

# How Institutionalized is India's Rural Finance across Farm and Non-farm Households: A Public Policy Perspective

SIMRIT KAUR \*  
CHESHTA KAPURIA\*\*

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## Abstract

The present paper empirically examines the determinants of participation in institutional and non-institutional credit across farm and non-farm sector in Rural India. Multinomial Logistic Regression has been applied for categorizing households' participation in credit markets in the following four categories viz. Participation in only Institutional Credit (PIC), Participation in only Non-Institutional Credit (PNIC), Participation in Both Sources of Credit (PBC), and Participation in Neither Source of Credit (PNC). Both household and state-level determinants have been analysed as correlates of participation in credit markets. Household dataset is sourced from the Situation Assessment Survey (NSSO, 70<sup>th</sup> round), and state-level datasets from Basic Road Statistics 2016, Agricultural Statistics at a Glance 2016, Rainfall Statistics of India 2014, Database on Indian Economy RBI, 2013 and Census 2011.

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## I. Introduction

AGRICULTURE HAS AN important place in the Indian economy. It holds a substantial part of the Gross Domestic Product (GDP) 15 percent and employment (49 percent). The importance of this sector in India's economic and social fabric goes well beyond this indicator (GDP) due to its strategic importance to poverty reduction and food security. However, agriculture remains a risky enterprise as it is exposed to exogenous climatic shocks, production risks, and inadequate availability of inputs, credit, infrastructure, and technology leads to diminishing income in farming

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\* Principal, Sri Ram College of Commerce and Professor of Economics and Public Policy, Faculty of Management Studies, University of Delhi, University Enclave, Delhi 110007, INDIA

\*\* Senior Research (Ph.D.) Scholar, University of Delhi, Faculty of Management Studies, University Enclave, Delhi 110007, INDIA

(MAFW, 2015). One of the most characteristics of India's agrarian economy in the past decade is the persistence of agrarian distress in many regions and dependence on non-institutional credit sources. Due to this government has strengthened formal credit programs in India. It is often observed that the buoyancy in the agrarian sector is directly proportional to institutional credit availability, as capital availability is consequential in agricultural growth (Narayanan, 2016).

It has been widely recognised that rural households who have access to well-designed credit, savings and insurance services can avail the benefits of structured financing models<sup>1</sup> to generate income; investment in riskier but profitable enterprises along with diversified asset portfolios; can reach markets effectively; and can adopt efficient strategies to stabilize their food consumption (Zeller, Schrieder, Von and Heidhues, 1997; Mohan, 2006). Empirical studies show that agricultural credit favourably impacts agricultural growth in India (Binswanger and Khandker, 1995; Golait, 2007; Kumar, Singh and Sinha, 2010; Pandey and Suganthi, 2015; Narayanan, 2016; Bharti, 2018). Further, Kumar, Mishra, Saroj and Joshi (2017) and Ramakumar and Chavan (2014) highlight huge variability in accessing institutional credit in India as it is not scale-neutral. Thus, increasing farm credit may not necessarily help the small and marginal farmers as much as benefits the big farmers.

Though there have been several studies on accessibility and availability of agricultural credit and its relationship with the farm sector, yet the association with the non-farm sector remains largely unexplored. To proliferate access to institutional credit, it is essential to understand the interrelationship between the farm and non-farm sector and appreciate the overlaps and differences in socio-economic characteristics of the farm and non-farm economy prevailing in rural India.

Seventy percent of the income of rural households is derived from farm activities (NSSO, 2013). In India, over 85 percent farmers are small and marginal (owning less than 2 hectares land) but own only 47.3 percent of the cropped area (MAFW, 2018). Better credit facilities not only help farmers smooth out consumption but also increases the ability of risk-averse farmers to make agricultural investments (Binswanger and Khandker, 1995; Ito and Kurosaki, 2009). However, the risk of irregular rainfall, high cost of cultivation, lower prices for produce, and exorbitant prices for seeds, often leads to difficulties in repayment of loans. Climate change often attributed by rising temperatures and erratic rainfall patterns, has been projected as the major reason behind short-run crop failures and long-run production declines in both rain-fed and irrigated areas in rural India (Mohan, 2006; De and Vij, 2013; Burgess, Descheiu, Donaldson and Greenstone, 2014; Kaur and Kaur, 2016; Chuang, 2019). Hence, diversification into rural non-farm sector has the potential to mitigate risk and alleviate the low income of the farm sector (Kaur, Kulkarni, Gaihs and Pandey, 2010).

Non-farm activities range from informal activities such as small food-processing units, grocery shops, tea stalls, animal rearing to highly formal activities such as micro-enterprises, and financial services. The significance of non-farm income for rural households has steadily increased in India (Lanjouw and Lanjouw, 2001; Haggblade, Hazell and Reardon, 2010; Kaur, Kulkarni, Galha and Pandey, 2010; Himanshu, Lanjouw, Murgai and Stern, 2013; Nakajima, Keijiro and Yamano, 2018). In India, for an average rural household, the ratio of agricultural to non-farm income is 1 to 4.5, whereas for the poor households, it is only 1 to 0.75 (Lanjouw and Shariff, 2004; Kaur, Kulkarni, Galha and Pandey, 2010). The potential benefits of the non-farm sector are particularly helpful for small and marginal farmers as well as landless tenant farmers in the form of consumption smoothing<sup>2</sup> for dealing with exogenous agricultural shock (Kochar, 1999; Haggblade, Hazell, and Reardon, 2010). However, in the case of developing economies such as India, the absence of information about possible non-farm activities and credit availability acts as an obstacle for the development of this sector (Rajeev and Manojit, 2017).

The present paper examines the characteristics of the Farm Households (FHHs) and Non-Farm Households (NFHHs) in their participation in institutional credit across rural India. We use household data from NSSO'13 to explore whether there is a relationship between occupational structure and their preferred choice of credit source, viz. Institutional or Non-Institutional. Depending upon the participation in various types of credit, households have been classified in the following four mutually exclusive categories

- i. *Participate only in the Institutional source of credit (PIC)*: households participating in institutional source of credit only and not in non-institutional source of credit.
- ii. *Participate only in the Non-Institutional source of credit (PNIC)*: households participating in non-institutional source of credit only and not in institutional credit source.
- iii. *Participate Both in Institutional and Non-Institutional sources of credit (PBC)*: households which participate in both institutional and non-institutional credit market.
- iv. *Participate Neither in Institutional nor Non-Institutional sources of credit (PNC)*: households which do not participate in either institutional or non-institutional sources of credit. For the purpose of the present study, this group is considered to be financially excluded<sup>3</sup>.

The rest of the paper is organized as follows. Section II reviews the theories related to the farm, non-farm rural activities, and climate change. In section III, the characteristics of a household participating in different sources of credit are presented. Data and methodology are described in section IV. Section V analyses the correlates of credit (institutional and non-institutional credit) across the farm and non-farm households using both household and state-level determinants of participation. Section VI concludes the study with relevant policy implications.

## II. Theoretical foundation

It has been well recognised that rural economies are not entirely agricultural and farm households are increasingly earning a share of their income from non-farm activities (Lanjouw and Lanjouw, 2001; Haggblade, Hazell and Reardon, 2010; Kaur, Kulkarni, Gaiha and Pandey, 2010; Thapa, Gaiha, Kaur, Kaicker and Vashishtha, 2011). Due to constraints on farm expansion and spurt in the rural population, greater attention is being given to non-farm activities in view of their likely effect on economic development and poverty reduction. Amidst increasing land lessness, poor households depend upon part-time employment in the non-farm sector for their survival.

Several studies have stated multiple linkages between rural farm and non-farm activities (Lanjouw and Lanjouw, 2001; Haggblade, Hazell and Reardon, 2007; Gaiha and Imai, 2008; Himanshu, Lanjouw, Murgai and Stern, 2013) such as production linkages, both forward (agricultural goods) and backward (inputs); consumption linkages and potential linkages through capital and supply of labor. Two key factors that incentivize the households to diversify into the non-farm economy are 'demand-pull' and 'distress-push' (Thapa, Gaiha, Kaur, Kaicker and Vashishtha, 2011). Incentives that 'pull' include lower risks or higher payoffs from non-farm activities as compared to farm activities. Favorable capacity variables that enable households to diversify into rural non-farm activities include physical (size of land holding), human (level of education), financial (number of commercial banks), infrastructure (roads and irrigation), and social capital (caste and religion). Some of the incentives that 'push' include small or declining land size holding and exogenous climatic shocks such as rainfall (Kaur, Kulkarni, Gaiha and Pandey, 2010).

Climate change affects the profitability of agricultural production, thereby decreasing farm incomes (Thapa, Gaiha, Kaur, Kaicker and Vashishtha, 2011; Sadler, Millan, Arredondo, Swann, Vasileiou, Baedekar, Parizat and Mikulcak, 2016). Farmers often acclimatise to these climate shocks through income diversification (Chuang, 2019) and climate-smart agriculture<sup>4</sup> (CSA) practices. For financing the CSA, three pathways have been assessed namely direct (short term and long-term institutional loans), indirect (economic initiatives to support farm-household income and income diversification), and behavioural (incentive schemes to increase returns by climate-smart practices).

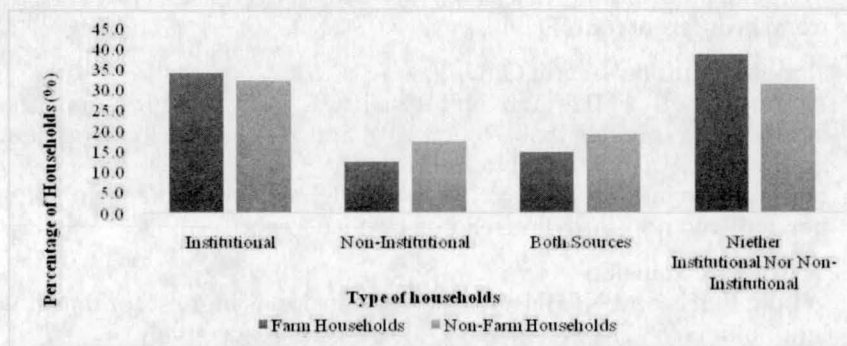
## III. Distribution of Households accessing different sources of credit

We analyse the characteristics of households participating in institutional and non-institutional sources of credit based on three important characteristics:

- i. Distribution of household types across activities, viz. farm and non-farm
- ii. Size of landholdings
- iii. Monthly household consumption expenditure

### 3.1 Distribution of Farm and Non-farm Households Across Occupational Structure

The distribution of households across occupational structure and participation in different sources of credit viz. institutional and non-institutional credit is presented in Figure 1.



Source: Based on SAS (70<sup>th</sup> NSSO), 2013

**Figure 1**  
**Occupational Structure and Participation in Institutional and Non-Institutional Credit**

Few pertinent observations based on figure 1 are:

- Institutional source of credit: Across FHHs and NFHHs, PIC is similar, varying between 30 and 35 percent, though marginally in favour of FHHs.
- Non-institutional source of credit: In general, FHHs participation in non-institutional credit is lower than for NFHHs (10 percent and 15 percent respectively).
- Both sources of credit: In general, FHHs participation in both sources of credit is lower in comparison to NFHHs (15 percent and 20 percent respectively).
- Neither source of credit: Close to 35 percent of the households in rural India remain financially excluded.

### 3.2 Land Size holding<sup>7</sup>, Occupational Structure, and Participation in Credit Markets

Land size has a significant role in enhancing agricultural households' participation in the formal credit market. Participation in formal credit is not scale-neutral. The relationship between land size and access to formal credit is positive (Kumar, Mishra, Saroj and Joshi, 2017). Land acts as collateral for borrowing by the farmer (Narayanan, 2016; Kumar, Mishra, Saroj and Joshi, 2017). Rural households with better resources have a higher probability of participating in formal credit compared to households with fewer resources. Following is the analysis based upon relative land size holding.

From Table I, some observations are as follows:

- i. Institutional Credit Only
  - Within FHHs, PIC is highest for marginal landholding (40.98 percent) followed by small landholding (26.04 percent). Landless (0.31 percent) have the lowest PIC.

- Within NFHHs, PIC is highest for marginal land holdings (82.45 percent) followed by medium landholdings (9.16 percent). Large landholdings have the least PIC (1.30 percent).
  - With respect to PIC, for FHHs, an increase in land size holding up to marginal land size increases PIC, thereafter it decreases. However, the trend is different for NFHHs.
- ii. Non- Institutional Credit Only
- Amongst both FHHs and NFHHs, PNIC is highest for marginal landholding (greater than 70 percent), and it is lowest for large land holding (less than or equal to 1 percent).
  - For landless landholding, PNIC is the highest across the farm (24.81 percent) and non-farm households (37.99 percent).
- iii. Financial Exclusion
- Within FHHs and NFHHs, financial exclusion is highest for marginal landholders (68.75 percent and 77.30 percent, respectively).
  - Rather surprisingly, financial exclusion is lowest for landless land size holdings (1.51 percent) in the farm sector, whereas it is lowest for large landholdings (0.06 percent) in the non-farm sector.

**Table I**  
**Occupational Structure, Land size holding and Participation in Institutional and Non-Institutional Credit (%)**

Size holding	Institutional	Non-Institutional	Both Sources	Neither Source
<b>Farm Households</b>				
Landless	0.31 (9.51)	2.05 (24.81)	0.59 (7.83)	1.51 (57.79)
Marginal	40.98 (23.23)	71.72 (16.26)	45.57 (11.40)	68.75 (49.12)
Small	26.04 (40.36)	16.66 (10.33)	26.07 (17.83)	16.12 (31.49)
Medium	25.10 (47.43)	8.56 (6.47)	24.56 (20.48)	10.76 (25.62)
Large	7.57 (58.27)	1.00 (3.09)	3.20 (10.88)	2.86 (27.75)
All	100 (32.23)	100 (12.91)	100 (14.22)	100 (40.63)
<b>Non-Farm Households</b>				
Landless	3.22 (14.62)	16.75 (37.99)	1.24 (3.45)	8.57 (43.94)
Marginal	82.45 (33.36)	74.46 (15.04)	65.49 (16.29)	77.30 (35.31)
Small	3.88 (12.52)	7.20 (11.59)	14.98 (29.71)	12.68 (46.18)
Medium	9.16 (45.81)	1.29 (3.23)	14.02 (43.13)	1.39 (7.83)
Large	1.30 (31.26)	0.30 (3.67)	4.27 (63.36)	0.06 (1.71)
All	100 (30.84)	100 (15.4)	100 (18.96)	100 (34.81)

**Note:** Figures in parentheses are the row percentages.

*Source:* Authors representation based on Situation Assessment Survey, NSSO'13

### 3.3 Monthly Household Consumption Expenditure, Occupational Structure, and Participation in Credit Markets

In this section, we provide descriptive statistics to analyze the distribution of FHHs and NFHHs for PIC and PNIC across their respective Monthly Household Consumption Expenditures (MHCE)<sup>8</sup>. Bonferroni multiple-comparison test has been applied to test the significance of differences in MHCE. MHCE is used as a proxy for income levels.

Pertinent observations based on Table II are as follows:

- One-way ANOVA results suggest that there is a significant difference in the mean MHCE across all types of credit categories amongst both

FHHs and NFHHs. For farm sector, households that do not participate in either institutional or non-institutional source of credit are the poorest (with an average MHCE at ₹ 5500), followed by households that PNIC only (with an average MHCE at ₹ 5631). For non-farm sector, households that PNIC are the poorest (with average MHCE at ₹ 6259), followed by households that do not participate in either institutional or non-institutional source of credit (with average MHCE at ₹ 6653).

- MHCE is highest for FHHs that participate in institutional credit (with average MHCE at ₹ 7503) and for NFHHs that participate in both sources of credit (with average MHCE at ₹ 8949).
- Further, MHCE for NFHHs participating in institutional credit is higher (with average MHCE at ₹ 7711) vis-a-vis FHHs (with average MHCE at ₹ 7503).

Table II

**Occupational Structure, Monthly Household Consumption Expenditure and Participation in Institutional and Non-Institutional Credit (₹).**

Household Type	Mean	Std.Dev.	Min	Max
<b>Farm Household</b>				
Institutional Sources	7503	14073	750	461500
Non-Institutional Sources	5632	4143	450	113900
Both Sources	6829	8415	1000	1228000
Neither Source	5501	3822	405	357500
<b>Non-farm household</b>				
Institutional Sources	7711	5175	2000	51200
Non-Institutional Sources	6259	4257	1490	33000
Both Sources	8949	23181	2000	313800
Neither Source	6653	4119	1135	35500

Source: Authors representation based on Situation Assessment Survey, NSSO'13

#### IV. Research Design

In section III, we provide the methodology adopted and the data utilized in the present study.

##### 4.1 Methodology and Model Specification

The household's decision to participate in credit is conceptualized as categorical. First, a household decides on whether to participate in any source of credit or not. After this initial decision, households choose to borrow (participates) from institutional, non-institutional, or both sources of credit. Thus the polychotomous nature of the decision leads to the application of the multinomial logit model. For our study, the multinomial logit model is used to assess the determinants of PIC and PNIC across the FHHs and NFHHs in rural India. For this purpose, households participation in financial credit has been categorized under the following four categories:

- i. Participate only in the Institutional Source of credit (PIC)
- ii. Participate only in the Non-Institutional Sources of Credit (PNIC)
- iii. Participate both in Institutional and Non-Institutional Sources of Credit (PBC)
- iv. Participate Neither in Institutional nor Non-Institutional Sources of Credit (PNC)

The multinomial logit model (Greene, 2003) is specified as

$$P[Y_i = j] = \frac{e^{\beta_j x_i}}{\sum_{k=1}^4 e^{\beta_k x_i}}, j = 1, 2, 3, 4 \quad (1)$$

where,  $j = 1, 2, 3, 4$  refers to the type of a household based on participation in different types of sources of credit. The estimated equations provide a set of probabilities for  $j + 1$  choices for a decision-maker with characteristics  $x_i$ . Following Greene (2003), out of the four choices, only three parameter vectors are needed to determine all the four probabilities. The probabilities of the model are given by

$$P[Y_i = j | x_i] = P_{ij} = \frac{e^{\beta_j x_i}}{1 + \sum_{k=1}^J e^{\beta_k x_i}}, \text{ for } j = 1, \dots, J, \beta_o = 0 \quad (2)$$

The paper applies  $j = 4$  as the omitted group, which represents the reference category (PNC) for our econometric analysis. Since  $\hat{\alpha}$  coefficients in this model are difficult to interpret (Greene, 2003), we compute the marginal effects corresponding to  $j = 1, 2, 3$  as

$$\delta_j = \frac{\partial P[Y_i = j]}{\partial x_i} = P[Y_i = j][\beta_j - \beta]; j = 1, 2, 3, 4 \quad (3)$$

Thus, every sub-vector of  $\beta$  enters every marginal effect, both through the probabilities and through the weighted average that appears in  $\delta_j$ . These values can be computed from the parameter estimates. Standard errors are computed using the delta method. The model estimated is:

$$Q_{ij} = \alpha + HH_i \beta + S_i \gamma + \theta_{ij}$$

where,  $Q_{ij}$  Probability of household participating in different sources of credit  $j$  (where  $j = 1$  to 4).

$\beta, \gamma$  represent a set of marginal estimates for the corresponding set of explanatory variables viz.  $HH_i$  and  $S_i$  respectively.

$HH_i$  is a vector of household-level characteristics such as the size of the household and caste to which the household belongs.

$S_i$  is a vector of state-level characteristics such as irrigation, financial penetration, and rainfall deviations.

$\theta_{ij}$  is the random error term assumed to be independently and identically (i.i.d.) distributed with constant variance.

The estimated multinomial logit equations provide a set of probabilities for the various choices for a decision-maker with a given set of characteristics. Following Greene (2003), out of the four choices, only three parameters are needed to determine all the four probabilities. Greene (2003) also suggests that only the marginal effects (and not the coefficients) are meaningful indicators of the impact of the given set of characteristics on the probabilities of interest.



#### 4.2 Data

Variables used in the study have been explained in Appendix 1. Data sources for estimating the determinants of source of credit by farm and non-farm rural households will primarily be as follows

- *Household-level characteristics*: The study uses household data from a nationally representative decennial survey conducted by the National Sample Survey Office (NSSO) in 2013. It is divided amongst three schedules, namely: land and livestock holdings, debt and investment, and situation assessment survey of agricultural households. For our study, we have worked on the Situation Assessment Survey (SAS). The unit of measurement is the sample 'household'. The survey covers 4,529 villages spread across the country and collects information from 35,200 rural households. The information has been collected primarily for the agricultural year 2012–2013.
- *State-level characteristics*: The study uses state-level variables categorized as physical infrastructure, financial development, and exogenous climate shocks. These are explained as follows:
  - *Physical Infrastructure*: This includes two variables, namely *road density*, and *irrigation*, to capture infrastructure. Road density has been measured by road density per 1000 population, which is total surfaced road per 1000 population. The data for total surfaced road is from Basic Road Statistics, 2016, and the population is from Census, 2011. Irrigation is measured as Area (Million Hectares) under Irrigation, which is the proportion of the irrigated area. It has been sourced from Agricultural Statistics at a Glance, 2016.
  - *Financial Development*: Financial development has been captured by the number of Scheduled Commercial Bank branches in a state in 2013 per 1000 population. It has been sourced from Database on Indian Economy, RBI, and Census, 2011.
  - *Exogenous Climatic Shocks*: Exogenous Climatic Shocks as measured by rainfall deviations due to climate change, have also been analysed. Climate change induces higher temperatures, which leads to lower and erratic rainfall and thereby increasing the number of 'dry days'<sup>5</sup>. Rainfall deviations have been measured by percentage variation from the normal<sup>6</sup> rainfall based on the rainfall records for the period from 1951–2000 for a state. Rainfall data for the states has been taken from Rainfall Statistics of India, 2013.

#### V. Results

The marginal effects<sup>9</sup> of FHHs and NFHHs are summarized in Table V. The association between household and state-level variables with the participation in various sources of credit across FHHs and NFHHs are hereby explained

##### 5.1 Households: Socio-demographic variables

- *Household Head: Female headed farm households* have a negative and significant relationship with PIC and PBC. This could be due to service

delivery or product features not attuned to serve their borrowing requirements. For *Female non-farm headed households*, there is a negative and significant relationship with PNIC.

- Age: For *farm households*, as the age of a household increases, PIC only, as well as PBC increases. However, the effect of age increases at a diminishing rate. For *non-farm households*, a non-significant relationship with respect to different sources of credit has been estimated.

### 5.2 Education

- For *farm households*, higher levels of education have been estimated to significantly increase the probability of PIC, while decreasing the probability of PNIC.
- For *non-farm households*, while similar trends exist, they generally remain non-significant.

### 5.3 Caste

- For *farm households*, in general, the Scheduled Tribes (STs) have been estimated to have a lower probability of participation in different sources of credit, be it institutional, non-institutional, or both. However, Scheduled Castes (SCs) have a lower probability of PIC and a higher probability of PNIC. On the contrary, OBCs have a significantly higher probability for non-institutional credit with reference to the base category 'General'.
- For *non-farm households*, our results indicate that STs, SCs, and OBCs have a lower probability of PIC, with reference to the base category 'General'.

### 5.4 Religion

- For *farm households*, Muslims have a lower probability of PIC. For non-farm Muslim HHs, the probability of participation is significantly lower for both *institutional and non-institutional* sources of credit.
- For both *farm and non-farm households*, in general, the Sikh community has a significantly lower probability to PIC and participation in both 'institutional and non-institutional source of credit', with reference to the base category of 'Hindu'.

### 5.5 Land size holding

- For both *farm and non-farm sector*, higher land holdings have a favourable impact on PIC and an adverse effect on PNIC.

### 5.6 Household size

- For *farm households*, in general, household size of up to 8, has a significantly higher probability of PIC. However, for *non-farm households*, impact of household size in accessing credit remains non-significant.

### 5.7 Monthly household consumption expenditure

- In FHHs, an increase in the consumption expenditure has been estimated to have a favourable effect on PIC. Further, the relationship strengthens with an increase in consumption expenditures. However, for *non-farm households*, the said relationship is significantly positive only for

**Table III**  
**Correlates of Farm and Non-Farm household's Access to Sources of Credit**  
**(Multinomial Logit Marginal Effect Estimates)**

Dependent variable	PIC		PNIC FHHs		PBC		PIC		PNIC NFHHs		PBC	
	ME	(SE-value)	ME	(SE-value)	ME	(SE-value)	ME	(SE-value)	ME	(SE-value)	ME	(SE-value)
Explanatory variables												
F_head	-0.038***	(0.013)	0	(0.01)	-0.027***	(0.009)	-0.057	(0.054)	-0.115**	(0.045)	0.032	(0.057)
Age	0.007***	(0.001)	-0.003**	(0.001)	0.004***	(0.001)	0.008	(0.006)	0.007	(0.007)	-0.003	(0.005)
Age*Age	-0.000***	(0)	0	(0)	-0.000***	(0)	0	(0)	0	(0)	0	(0)
Education level (Rc=illiterate)												
Primary	0.052***	(0.008)	-0.035***	(0.006)	-0.015**	(0.006)	0.005	(0.034)	-0.025	(0.033)	-0.009	(0.028)
Middle	0.085***	(0.009)	-0.056***	(0.008)	-0.006	(0.007)	0.049	(0.037)	-0.034	(0.036)	-0.035	(0.033)
Secondary	0.083***	(0.01)	-0.085***	(0.01)	-0.019**	(0.008)	0.043	(0.042)	-0.159***	(0.053)	-0.058	(0.038)
Higher secondary	0.094***	(0.011)	-0.114***	(0.011)	-0.031***	(0.009)	0.043	(0.041)	-0.062	(0.045)	-0.073*	(0.037)
Social group (Rc=General)												
ST	-0.051***	(0.011)	-0.022**	(0.01)	-0.091***	(0.01)	-0.201**	(0.083)	0.048	(0.061)	-0.043	(0.061)
SC	-0.019*	(0.011)	0.030***	(0.009)	0.006	(0.009)	-0.104**	(0.044)	0.055	(0.042)	0	(0.035)
OBC	0.01	(0.007)	0.013**	(0.007)	-0.003	(0.006)	-0.069***	(0.027)	0.029	(0.032)	-0.033	(0.025)
Religion (Rc= Hindu)												
Muslim	-0.037***	(0.013)	0.014	(0.01)	-0.014	(0.011)	0.032	(0.035)	0.037	(0.035)	-0.132***	(0.042)
Christian	-0.045	(0.041)	-0.009	(0.03)	-0.069*	(0.041)	1.134	(81.014)	-1.94	(239.122)	-1.267	(199.420)
Sikh	-0.069***	(0.021)	0.045**	(0.022)	-0.177***	(0.017)	-0.313***	(0.105)	0.082	(0.124)	-0.184**	(0.086)
Others	-0.033	(0.038)	-0.053*	(0.03)	0.01	(0.029)	0.548	(36.152)	0.272	(26.669)	-1.622	(111.852)
Landholding (Rc=landless)												
Marginal	3.515***	(0.557)	0.949	(0.092)	5.683***	(1.227)	0.086*	(0.045)	-0.127***	(0.033)	0.166***	(0.051)
Small	6.018***	(0.97)	0.862	(0.091)	9.340***	(2.043)	0.144***	(0.053)	-0.184***	(0.056)	0.199***	(0.056)
Medium	8.038***	(1.373)	0.904	(0.124)	13.158***	(3.001)	0.217***	(0.084)	-0.334*	(0.174)	0.321***	(0.073)
Large	8.020***	(2.009)	0.924	(0.289)	14.091***	(4.342)	2.055	(256.221)	-1.202	(678.077)	1.43	(178.847)
Household size (Rc=Household 1)												
HS 2	0.040**	(0.019)	0.002	(0.02)	-0.01	(0.016)	-0.029	(0.071)	0.128	(0.129)	-0.002	(0.066)
HS 3	0.031*	(0.018)	0.01	(0.02)	-0.017	(0.015)	-0.024	(0.068)	0.123	(0.128)	-0.048	(0.064)
MHCE (Rc = MHCE 1)												
MHCE 2	1.356***	(0.081)	1.238***	(0.073)	1.358***	(0.101)	0.002	(0.04)	-0.023	(0.047)	0.04	(0.033)
MHCE 3	1.527***	(0.094)	1.230***	(0.078)	1.690***	(0.127)	0.058	(0.041)	-0.090**	(0.046)	0.029	(0.031)
MHCE 4	1.669***	(0.103)	1.143**	(0.077)	1.763***	(0.134)	0.073*	(0.042)	-0.155***	(0.046)	0.104***	(0.035)
MHCE 5	1.691***	(0.111)	1.032	(0.08)	1.483***	(0.123)	0.042	(0.042)	-0.136***	(0.049)	0.106***	(0.037)
Road density	0.007*	(0.004)	-0.006**	(0.003)	0	(0.004)	0.029*	(0.015)	-0.039***	(0.013)	-0.011	(0.014)
Irrigated area	0.054***	(0.021)	-0.092***	(0.016)	0.023	(0.018)	0.108	(0.087)	-0.203***	(0.076)	-0.057	(0.068)
Exogenous Climatic shocks	0.133***	(0.018)	-0.048***	(0.016)	0.051***	(0.015)	0.042	(0.08)	-0.079	(0.085)	-0.032	(0.067)
SCB	1.465***	(0.125)	-0.05	(0.114)	2.746***	(0.098)	2.202***	(0.54)	-0.539	(0.63)	1.654***	(0.47)
Observations	20,231		20,231		20,231		1,089		1,089		1,089	

**Notes:** \*\*\*, \*\*, \* refer to significance at the 1%, 5% and 10% level, respectively.

ME = Marginal Effect (dy/dx).

Source : Self Computed

Figures in the parentheses are the Standard error values.

Definitions of the variables are given in Appendix 1

institutional sources of credit for the higher quintile classes.

- Additionally, for *both farm and non-farm households*, MHCE has been estimated to have a significantly higher effect on accessing both ‘institutional and non-institutional source of credit’.

### 5.8 State variables

- *Road density per 1000 people*: For *both farm and non-farm households*, improvement in road density significantly increases the probability of PIC, while significantly lowers the probability of PNIC.
- *Irrigated area per hectare*: For *farm households*, improvement in irrigation has a significantly higher probability of PIC. Further, access to irrigation significantly lowers the probability of PNIC across the *farm and non-farm households*.
- *Exogenous Climatic Shocks*: For the farm sector, higher deviations in the rainfall have been estimated to increase the probability to PIC and both ‘institutional and non-institutional credit’. Our findings are consistent with the previous study by De and Vij (2013), which shows that PIC is increased in (low rainfall) drought years as compared to non-drought years. Further, rainfall deviations lower the probability of PNIC. However, for *non-farm households*, the impact of rainfall deviations in accessing credit remains non-significant.
- *Commercial banks per 1000 population*: For both FHHs and NFHHs, in general, the commercial bank branches have a higher probability of PIC, as well as, in both ‘institutional and non-institutional credit’. The corresponding estimates for PNIC remain non-significant across farm and non-farm sectors.

## VI. Conclusions and Policy Implications

The study examines the relationship between participation in credit (institutional and non-institutional) across rural Indian households’ and their respective occupational category, viz. farm and non-farm. Multinomial Logistic Regression is applied on primary household-level data (NSSO, 2013) to test the relationship between participation in various sources of credit and their respective occupational categories controlling for variables such as social group, religion, household consumption expenditure, education, land size, physical and financial infrastructure, and exogenous climatic shocks. Findings suggest a significant exclusion in the PIC across both FHHs and NFHHs. Further, non-farm households have lower PIC vis-à-vis farm households. Our econometric results indicate that, in general, for both type of households (farm and non-farm), factors such as MHCE, land size holding, road density, and penetration of scheduled commercial banks influence the probability of PIC favourably. On the other hand, factors such as being socially disadvantaged and belonging to minority religious groups, lowers the probability of PIC for both FHHs and NFHHs in rural India.

The financial system in India has witnessed significant policy developments for the expansion of institutional credit in the agriculture sector. Some of the policy initiatives include the nationalization of banks in

1969 and 1980<sup>10</sup>, the establishment of Regional Rural Banks (RRBs) in 1975, the National Bank for Agriculture and Rural Development (NABARD) in 1982, Kisan Credit Card<sup>11</sup>(KCCs) in 1998, and the recently promulgated Pradhan Mantri Jan Dhan Yojana<sup>12</sup> (PMJDY) in 2014. Together, these policies have shaped and strengthened the evolution of the financial system landscape in India. Ideally, the influence of such measures should have manifested greater financial inclusion. However, the empirical findings from our study suggest that institutional credit is still not widely accessible to FHHs (35 percent) and NFHHs (30 percent). In this context, the following five aspects that impact the relevance of PIC are discussed: (a) socio-economic structure of households (b) education and awareness (c) financial infrastructure support (d) physical infrastructure support and (e) mitigating climate change impacts. These are briefly described below:

- i. *Socio-economic structure of Households*: Discriminative socialization is prevalent amongst the disadvantaged castes and religion as their PIC remains low. A majority of these disadvantaged borrowers consist of lower castes (SCs and STs) and backward castes (OBCs), ethnic and religious minorities (Sikhs, Muslims, and Christians), women, marginalised farmers, and landless laborers. These groups have lower PIC and hence, participate in only non-institutional credit (primarily, moneylenders). Moneylenders, often exploit them by charging exorbitant rates of interest, thereby leading to a vicious debt cycle. Government initiatives such as Microfinance Institutions, creation of Sa-Dhan<sup>13</sup> Community Development Finance Institutions, NABARD Tribal Ministry, and Joint Liability Groups<sup>14</sup> (JLG) are steps in the right direction.
- ii. *Promoting Education and Awareness*: Education is critical for increasing awareness regarding benefits of formal credit markets in rural areas. Low levels of general education (limited literacy or numeracy) act as a barrier in dealing with financial service providers. In this context, policies such as the Right to Education Act, Sarv Siksha Abhiyan, Rashtriya Madhyamik Shiksha Abhiyan, Mid-day meal schemes, and providing better water and sanitation facilities at school shall help improve education, thereby influencing PIC favourably. Poor knowledge of financial products and their processing costs, along with their timelines, hinders financial inclusion. Establishment of Agri-clinic, Agri-business, Kisan call centers, and Agricultural Extension Education institutes at sub-national levels can provide awareness about several advantages of institutional credit policies, products and programmes, and modern farm techniques, thereby making participation in credit markets more informed.
- iii. *Financial Infrastructure Support*: The availability of better banking facilities aid to overcome the obstacle of low PIC for rural households. Several noteworthy initiatives adopted by the government, such as Jan Dhan Yojana, Basic Saving Bank Deposit (BSBD), simplified Know Your

Customer norms, compulsory opening of branches in unbanked villages, business correspondents (BCs)<sup>15</sup>, and Kisan Credit Cards have helped in achieving financial inclusion goals. Besides reforming the rural formal financial institutions, complementary services, such as targeted training programs, better awareness about the formal credit lending agencies and financial products, reduction of transaction costs, and linkages to urban markets, could further enhance efforts to expand the sector's PIC.

- iv. *Physical Infrastructure Support:* Our findings corroborate the positive influence of infrastructure (roads and irrigation) on institutional credit for rural households. Better roads lower the transaction costs of credit services, resulting in increased lending to farmers, rising demand for agricultural inputs and thereby, increasing the crop yields. Indian rainfed agriculture is vulnerable to erratic availability of water due to climate changes. The pattern and amount of rainfall directly affects yields and the level of production of crops. The impacts are comparatively more adverse in unirrigated (rainfed) lands than in irrigated areas. Development of irrigation systems is not only essential for raising productivity levels and achieving food security but also to address climate-induced agricultural uncertainties. Our results support that higher investments in irrigation promote participation in formal credit markets. Several Government initiatives have been adopted, such as Pradhan Mantri Gram Sadak Yojana, Pradhan Mantri Krishi Sinchai Yojana, and Micro Irrigation schemes, to provide infrastructure aid to the farmer. With several policies in place, the immediate requirement is to further strengthen and widen the programs through public and private sector either independently or in public-private partnerships (PPPs) to connect the rural households to institutional finance.
- v. *Mitigating Climate Change Impacts:* The imprint of climate change is manifested in increasing the frequency of extreme weather outcomes and rainfall extremities. Climate change is expected to lower agricultural productivity, thereby impacting annual agricultural incomes, which are expected to reduce by 15 to 18 percent (Economic Survey, 2017-18). Volatility in income exacerbates loan repayment capacities of agricultural households (Thapa, Gaiha, Kaur, Kaicker and Vashistha, 2011; Sadler Millen-Arredonde, Swann, Vasileiou, Baedeker, Parizat and Mikulcak, 2016; Chuang, 2019). Hence, formal credit agencies often shy away from lending to these households (Ruete, 2015) and thereby lowering their PIC. Access to formal financial services, such as credit, savings, and insurance, can only build resilience to these exogenous climatic shocks through consumption smoothening. It is even more crucial in the adoption of mitigation and adaptation measures, and subsequent upscaling of CSA practices (Ruben, Wattel and van Asseldonk, 2019). In view of expected adversities pertaining to exogenous climate change, Fasal Bima Yojana, Soil Health Management, the National Innovations on Climate Resilient Agriculture, Climate Change and Sustainable Agriculture: Monitoring, Modelling, and Networking, the National Adaptation and the Climate Change Fund, and the State Action Plan on Climate Change are policy initiatives in the right direction.

To conclude, our results suggest that for non-farm households, PIC remains lower than for farm households. Though several policies have been initiated, yet close to 35 percent households, do not participate in credit markets in rural India. There is a long way to go before rural India gets financially empowered. Fortunately, government policies are steps in the right direction.

### Notes

1. The Indian Government, through the Agriculture Commercialization Enterprise (ACE) Programme in 1994, developed an innovative program with a provision of agribusiness finance and use of organised finance to agribusiness and small holder agriculture.
2. In developing countries, agriculture still remains a risky economic activity, better credit facilities can help farmers smooth out their daily or short-term expenditure and, therefore, increase the willingness of risk-averse farmers to take risks and make agricultural investments (Binswanger and Khandker, 1995).
3. For the purpose of our paper, Financial Exclusion implies that households do not borrow money from either institutional or non-institutional sources of credit. However, this is not to say that they do not have bank account.
4. Climate-smart agriculture is a system designed to improve food security and rural livelihoods and to support climate change adaptation and mitigation effort.
5. Dry days means days with less than 0.1 mm rainfall.
6. Long Period Average (LPA) popularly known as normal rainfall, is the average rainfall received by India during the south-west monsoon, for a 50-year period. The current LPA is 89 cm, which is according to the average rainfall over years 1951 and 2000. This acts as a benchmark against which the rainfall in any monsoon season is measured.
7. For the purpose of our study, land size holding is categorized into 5 classes, namely landless (<0.02ha), marginal (0.02-2.00ha), small (2.01-4.00 ha), medium (4.01-10.00 ha) and large (More than 10.00 ha).
8. 1 USD = ~ 70 INR
9. Results of coefficient estimates representing relative risk ratio and model statistics can be provided on request.
10. 14 major commercial banks were nationalized in 1969 and six in 1980 in India.
11. Kisan Credit Card (KCC) offers credit to the farmers other than marginal farmers in two types viz, Cash Credit and Term Credit.
12. PMJDY is an initiative aimed at indirectly lowering social hurdles towards access towards banking services to all the households in India.
13. Sa-Dhan's mission is to build the community development finance in India to better serve low-income households, particularly the marginalized segment, in both rural and urban India, in their quest for establishing stable livelihoods and improving quality of life.
14. JLG consists of an informal group of min 4 (max 20) who are engaged in similar occupation, formed with the purpose of availing loan through the group mechanism against mutual guarantee.
15. Business Correspondents (BCs) are retail agents engaged by banks for providing banking services at an unbanked location services at low cost. They are instrumental in promoting financial inclusion.

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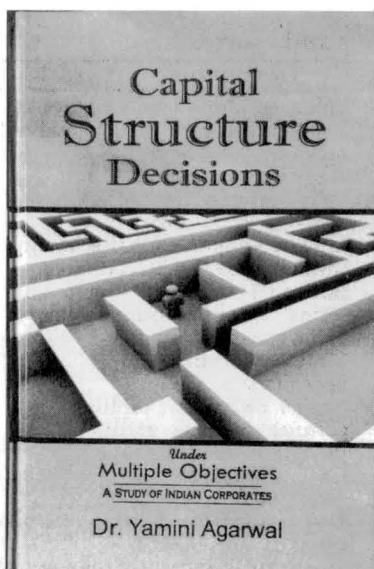
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**Appendix I**  
**Variables names, definitions and sources**

Variable code	Variable name	Description
F_hhead	Female Household Head.	The head of the family is female. The Base category: Male household head.
Age	Age	Age of the household head
Reference category: Illiterate	Illiterate	Below primary level of education
Primary	Primary education	Literate without formal schooling: through EGS/NFEC/AEC, through TLC, others; literate with formal schooling: below primary, primary education.
Middle	Middle school	Middle education
Secondary	Secondary education	Secondary education
H_secondary	Higher secondary & above	Higher Secondary, diploma/certificate course, graduate, postgraduate and above.
Reference category: Others	General	Unreserved caste
ST	Scheduled Tribe	Disadvantaged tribe as a reserved category
SC	Scheduled Caste	Disadvantaged caste of the country
OBC	Other Backward Classes	A collective term used by the Government of India to classify castes which are socially and economically disadvantaged. It includes religions like Jainism, Buddhism, Zoroastrianism, others.
Religion: Others	Others	Landless households
Reference category: Hindu	<0.02ha	
Reference category: Landless	0.02-2.00ha	Size of the land between 0.02 hectares and 2 hectares.
Marginal.	2.01-4.00 ha	Land between 2.01 hectares and 4 hectares.
Small	4.01-10.00 ha	Land between 4.01 hectares and 10 hectares.
Medium	More than 10.00 ha	Land more than 10 hectares.
Large	The size of the household is 6 or less	1 = The size of the household is 6 or less (Reference category) 2 = The size of the household is >4-<83 = The size of the household is 12 or more
HS 1 ,2, 3		
MHCE 1, 2,3,4,5	Monthly Household Consumption Expenditure 1, 2,3 and 5 respectively	1 = lowest quintile class (20 percentile) (Reference category) 2 = 20 quintile class (40 percentile) 3 = 30 quintile class (60 percentile) 4 = 40 quintile class (80 percentile) 5 = highest quintile class (100 percentile)
Road density	Road density	Total surfaced road density per 1000 population
Irrigated area	Irrigated area	Area (million hectares) under irrigation
Exogenous Climatic	Rainfall recorded in State	Percentage rainfall from average rainfall based on 1951-2000. (Deviations)
SCB	Scheduled Comm. bank	A commercial bank accepts deposits, provides loans, and offers investment products per 1000 people.



## Capital Structure Decisions under Multiple Objectives : A Study of India Corporates

### Contents

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### Endorsed by :

Prof. Franklin Allen ; Prof. Raj Lyengar;  
Dr. Renyong Chi and Prof. Yochana Shachmurove

### About the Author

Prof. Yamini Agarwal, Ph.D. (IIT Delhi), SBM (SIDA Sweden), M. Com. (Delhi School of Economics, MBF (Indian Institute of Finance), B.Com Honours (SRCC, University of Delhi)



Prof. Agarwal is currently working as Director and Professor of Finance, BVIMR, Delhi. She is Professor of Economics and Finance, Indian Institute of Finance. She had also served as Director, IIF Business School. She has done her Ph.D. on Capital Structure Decision under Multiple Objectives : A Study of Indian Corporates from IIT, Delhi. She has two international books to her credit published by John Wiley & Sons (Singapore & USA) and IIF Publications (India). She has 38 Research Papers and 57 Book Reviews published in international and national refereed journals. She has supervised over 78 MBA level dissertations. She has developed 79 Case Studies in Corporate Finance and Managerial Economics. She has also presented 12 research papers in international and national conferences and seminars. She is also on the referee and review board of several well known publishers. She is also Associate Editor of Finance India. She is Regional Council Members of the Indo American Chambers of Commerce. She has delivered seminars at Central Banks and National Universities of different countries. She has travelled over 22 countries as part of the international academic collaborations. She is on the editorial board of the journal Sub-Saharan Review of Economics and Finance Paris, France. She has a research bent of mind. Her areas of interest are Corporate Finance and Valuations, Micro and Macroeconomic Perspective on Global Issues, Security Analysis and Portfolio Management. She appears frequently for her expert views as an economist on All India Radio, TV, Magazines and National Dailies.

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