uttarakhand	0.63	0.72	0.68	0.71
West Bengal	0.74	0.68	0.70	0.67
All India	0.81	0.84	0.61	0.55

TABLE 2: Access and Usage Score- Urban and Rural

States	Access-Urban	Usage-Urban	Access-Rural	Usage-Rural
Andhra Pradesh	0.65	0.72	0.69	0.66
Assam*	0.74	0.78	0.66	0.64
Bihar	0.63	0.64	0.69	0.68
Chhattisgarh	0.69	0.73	0.60	0.74
Delhi	0.71	0.70	0.69	0.61
Goa	0.71	0.71	0.71	0.71
Gujarat	0.65	0.66	0.63	0.63
Haryana	0.64	0.75	0.76	0.70
Himachal Pradesh	0.71	0.71	0.73	0.71
Jammu & Kashmir	0.71	0.71	0.71	0.71
Jharkhand	0.65	0.62	0.69	0.70
Karnataka	0.69	0.65	0.69	0.65
Kerala	0.73	0.63	0.68	0.65
Madhya Pradesh	0.62	0.67	0.67	0.65
Maharashtra	0.66	0.66	0.58	0.57
Odisha	0.69	0.71	0.68	0.73
Punjab	0.74	0.75	0.65	0.68
Rajasthan	0.73	0.67	0.71	0.71
Tamil Nadu	0.69	0.68	0.71	0.63
Telangana	0.73	0.68	0.60	0.71
Tripura	0.71	0.71	0.71	0.67
Uttar Pradesh	0.62	0.55	0.64	0.58
Uttarakhand	0.68	0.69	0.72	0.68
West Bengal	0.70	0.70	0.68	0.67
All India	0.63	0.59	0.58	0.51

TABLE 3: Comparison of State-Ranking by Demand and Supply-side Index

States	Rank-FII Rural	Rank-FII Urban	Rank-CRISIL Inclusiv
Haryana	1	14	11
Himachal Pradesh	2	7	8
Rajasthan	3	5	17
Jammu & Kashmir	4	7	21
Goa	4	7	2
Uttarakhand	6	15	10
Odisha	7	12	13
Tripura	8	7	12
Jharkhand	9	23	19
Bihar	10	22	24
Andhra Pradesh	11	16	5
West Bengal	12	11	16
Tamil Nadu	13	17	6
Karnataka	14	18	4
Kerala	15	13	1
Punjab	16	2	9
Madhya Pradesh	17	21	18
Delhi	18	4	3
Assam	19	1	20
Chhattisgarh	20	6	22
Telangana	21	3	7
Gujarat	22	20	15
Uttar Pradesh	23	24	23
Maharashtra	24	19	14

Rank correlation coefficient between rural and urban FII- rank= 0.152
Rank correlation coefficient between FII-rural and CRISIL rank=0.131
Rank correlation coefficient between FII-urban and CRISIL rank=0.236

TABLE 4: Percentage Contribution of Dimension- Urban

State	Bank a/c access	Health insurance access	Life insurance access	Provident fund access	Risk-free asset access	Risky asset access	Formal borrowing access	Risk-free asset usage	Risky asset usage	Life insurance usage	Provident fund usage	Formal borrowing usage
Andhra Pradesh	10%	7%	8%	8%	7%	7%	8%	8%	9%	8%	9%	10%
Assam	6%	9%	8%	9%	8%	NA	8%	9%	NA	9%	8%	9%
Bihar	9%	8%	8%	7%	8%	9%	9%	8%	9%	8%	8%	9%
Chhattisgarh	9%	7%	9%	8%	7%	8%	8%	9%	8%	9%	7%	9%
Delhi	7%	9%	8%	8%	7%	10%	9%	8%	10%	8%	7%	8%
Goa	8%	8%	8%	8%	8%	NA	8%	8%	8%	8%	8%	8%
Gujarat	10%	9%	9%	8%	7%	8%	6%	8%	8%	10%	9%	7%
Haryana	7%	8%	9%	8%	7%	9%	7%	10%	10%	10%	9%	7%
Himachal Pradesh	8%	NA	8%	8%	8%	NA	8%	NA	NA	8%	8%	8%
Jammu & Kashmir	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%
Jharkhand	10%	9%	8%	8%	8%	8%	8%	8%	8%	8%	9%	8%
Karnataka	9%	9%	10%	10%	9%	6%	7%	8%	7%	8%	10%	7%
Kerala	10%	10%	8%	10%	10%	7%	8%	8%	7%	7%	8%	7%
Madhya Pradesh	9%	8%	8%	7%	8%	8%	8%	10%	8%	10%	8%	9%
Maharashtra	10%	8%	7%	7%	9%	7%	9%	9%	9%	8%	7%	9%
Odisha	9%	8%	9%	8%	9%	8%	8%	9%	8%	9%	7%	9%
Punjab	8%	9%	9%	8%	9%	8%	7%	9%	9%	9%	8%	7%
Rajasthan	10%	9%	9%	9%	9%	6%	8%	8%	7%	8%	10%	7%
Tamil Nadu	10%	7%	10%	7%	10%	7%	8%	10%	7%	9%	7%	8%
Telangana	9%	9%	9%	8%	8%	8%	9%	9%	8%	8%	7%	8%
Tripura	8%	8%	8%	8%	8%	NA	8%	8%	NA	8%	8%	8%
Uttar Pradesh	12%	6%	10%	9%	10%	8%	6%	7%	6%	9%	9%	7%
Uttarakhand	8%	7%	10%	7%	8%	9%	9%	8%	10%	9%	8%	8%
West Bengal	9%	9%	9%	8%	8%	8%	8%	8%	8%	9%	9%	8%
All India-Urban	11%	7%	10%	8%	11%	6%	8%	8%	5%	10%	8%	8%

TABLE 5: Percentage Contribution of Dimension- Rural

State	Bank a/c access	Health insurance access	Life insurance access	Provident fund access	Risk free asset access	Risky asset access	Formal borrowing access	Risk free asset usage	Risky asset usage	Life insurance usage	Provident fund usage	Formal borrowing usage
Andhra Pradesh	8%	8%	8%	8%	9%	9%	9%	7%	9%	6%	8%	10%
Assam	9%	7%	10%	6%	10%	NA	10%	10%	NA	8%	6%	8%
Bihar	9%	9%	9%	9%	8%	8%	6%	7%	7%	9%	9%	9%
Chhattisgarh	9%	9%	10%	9%	8%	0%	9%	9%	NA	9%	10%	9%
Delhi	9%	8%	8%	9%	9%	8%	9%	7%	7%	9%	9%	7%
Goa	NA	NA	8%	8%	8%	NA	8%	NA	NA	8%	8%	8%
Gujarat	10%	7%	8%	8%	8%	9%	8%	7%	10%	9%	8%	7%
Haryana	9%	9%	9%	9%	9%	8%	7%	8%	8%	8%	9%	7%
Himachal Pradesh	11%	6%	10%	7%	11%	NA	6%	8%	7%	9%	8%	9%
Jammu & Kashmir	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%
Jharkhand	9%	9%	9%	7%	9%	7%	7%	10%	8%	8%	7%	9%
Karnataka	10%	8%	9%	7%	9%	8%	9%	8%	9%	8%	7%	9%
Kerala	9%	8%	8%	8%	8%	9%	10%	8%	NA	8%	8%	9%
Madhya Pradesh	9%	7%	8%	7%	9%	10%	8%	8%	8%	8%	8%	9%
Maharashtra	12%	6%	8%	7%	10%	7%	8%	8%	9%	9%	6%	9%
Meghalaya	9%	8%	7%	9%	10%	NA	8%	8%	NA	7%	9%	9%
Odisha	8%	8%	9%	10%	7%	7%	8%	10%	8%	10%	7%	8%
Puducherry	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Punjab	8%	7%	8%	9%	9%	8%	9%	9%	7%	8%	9%	9%
Rajasthan	8%	8%	7%	8%	8%	9%	9%	9%	8%	9%	9%	7%
Sikkim	7%	9%	8%	9%	8%	NA	8%	8%	NA	8%	9%	7%
Tamil Nadu	11%	7%	9%	8%	10%	9%	7%	10%	8%	8%	7%	6%
Telangana	8%	10%	10%	9%	8%	0%	9%	11%	NA	10%	9%	8%
Tripura	10%	8%	9%	7%	8%	NA	10%	8%	NA	8%	8%	NA
Uttar Pradesh	11%	7%	9%	10%	9%	8%	8%	6%	10%	7%	9%	8%
Uttarakhand	9%	8%	9%	8%	10%	8%	6%	8%	NA	9%	8%	7%
West Bengal	8%	10%	8%	8%	7%	9%	8%	8%	8%	7%	8%	9%
All India- Rural	13%	8%	11%	7%	10%	5%	8%	8%	6%	9%	7%	8%