Determinants of Agricultural Credit in Rural India by Social Group

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Karthick V[1] and Madheswaran S[2]

Abstract

Despite the increase in the supply of formal credit to agriculture, the post-reform period in India witnessed an enormous gap between households' credit access. Although the decreasing share of wealth and resources affect farmers adversely in access to credit, there are also other social and economic factors involved, and understanding them is equally important in access to credit. Therefore, this study aims to analyse the trends and determinants of formal agricultural credit in India by using AIDIS data. Both the Probit and Heckman's selectivity bias-corrected-OLS models are employed to analyse the determinants of access to credit, and amount of credit respectively. The study results find that social status, land size, irrigated area, asset values, and education levels of the heads of households influence the formal agricultural credit they receive. This result exemplifies that the government needs to revamp the existing credit policies to make access to credit more inclusive.

Keywords: agricultural credit, wealth inequality, caste and class, determinants of credit, selectivity bias.

Introduction

As long as agriculture is considered as the primary sector of any economy, credit is crucially important to procure various inputs to produce agricultural outputs (Conning and Udry, 2007). Credit empowers farmers to move on to a superior production frontier, so that with minimum inputs, they can produce the maximum output (Narayanan, 2015) and it also reduces the risk and uncertainty of their dependence on the weather by helping them to use their resources efficiently (Carter, 1989). Credit is considered as an effective mechanism to enhance the production and consumption activity of the households (Zeller, M, 1993; Robinson, 2001; Armendariz and Morduch, 2005; Conning and Udry, 2007; Swain *et al*, 2008). Hence, accessing the credit in agriculture boosts the well-being of agricultural households (AHH) as well as the economy of the state. Before formal lending came to exist in India, informal lenders used to charge an usurious interest rate for low amounts of credit, thus causing many farmers to end up as agricultural labourers. In 1954, the first All India Rural Credit Survey Committee (AIRCSC) was constituted by the Reserve Bank of India (RBI) to study the rural credit issues in India. The Government of India (GoI) has since executed many policies and programmes to improve AHHs' access to formal credit. Such policies include the nationalisation of the large commercial banks (1969 and 1980), establishment of Regional Rural Banks (1975) and the National Bank for Agriculture and Rural Development (1982), the Special Agricultural Credit Plan (1994–1995), Kisan Credit Cards (1998–

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1999), the Doubling Agricultural Credit programme (2004), the Interest Subvention Scheme (2010–2011), and the Pradhan Mantri Jan Dhan Yojana (2014). As a result, in India, access to formal credit is positively correlated with agricultural productivity and household income (Binswanger and Khandker, 1992; Carter, 1989; Carter and Weibe, 1990; Pitt and Khandker, 1996; Khandker and Farooqui, 2003; Bhalla and Singh, 2010; Awotide *et al,* 2015; Narayanan, 2015).

However, as a predictor of economic outcomes and having influence on occupation and employment (Thorat and Attewell, 2007; Madheswaran and Attewell, 2007; Ito, 2009; Prakash, 2015), income and expenditure (Deshpande, 2000), and capital (Kijima, 2006), caste also can influence access to credit in agriculture in India. Unlike in other countries, caste is an enclosed entity of class (Ambedkar, 2004). Therefore, both caste and class can affect access to credit among AHHs. Some studies have reported that forward caste (FC) households have the advantage of access to credit over their other caste counterparts such as OBC, SC, and ST (Kumar, 2013a; Kumar *et al*, 2015; Rao, 2018; Karthick and Madheswaran, 2018; Karthick and Madheswaran, 2020). Some other studies have reported that large farmers have the advantage of access to credit over other landholders such as medium, semi-medium, small, and marginal (Vaidyanathan, 2006; Jeromi, 2007; Singh *et al*, 2008; Posani, 2009; Mohanty, 2013; Karthick and Madheswaran, 2018; Karthick and Madheswaran, 2020). This unequal access to credit within farming communities can affect the production and livelihoods, and thereby it reduces the importance of policies and programmes to improve AHHs' access to formal credit. Thus, this unequal access has a negative impact when it comes to reducing both economic and social inequalities in the country. In this background, this article examines the accessibility and determinants of agricultural credit in rural India.

The next section (2) makes a brief review of the literature to contextualise the study. Sources of data and econometric methodology are described in section 3. Section 4 explains the AHHs' shares, trends, assets, and credit status respectively. The results of the econometric model are explained in section 5. Finally, section 7 concludes with the way forward for policy implications.

A Brief Review of the Literature

Numerous works of literature have observed that access to credit is influenced by both demand and supply-side factors. The supply of formal credit to agriculture has declined substantially in recent years. During 2017-18, only 59% of formal credit was supplied to the agricultural sector against the target of Rs. 10 lakh crore (GoI, 2018). Such low supply might adversely affect marginal and small farmers' access to credit as their bargaining power and creditworthiness is much lower than that of large farmers. In his study, Mehrotra (2011) had identified that the share of marginal and small farmers' share in agricultural credit had declined. The reason could be the large farmers' influence on the credit market (Kumar, 2013a; Karthick and Madheswaran, 2018; Karthick and Madheswaran, 2020), bank bureaucracy (Kumar, 2013a), and the possible nexus between large farmers and bank bureaucracy. At the sub-bank level, commercial banks reportedly do not discriminate against caste (Kumar, 2013a), but the cooperative banks do as they are prone to capture by large farmers (Kumar 2013a). However, Jodhka (1995), Rao (2018), and Karthick and Madheswaran (2020) have revealed that both commercial and cooperative banks discriminate against SCs and STs in access to credit from formal sources.

Besides this, unfavourable demand factors also can reduce access to credit among both marginal and small farmers. About 86% of marginal and small farmers are affected by the rapid marginalisation of landholdings (NSSO, 2013). Due to these fewer endowments, these farmers are less likely to access the credit than large farmers in spite of their high agricultural productivity (Chand *et al*, 2011). Some studies show that access to credit is influenced by asset holdings, marital status of the household head, distance to the credit market and geographical locations (Duy *et al,* 2012; Karthick and Madheswaran, 2018; Karthick and Madheswaran, 2020), age of farmers, membership of a social group, education of the household head, and nature of the credit market (Karthick and Madheswaran, 2018; Karthick and Madheswaran, 2020), land-owning status (Duy *et al,* 2012), and irrigated area (Kumar, 2013a; Karthick and Madheswaran, 2018; Karthick and Madheswaran, 2020). As the majority of the marginal and small farmers belong to SCs and STs (Dev, 2012), certainly, their access to agricultural credit depends on their caste (Omvedt, 1978; Rudra, 1978; Gough, 1980; Jodhka, 1995; Drèze *et al,* 1997; Pal, 2002; Burgess and Pande*,* 2005; GoI, 2007; Kumar, 2013a; Kumar *et al,* 2015; Prasad, 2015; Rao, 2018; Umanath *et al,* 2018), and class (Sarap, 1990; Jodhka, 1995; Drèze *et al,* 1997; Rao, 2017; Rao, 2018). To the extent, access to credit can be affected due to gender identity also (Rajeev *et al,* 2011). Further, studies of Sarap (1990), Drèze *et al* (1997), Sahu *et al* (2004), Kumar (2013a), Kumar *et al* (2015), Karthick and Madheswaran (2018), Karthick and Madheswaran (2020) have identified that the FCs' amount of credit is more than that of non-FCs. Thus, the influence of caste on access to credit is clear and strong. Only a few studies have analysed the determinants of access to credit and amount of credit together (Sahu *et al,* 2004; Kumar, 2013a; Umanath *et al,* 2018). However, these studies have not given much focus on the caste influence in access to credit and the amount of credit. Hence, our study is engaged in analysing the determinants of agricultural credit and the amount of credit together in rural India.

Sources of Data and Econometric Methodology

Sources of Data

This study employed the recent three waves of All India Debt and Investment Survey (AIDIS) such as 48th (1992), 59th (2003), and 70th (2013) waves, a unit-level data of NSSO. While descriptive analysis was used in all three rounds to make a comparative study between FCs and non-FCs, econometric analysis was used only in the 70th round to analyse the determinants of access to credit. The entire analysis of this study covers only Hindu religious AHHs as their proportion is the largest (about 90%) in India. Also, the Constitution of India forbids the social category classification in minority religions under Articles 29 to 30 and 350A to 350. Therefore, in many states, this classification of social categories creates chaos at least in the caste-based research. Hence, the sample size of AHHs belonging to only Hindus are 25,491 (48th), 41,487 (58th),and 31,162 (70th). However, the interpretation of the 48th round results have certain limitations as classification of religion as well as the OBC category doesn't exist in this particular round. Technically, both religious and OBC groups are added to the NSSO survey questionnaire from 1999-2000. Until then, the social group 'Others' had captured non-SCs/STs information in the survey. Therefore, for the year 1992, the result of OBC is included in FCs, and results provided for all social groups are irrespective of religion. In our study, **AHHs** mean households that

possess an area of irrigated crop, unirrigated crop, orchards and plantation crop, forest crop, and aquaculture purpose. **Agricultural credit** means credit of previously unpaid and currently received loans used for both current and capital expenditure in agriculture.

Econometric Methodology

The determinants of agricultural credit can be estimated using a sub-sample of the households who have access to credit. Therefore, employing non-linear regression models is conceptually preferable when the outcome variable is dichotomous as well as their estimated results are asymptotically consistent and efficient over linear probability models. Hence, we have employed the Probit model to study the determinants of access to credit. Since access to credit is a binary choice model (access to credit = 1, otherwise = 0) involving estimation of the probability of access to credit (y) as a function of a vector of explanatory variables (x), it is assumed that there is an underlying response variable y_i^*. Where,

$$y_i^* = \beta' x_i + u_i \qquad \text{.. (1)}$$

However, practically, y_i^* is unobservable.Hence, the observable dummy variable is (y). Where,

$$y = 1 \; if \; y_i^* > 0 \; (access \; to \; credit)$$

$$= 0 \; otherwise \; (not \; access \; to \; credit) \qquad \text{... (2)}$$

From the equations (1) and (2),

$$Prob \; (y_i = access \; to \; credit) = Prob \; (u_i > -\beta' x_i)$$

$$= 1 - F \left(-\beta' x_i \right) \qquad \text{... (3)}$$

Where F is the c.d.f for u. In this case, the observed values of y are just the realisation of a binomial process with probabilities given by equation (3) and varying from trail to trail (depending on x_i). Hence the likelihood function is

$$L = \prod_{y=0} F \left(-\beta' x_i \right) \prod_{y=1} [1 - F \left(-\beta' x_i \right)] \qquad \text{... (4)}$$

Where taking the logarithm of L and maximising w.r.t β gives the ML estimator of slope coefficient. For the policy interest, we also calculated the marginal effect (ME) of change in independent variables on the conditional probability of the dependent variable (y = 1). Since the standard Probit model is a single-index model, the ratio of coefficients for two different independent variables equals the ratio of the ME (Cameron and Trivedi, 2005). Hence, the ME of the Probit model is calculated by using the formula,

$$\frac{\partial y_i}{\partial x_{ij}} = \phi\left(x_i' \beta\right) \beta_j = \phi(\Phi^{-1}(y_i)) \beta_j \qquad \text{... (5)}$$

Where, $y_i = \Phi(x_i' \beta)$. This ME of coefficients can be interpreted as the OLS regression coefficient.

The determinants of amount of credit are estimated using a sub-sample of AHHs who have access to credit. Hence, to analyse both the probability of access to credit and the amount of credit simultaneously, Heckman (1979) had developed a *joint maximum likelihood procedure*. Since this approach requires identification of the credit equation, an AHHs geographical location is used as an identification variable in this study. However, AHHs who have access to credit is not a randomly selected sample from the population, this generates a sample selection problem. Heckman (1979) developed a *two-step procedure* to address this problem. From this solution, the variable Inverse Mills Ratio (IMR) (λ) will be added as an explanatory variable in the credit function to tackle the selectivity bias. Hence, the equation that determines the sample selection is

$$I_i^* = \gamma^{'} Z_i + u_i \qquad\qquad \text{.. (6)}$$

and the equation of primary interest (determinants of credit) is

$$y_i = \beta^{'} x_i + \varepsilon_i \qquad\qquad \text{.. (7)}$$

The sample selection rule is that y is observed only when I is greater than zero. Hence, the model with a bivariate normal distribution(ε and u), zero mean, and correlation ρ, would be

$$E\left[y_i | y_i \text{ is observed}\right] = E\left[y_i | I_i^* > 0\right] = E\left[y_i | u_i > -\gamma^{'} Z_i\right]$$
$$= \beta^{'} x_i + E\left[\varepsilon_i | > -\gamma^{'} Z_i\right]$$
$$= \beta^{'} x_i + \rho\sigma_\varepsilon \lambda_i(\alpha_u)$$
$$= \beta^{'} x_i + \beta_\lambda \lambda_i(\alpha_u) \qquad \text{.. (8)}$$

Where in (8)

$$\alpha = \gamma^{'} Z_i / \sigma_u \text{ and } \lambda(\alpha_u) = \frac{\phi(\gamma^{'} Z_i / \sigma_u)}{\Phi(\gamma^{'} Z_i / \sigma_u)}$$

$$Y_i | I_i^* > 0 = E\left[Y_i | I_i^* > 0\right] + V_i = \beta^{'} x_i + \beta_\lambda \lambda_i(\alpha_u) + V_i$$

It is a common problem in the survey data that if samples selection is not random, the use of the OLS produces biased, inconsistent, and inefficient regression estimations. In this study, the determinants of credit for AHHs who have access to credit produce inconsistent estimates of β coefficients when OLS regression is used. Using λ as an independent variable in the OLS model captures the unobserved variables and that would produce consistent estimates of OLS regression of y on x and λ. Otherwise, if λ is omitted, then the specification error of an omitted variable is committed. Hence, Heckman's *two-step procedure* is employed to rectify this problem in this study. In the first step, the discrete choice model is estimated by Probit on the entire sample. Using the estimates, the λ has been estimated and included in the second-step estimates of the OLS regression equation on the selected sample of non-censored observations.

Results and Discussion

The disproportion of agricultural resources, net worth and Wealth Index

Indian agriculture is mainly based on marginal and small landholders whose average land size is less than 2 hectares. These 86% of marginal and small farmers are holding only 47% of the operated area (Gulati and Juneja, 2019). Further, the persistent caste hierarchical system in the country has impacts on holding the principal means of production i.e. land, and that leads to the unequal distribution of asset holdings and outcomes of agriculture among AHHs. The results of our study from the NSS data also reflect the same insight for the last two decades from 1991 to 2012. Even after 70 years of independence, the inequality of agricultural resources is as high among AHHs. Despite the second-highest share among Hindu AHHs, SC's status in most of the resources like landholdings is much lower than that of other social groups, while FCs are the most advantaged community in spite of a share of the third-highest households among Hindus. For example, about 20% of FCs held 24% of the lands whereas 23% of SCs held just 14% of the lands during 2012 (Table 1). In the same year, the figures for landless households show that most landless households are from SC households (31%) despite their share among total households being 23%. But in other groups, this landlessness is lower than their total household share. This result draws attention that elaborate land reform policies have failed in terms of redistribution of the lands (Besley and Burgess, 2000). Besides, the marginalisation of land is very high among SCs (Rao, 2017). Also, the share of casual labour makes it clear that labourers are abundant in one particular community i.e. SC as their share among total households (23%) was lower than their share among casual labour (28%) during 2012 (Table 1). During the last two decades, from 1991 to 2012, the SCs still persisted as either casual labour or landless households with a low share of landholdings.

Table 1: Share of AHHs and Their Agricultural Area, Asset Values and Loan Outstandings from 1991 to 2012 Across Social Groups

Particulars	1991[a]					2003					2012				
	ST	SC	OBC	FC	All	ST	SC	OBC	FC	All	ST	SC	OBC	FC	All
Total Hindu households (%)	11.0	21.6	-	67.4	100	10.6	24.0	43.1	22.4	100	12.4	23.0	44.7	19.9	100
Self-employed AHH (%)	12.0	11.8	-	76.2	100	10.8	13.1	46.3	29.9	100	14.5	13.9	47.5	24.1	100
Landless households (%)	9.2	31.3	-	59.5	100	9.0	33.7	40.3	17.0	100	10.0	31.1	43.0	16.0	100
Casual labour AHH (%)	16.1	29.6	-	54.2	100	16.5	28.9	42.4	12.2	100	16.0	28.2	41.5	14.3	100
Operational holdings of AHH (%)	12.0	16.2	-	71.7	100	11.7	17.3	45.0	26.0	100	14.3	16.6	46.1	22.9	100
Operational area of AHH (%)	11.5	10.3	-	78.2	100	11.1	9.6	45.2	34.2	100	13.4	10.7	46.4	29.5	100
Agricultural area of AHH (ha)	1.39	0.92	-	1.61	1.47	1.09	0.66	1.23	1.62	1.21	0.87	0.58	0.92	1.22	0.92
Irrigated area of AHH (ha)	0.92	0.61	-	1.24	1.12	0.94	0.54	0.97	1.41	1.01	0.76	0.49	0.76	1.02	0.77
Agricultural related asset values per AHH (Rs. Lakhs @ 2012 prices)															
Irrigated land	1.89	2.23	-	5.46	4.64	2.62	2.76	4.98	8.30	5.36	4.71	5.06	9.32	16.39	9.98
Agricultural land	1.63	2.06	-	4.73	3.91	2.07	2.46	4.53	7.36	4.66	3.91	4.43	9.17	14.85	8.88
Buildings & constructions	0.61	0.70	-	1.42	1.21	0.86	1.09	1.53	2.28	1.51	1.19	1.90	2.53	3.33	2.41
Livestock & poultry	0.22	0.18	-	0.28	0.26	0.20	0.15	0.24	0.26	0.23	0.29	0.25	0.37	0.38	0.34
Transport equipment	0.11	0.06	-	0.17	0.15	0.07	0.07	0.14	0.25	0.15	0.23	0.20	0.38	0.58	0.38
Agricultural tools & implements	0.05	0.05	-	0.21	0.16	0.08	0.07	0.19	0.26	0.18	0.06	0.05	0.10	0.13	0.09
Bullions and ornaments	0.15	0.12	-	0.32	0.27	0.09	0.10	0.20	0.26	0.19	0.27	0.36	0.56	0.68	0.52
Financial assets, shares & debentures	0.13	0.11	-	0.25	0.23	0.06	0.09	0.11	0.23	0.14	0.14	0.22	0.26	0.38	0.27
Average asset value	**2.85**	**3.29**	**-**	**7.60**	**6.33**	**5.62**	**6.93**	**12.60**	**19.54**	**12.61**	**6.46**	**8.32**	**14.83**	**22.32**	**14.26**
The loan outstanding from financial sources per AHH (Rs. Lakhs @ 2012 prices)															
Formal sources	0.20	0.23	-	0.43	0.37	0.23	0.24	0.62	0.48	0.44	0.56	0.57	0.80	1.15	0.86
Commercial banks	0.22	0.25	-	0.49	0.41	0.44	0.32	0.72	0.79	0.63	0.68	0.51	0.92	1.52	1.03
Cooperative banks	0.18	0.19	-	0.33	0.30	0.31	0.24	0.42	0.58	0.45	0.47	0.66	0.68	0.85	0.72
Informal sources	0.20	0.24	-	0.38	0.34	0.25	0.30	0.50	0.67	0.49	0.53	0.70	0.80	1.17	0.84
Money lenders	0.27	0.24	-	0.41	0.37	0.28	0.27	0.43	0.59	0.43	0.58	0.55	0.93	1.50	0.96
Average outstanding	**0.21**	**0.25**	**-**	**0.44**	**0.39**	**0.34**	**0.27**	**0.50**	**0.60**	**0.48**	**0.60**	**0.63**	**0.87**	**1.22**	**0.92**

Source: Author's calculation based on NSSO unit-level data (AIDIS), 48th (1991), 59th (2002) and 70th (2013) round.

Notes: [a]Figures represented in 1991 are irrespective of religion, and where FC includes OBCs as well.

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However, in this period, the share of agricultural operational households increased among social groups. For example, the share of STs increased from 12% in 1991 to 14% in 2012 and SCs from 16% to 16.6% (Table 1). Despite this fact, the operational area share of SCs is indeed lower than that of other counterparts. The average size of the agricultural area, in terms of a hectare (ha), was relatively much lower among SCs (0.92 ha in 1992, 0.66 ha in 2002 and 0.58 ha in 2012) among all groups, while FCs' area was more than one ha during the study period. The area of irrigated land also was lower to SCs. This lack of inputs and resources will certainly reduce the bargaining power of SC AHHs in access to credit. This disadvantage of SCs is, by default, an advantage to the relatively richer sections of society in terms of access to formal credit (Kumar *et al*, 2010).

Besides, other economic resources such as the value of different assets undoubtedly occupy the primary role in access to credit. Poor economic resources or resource-less status creates a weak 'initial condition' to the groups who find themselves at the bottom of society. This could be due to fewer endowments or natural conditions (e.g. arid or desert areas) or historical/political/social factors. Certainly, a better wealth status not only stabilises the households during different times of stress but also strengthens them to derive a flow of income as well as social status as a basic 'capital' (Kannan, 2016). But this study says that all agriculture-related assets per household are in favour of FCs. The observed lower value of irrigated land (from Table 1) for both SCs and STs may be due to differences in irrigation levels and soil quality (Rao, 2018).

Further, we also found that there are remarkable differences in the value of other assets as well. The values of agricultural land, buildings and other constructions, agricultural machinery and implements, livestock and poultry, transport equipment, bullions and ornaments, and other financial assets belonging to non-FCs are less than that of FCs and that of the national average. During the last two decades, this unequal trend continues to be similar due to the persistent caste hierarchy. This result shows that, still, many movements like land donation are needed to balance the resource inequalities among social groups. In addition, non-repayment of earlier loans is another hurdle preventing the households from accessing credit from lending sources. In general, it is believed that compared to large and rich farmers, marginalised sections are the biggest defaulters. But our study has revealed that it is the FC whose non-repayment of loans was more than that of OBCs, SCs, and STs during the study period (Table 1). Hence, it is clear that fewer SCs and STs are defaulters than FCs, and thus their access to credit ought to be high.

Nevertheless, less advantage of wealth distribution and net worth reduces the access of any economic goods. High inequalities of net worth prevail across the social groups and continue to increase from STs to FCs between 1991 and 2012. From Table (2), it is visible that when compared with FCs, every other social group has lost out by showing a decline in their net worth ratios. This scenario is worse among the SCs and STs as their net worth is much lower than that of FCs during the last two decades. As a result, access to credit is less among SCs and STs than FCs as their net worth ratios are lower than that of the FCs. Furthermore, we have also calculated the Wealth Index (WI) by scoring each variable from 0 to 100 based on the values of the variable, followed by an average of all variables, score is also calculated separately for one year at first to arrive at one single average WI for all three years next. The WI could be an explanatory factor for accessing credit. From Table 2, we can

understand that SC's wealth status is as much low as their WI is 0.57% and the highest is to FCs (1.27%), whereas the WI for the STs is 0.59% and 0.75% for the OBCs. The WI to the SCs, STs, and OBCs is, in fact, lower than the national average i.e. 0.99%. Certainly, both SCs and STs are less privileged in terms of wealth endowments than FCs, but access to credit is also bound by caste status (Kumar *et al*, 2007; Kumar *et al*, 2010; Kumar, 2013a; Kumar, 2013b; Kumar *et al*, 2015; Rao, 2017; Rao, 2018; Umanath *et al*, 2018; Karthick and Madhewaran, 2018; Karthick and Madhewaran, 2020).

Table 2: Net worth and Wealth Index of AHHs across social groups

NSSO Survey rounds	ST	SC	OBC	FC	All
Networth[a](Rs. lakh)					
1991[c]	2.64	3.04	-	7.16	5.95
2002	5.28	6.66	12.10	18.94	12.13
2012	5.86	7.69	13.96	21.09	13.34
Networth ratio [b]					
1991[c]	0.37	0.42	-	1.0	0.83
2002	0.28	0.35	0.64	1.0	0.64
2012	0.28	0.36	0.66	1.0	0.63
Wealth Index (%)					
1991[c]	0.91	0.82	-	1.79	1.52
2002	0.38	0.41	0.69	1.03	0.69
2012	0.50	0.50	0.81	0.99	0.75
Average (of three years)	0.59	0.57	0.75	1.27	0.99

Source: Author's calculation.

Notes: [a]Net worth is the difference between the average asset value and average outstandings.

[b]Net worth ratio is defined as the ratio between non-FCs and FCs.

[c]Figures represented in 1991 are irrespective of religion, and FC includes OBCs as well.

Inequality of Agricultural Credit

Studies by Binswanger and Khandker (1992), Agrawal *et al* (1997) and Bhalla and Singh (2010) have observed that credit maximises yield at a given level of inputs, but Banerjee (1999) noticed that among all AHHs, both marginal and small farmers' productivity is higher. But Rao's (2017) study revealed that differences in access to formal credit among social groups result in differences in crop yields and land productivity. From our study, the observed decreasing share of access to credit will certainly affect both SCs' and STs' agricultural productivity. During the last two decades, both SCs' and STs' share of access to credit from formal sources is lower than their AHHs proportion (Table 3). A similar trend has been observed in commercial as well as cooperative banks. Correspondingly, both SCs' and STs' amount of formal credit also are as much lower than that of FCs as well as the national average during this period. From Table 3, the ratio of the mean credit indicates that both SCs and STs avail half of the shares of FCs' credit. However, in commercial banks, SC AHHs are more deprived than others as their average amount of credit is small. During this period (1991 to 2012), SCs' average amount of credit increased from Rs. 25,000 to Rs. 45,000, and for FCs, those numbers are Rs.42,000 to Rs.90,000. The increments of credit to these groups are 1.76 and 2.15 times respectively. But when compared to FCs, the ratio of

SCs indicates that credit increment from 1991 to 2012 declined from 0.50% to 0.34% in commercial banks. In the case of cooperatives, the STs are the most deprived group during the last two decades. Although STs' average amount of credit increased by 2.57 times than FCs' (2.39 times), their mean credit amount is lower than that of FCs. Both the average amount of credit differences and calculated credit ratios presumed that formal credit to agriculture is determined by caste, and highly significant calculated t-values confirm that there is caste discrimination in access to credit in agriculture. Informal credit too deprives both SCs and STs of access to credit as their amount of credit is smaller than that of others (Table 3). This result makes two distinctive points here: (1) even after 70 years of independence, still, AHHs are under the clutch of moneylenders for their credit demand, and (2) the policies and programmes initiated for access to credit among marginalised AHHs have failed wholly.

Unlike SCs and STs, irrespective of credit sources, OBCs' access to credit is as high as its share among the total households. However, their average amount of credit is less compared to FCs, and our result is consistent with studies like Drèze *et al* (1997), Sarap (1990), Kumar (2013a and b), Kumar *et al* (2015), and Rao (2018). As a result, regardless of the source of borrowing, access to credit of AHHs is organised ascendingly from ST to SC to OBC to FC. Our result confirms that still, the caste structure is prevailing in the credit market. Therefore, an unbiased and neutral credit delivery system is needed to end the discrimination against marginalised caste groups.

Table 3: Share of AHHs and their access to credit and amount of credit from 1991 to 2012 across social groups (Rs. @ 2012 prices)

Particulars	1991[a]					2002					2012				
	ST	SC	OBC	FC	All	ST	SC	OBC	FC	All	ST	SC	OBC	FC	All
AHH share (%)	12.0	16.2	-	71.7	100	11.7	17.3	45.0	26.0	100	14.3	16.6	46.1	22.9	100
Formal credit sources															
Access (%)	9.5	17.6	-	72.8	100	12.7	17.4	42.8	27.1	100	8.8	12.4	49.8	29.0	100
Mean (Rs.)	17,317	23,090	-	42,187	36,445	20,591	24,751	48,016	49,229	40,809	44,256	47,774	74,697	98,526	75,557
Ratio	0.4	0.6	-	1.0	0.86	0.4	0.5	0.9	1.0	0.83	0.5	0.5	0.8	1.0	0.8
t-test	12.96**	10.64**	-	-	-	2.15*	3.07*	1.158	-	-	10.99**	11.29**	5.31**	-	-
Commercial bank credit															
Access (%)	10.5	19.9	-	69.6	100	9.9	15.4	45.3	29.4	100	9.0	11.0	52.1	27.9	100
Mean (Rs.)	20,245	25,207	-	50,116	42,032	42,828	36,416	72,109	91,923	69,530	56,260	44,555	85,416	1,29,297	90,533
Ratio	0.4	0.5	-	1.0	0.8	0.5	0.4	0.8	1.0	0.8	0.4	0.3	0.7	1.0	0.7
t-test	14.41**	8.73**	-	-	-	5.30**	10.60**	5.12**	-	-	6.66**	9.93**	4.21**	-	-
Cooperative bank credit															
Access (%)	7.0	13.2	-	79.8	100	8.9	10.7	43.5	36.8	100	7.7	12.4	49.0	30.8	100
Mean (Rs.)	13,841	17,882	-	30,295	27,501	29,597	22,719	46,937	59,276	47,331	35,577	51,456	60,521	72,385	61,137
Ratio	0.5	0.6	-	1.0	0.9	0.5	0.3	0.8	1.0	0.8	0.5	0.7	0.8	1.0	0.8
t-test	5.76**	7.02**	-	-	-	7.76**	8.89**	4.15**	-	-	7.34**	5.67**	4.07**	-	-
Informal credit sources															
Access (%)	9.3	18.9	-	71.8	100	8.7	15.2	51.7	24.4	100	9.5	15.2	53.6	21.7	100
Mean (Rs.)	15,864	16,060	-	28,858	25,229	19,547	20,738	39,991	51,712	38,155	37,013	45,718	52,140	71,169	53,867
Ratio	0.6	0.6	-	1.0	0.9	0.4	0.4	0.8	1.0	0.7	0.5	0.6	0.7	1.0	0.8
t-test	12.22**	9.23**	-	-	-	9.06**	9.14**	4.12**	-	-	6.48**	5.96**	2.70**	-	-
Moneylenders credit															
Access (%)	7.7	19.9	-	72.4	100	8.1	15.4	53.2	23.4	100	9.8	12.2	57.4	20.7	100
Mean (Rs.)	17,190	17,345	-	30,822	27,093	23,398	23,109	43,052	55,323	41,263	55,579	35,723	61,433	84,424	62,492
Ratio	0.6	0.6	-	1.0	0.9	0.4	0.4	0.8	1.0	0.8	0.7	0.4	0.7	1.0	0.7
t-test	4.97**	7.91**	-	-	-	5.87**	6.74**	3.03**	-	-	2.20*	2.67*	1.0	-	-

Source: Author's calculation based on three rounds (48th, 59th, and 70th) of NSSO (AIDIS) unit-level data.

Notes: [a]Figures represented in 1991 are irrespective of religion, and where FC includes OBCs as well.

**.01 level

* .05 level

Econometric Results

Determinants of access to formal agricultural credit

As we mentioned in the methodology part, the Probit regression model is employed first to analyse the determinants of access to formal agricultural credit as the dependent variable is binary (household access =1, otherwise=0) and independent variables are social, economic, demographic, and geographic characteristics. Since caste can influence all kinds of economic activities including agriculture, different caste dummies (ST, SC, OBC, and FC) are used under *social groups*. As irrigated crops need more inputs than unirrigated crops, the loan amount will be more to irrigated crops. Besides, the land size of AHHs is important to access credit as large farmers can influence the credit market compared to marginal and small farmers. Also, high asset and net-worth values are significant in access to credit as it is considered as a proxy of creditworthiness. Hence, variables of irrigated land, land holding size, and average asset values are included under *economic variables*. Under the *demographic variables*, family size, age of the household's head, and his/her education level are included as independent variables. The presumed reasons for adding these variables are (1) bigger the family size, more the productivity which yields high income; thus, repayment becomes easy, (2) greater the age of AHHs' head, more the experience which brings more likelihood of access to credit, and (3) similarly, more the education of the head of AHHs, greater weightage in credit access as it increases the head's awareness of the credit system. Under *geographical variables,* regional dummies are used as dependent variables as access to agricultural credit varies across states and social groups (see Appendix I for the region classification). Appendix II displays mean and standard deviation and definitions of selected variables.

The results of the Probit model reveal that access to formal credit is significantly determined by many characteristics (Table 4). Negatively significant caste dummies show that both SCs and STs have less likelihood of access to formal credit than FCs. The ME coefficient infers that one per cent change in both SCs and STs decreases their access to credit by on average 3.34% and 4.51% respectively from formal credit sources than for comparable FCs. Positively significant *economic variables* show that economic benefit is extremely important to access other economic benefits. The ME coefficient of both irrigated land and asset values infer that a one per cent change in these variables increases AHHs' access to credit by 3% and 4% respectively. The ME coefficient of land size shows that compared to marginal landholders, access to formal credit among small, semi-medium, and medium-large households increased by 17%, 25%, and 25% respectively for a one-unit change in these variables. As mentioned in many studies as well as our descriptive results, our Probit results also confirm that both marginal and small farmers and SC and STs face difficulties in access to credit. Also, this result paves the way to contemplate the discrimination that prevails in the formal credit market against SCs and STs as most of them belong to marginal and small farmers as mentioned by Dev (2012).

Table 4: Determinants of Access to Formal Credit during 2012: *Probit Model Results*

Variables type	Variables	Coefficients		Marginal effect	
Social characteristics	OBC	0.0133	(0.66)	0.0046	(0.66)
	SC	-0.0977***	(-3.65)	-0.0334***	(-3.72)
	ST	-0.1328***	(-4.91)	-0.0451***	(-5.03)
Economic characteristics	Irri area	0.0879***	(9.21)	0.0305***	(9.19)
	LnAsset	0.1084***	(11.51)	0.0377***	(11.52)
	Small	0.4708***	(21.08)	0.1741***	(21.27)
	Semi-medium	0.6649***	(22.53)	0.2528***	(21.85)
	Medium and large	0.6469***	(13.85)	0.2475***	(13.42)
Demographic characteristics	HH size	0.0190***	(5.78)	0.0066***	(5.78)
	Age	0.0046***	(7.36)	0.0016***	(7.37)
	Primary	0.1251***	(4.98)	0.0445***	(4.87)
	Middle	0.1608***	(6.94)	0.0574***	(6.78)
	Secondary	0.1461***	(6.24)	0.0521***	(6.11)
	Graduate	0.1469**	(3.48)	0.0528**	(3.38)
Geographic characteristics	North	-0.2090***	(-7.12)	-0.0695***	(-7.48)
	Central	-0.0916***	(-3.68)	-0.0315***	(-3.71)
	East	-0.0695*	(-2.51)	-0.0239*	(-2.54)
	Northeast	-0.9505***	(-21.43)	-0.2443***	(-33.95)
	South	-0.1889***	(-6.61)	-0.0632***	(-6.89)
Constant		-2.3914***	(-18.54)		
Log pseudolikelihood		-17487.4			
Chi-square		3971.39			
Pseudo R- square		0.102			
Number of observations		31,162			

Source: Author's calculation based on unit-level data (AIDIS), NSSO, 70th (2013) round.

Note: The dependent variable is access to formal credit.

Figures in parentheses are t values.

*** .01 level

** .05 level

* .10 level

The *demographic variables* are positive and significant and it implies that access to credit is determined by household size, age, and the education of the head of the household. From the ME coefficient, it is inferred that with a 1% change in household size and the age of the head of AHHs, access to credit from formal sources is increased by, on average, 0.7% and 0.5% respectively. The education level dummies show that more educated AHHs are more likely to access the credit than illiterates. The ME coefficient for these variables explains that access to credit is increased to the more educated than for the illiterate heads of households. For a 1% change in primary, middle, secondary, and graduate level education among them, the access to credit increases by 5%, 6%, 5%, and 5% respectively than for comparable illiterates. Even though the higher education level of the head brings higher chances of access to credit, that trend is decreasing after middle school education. This

decreasing trend occurs, probably, due to the high-level shifting of occupation between the agriculture and non-agriculture sector among secondary as well as graduate heads of households. However, the results imply that education in agriculture is most important as it creates awareness of credit and other agricultural training programmes. Lending sources also will have trust in well-educated heads of AHHs as they might repay the loans easily by working in the non-farm employment sector.

The negatively significant *geographical variables* show that all regions are having less likelihood of access to credit than the comparable western states. The possible reason for this greater likelihood of access to formal credit in the western region is the high growth rate of cooperative credit during the 1990s to 2000s (Chavan, 2015). The ME coefficient infers that, among all regions, the north-eastern AHHs' access to credit decreases by 24% for 1% change in input. Southern states come next as their access to credit, as their marginal effect, decreases by 6% for a unit of change. Our results are efficient and unbiased with high chi-square (3971.39) and pseudo-R-square (10.2%) which evaluates that 89.8% of the households are credit rationed in the formal credit sources. Our results are consistent with studies of Sahu *et al* (2004), Kumar (2015), and Kumar (2013a) to show that socio, economic, demographic, and geographic variables influence access to formal credit.

Determinants of Formal Agricultural Credit

The Probit analysis has shown that access to credit is influenced by factors such as caste, landholding size, age and education of the household head, irrigated land, asset values, and geographical regions. Now, let us discuss the determinants of agricultural credit of AHHs who have accessed formal sources of credit. As we have mentioned in the methodology part, the IMR (λ) is generated from the Probit results and used in the credit function as an independent variable to capture the selectivity bias. Since the Heckman selectivity bias approach requires identification of the credit equation, an AHH's geographical location is used as the appropriate identification variable in this study. The descriptive statistics of the selected variables for the OLS regression model are given in Appendix II.

As we expected, most of the OLS regression results are significant at a 1% level, the same as the Probit regression results. Similarly, for both SCs and STs, the average amount of formal credit is smaller than that for FCs. The average amounts of formal credit to SCs and STs are decreased by 13% and 25% respectively for a 1% change in the input variables. The positive and significant *economic variables* such as irrigated land and asset values increase the amount of credit to the AHHs by 9% and 42% for a 1% change in those variables respectively. Similarly, the increasing land-holding size increases the enormous amount of credit to AHHs. In comparison with marginal land-holders, the average amount of credit to small, semi-medium, and medium and above land-holders increases by 35%, 53%, and 70% respectively for 1% change in the respective variables.

Table 5: Determinants of formal credit during 2012: *Selectivity bias-corrected OLS model results*

Variables type	Variable	Coefficients	
Social characteristics	OBC	0.0130	(0.54)
	SC	-0.1268***	(-3.51)
	ST	-0.2546***	(-6.73)
Economic characteristics	Irri area	0.0908***	(9.81)
	LnAsset	0.4167***	(29.5)
	Small	0.3453***	(8.66)
	Semi-medium	0.5330***	(10.14)
	Medium and large	0.6971***	(11.33)
Demographic characteristics	HH size	0.0187***	(4.65)
	Age	0.0032***	(3.74)
	Primary	0.0222	(0.69)
	Middle	0.1318***	(4.33)
	Secondary	0.1902***	(6.33)
	Graduate	0.2723***	(5.29)
Constant		3.6496***	(12.48)
Inverse mills ratio (λ)		0.4706***	(5.05)
Rho (ρ) value		0.4580	
F-test value		289.81	
R-squared		0.3057	
Adjusted R-squared		0.3046	
Number of observations		9,891	

Source: Author's calculation based on unit-level data (AIDIS), NSSO, 70th (2013) round.

Note: The dependent variable is the amount of formal credit.

Figures in parentheses are t values.

*** .01 level

Household size, age of the head of the household, and education level of the household are highly significant and positive to get more amount of credit under the *demographic variables* category. Though the coefficient of the primary level of education of the household head is not significant, it is positive. However, increasing coefficients of middle, secondary, and graduation levels of education show that a greater amount of credit is provided to the households whose head is more educated. For an additional increase in these input variables, the average amount of credit from formal sources increases by an average of 13%, 19%, and 27% respectively compared to the illiterate heads of households. This result endorses the fact that education is important for agricultural activity as it widens their awareness about credit and thus leads to a high production level and greater income. The result of IMR (*λ*)is positive and significant and shows that the resulting equation is unbiased and the samples are selected randomly. The R-square value is 30.57%, which means that 30% of the variations are explained by the variables included in the model. The OLS model again confirms that variables such as caste, irrigated land, asset values, household size, age, and education of the head of the household, land holding-size and geographical regions are important determinants of agricultural credit.

Is education a panacea in access to credit for the social group?

From our Probit as well as selectivity bias-corrected OLS model, results show that access to credit increases if the head of the household is well educated. Indeed, education is considered as a means of societal upliftment in most countries because it "enhances one's ability to receive, decode, and understand information" (Nelson and Phelps, 1966). In a study, Awasthi and Bhat (2016), have indicated that education is expected to promote a better quality of life and economic empowerment in rural areas. They also found that agricultural income increases proportionately from illiterates to the highly educated. Asadullah and Rahman (2009) have rightly mentioned that education develops managerial skills within the farmers by helping them in accumulating information and awareness about the choice of crops, modern cultivation practices, and resource availability.

Table 6: Share of AHHs and the Amount of Formal Credit by Education and Social Group

Education Level	Share of AHHs (%)					Amount of formal credit in 2012 (000' Rs.)				
	ST	SC	OBC	FC	All	ST	SC	OBC	FC	All
Illiterate	68.3	59.7	49.1	34.2	47.8	41.1	44.0	65.0	82.9	62.4
Primary	10.7	13.7	12.8	15.1	13.4	55.8	50.2	82.4	80.1	75.7
Middle	11.3	13	15.8	18.7	15.9	52.4	59.0	87.5	77.2	78.9
Secondary	6.8	10.9	17.5	26.2	18.2	44.9	51.4	83.7	132.1	100.1
Graduate	2.9	2.7	4.9	5.7	4.7	43.8	51.6	78.8	156.7	102.6
Total	100	100	100	100	100	44.3	47.8	74.7	98.5	75.6

Source: Author's calculation based on unit-level data (AIDIS), NSSO, 70th (2013) round.

Our study has shown that education in agriculture is important as it increases farmer's access to credit. From Table 6, it can be seen that more educated households prefer to work in the non-agriculture sector than in agriculture as their households' share from among the population of illiterates to graduates is decreasing. Despite the shifting of employment, the lower share of graduate households gets more amount of credit than the high share of illiterate households due to the significance of education. While around 48% of illiterate AHHs get around Rs.62,000 amount of credit , just 4.7% of graduate households get more than Rs.1,00,000. Irrespective of the caste group, this amount of credit is increasing from illiterate households to graduate households. However, the increment is not equal across the social groups. In the case of ST and SC, from illiterate to graduate, the amount of formal credit increased only by Rs 3,000 and Rs 4,000 respectively. But for OBC, this value is Rs.14,000, this is higher from the amount of illiterate (Rs.65,000) when compared to the credit amount of the graduates (Rs.79,000). Unlike ST, SC, and OBCs, the FC household's average amount of credit to the graduate household is increased by double the amount of the illiterate's. When compared to illiterate FC households (Rs.83,000), the graduate FC households used to get Rs.1,57,000. This result shows that more educated households of FCs are getting a higher average amount of credit than less educated households of OBCs, SCs, and STs. To support these descriptive results, we also calculated the predicted probability values of education on access to credit after running the logit model. The result shows that despite the increase in access to credit from illiterate to graduate households, access probability is less to households of both SCs and STs when compared to FCs and OBCs (Figure 1).

Already, AHHs are deprived of access to credit due to socio-economic factors such as caste and land size. Again, this education inequality of the households also deprives them of access to credit. In the earlier literature, the impact of human capital on agricultural productivity is established (Ram and Shultz, 1979; Adams and Bumb, 1979; Lio and Liu, 2006; Fuglie and Schimmelpfennig 2010; Fuglie, 2010). Therefore, as Marshall (1920) mentioned in his book *Principles of Economics*, *"Capital consists of a great part of knowledge"* and *"... knowledge is the most powerful engine of production"*, our study endorses the strong building of human capital among SCs and STs' access to agricultural credit which will reduce asymmetric information and distress sale.

Figure 1: Predicted Probability of Education Onformal Credit Market by Social Group
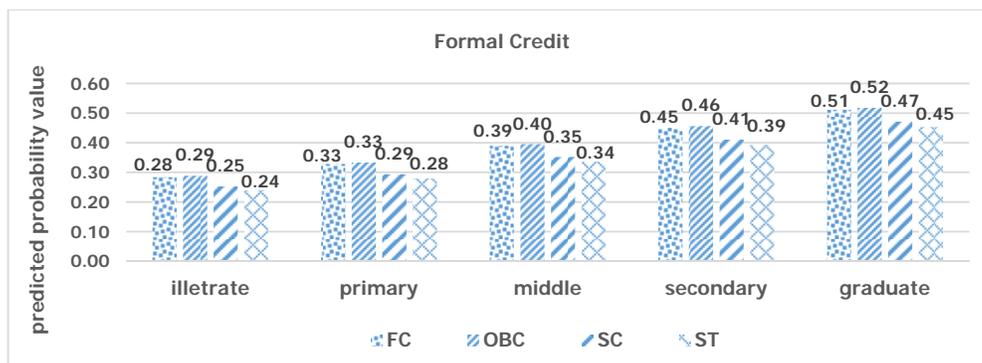
Source: Author's calculation based on unit-level data (AIDIS), NSSO, 70th (2013) round.

Conclusion and Policy Implications

India's persistent socio, economic, and spatial inequalities dampened agrarian society's access to credit. Our study finds that marginal, small, SC, and ST farmers' wealth resources are meager and below the rank of large, rich, and FC farmers. This inherent disadvantage might hamper their access to credit. Further, Probit analysis elucidates that these farmers have less likelihood of access to formal credit than large and FC farmers. Educated heads of AHHs also has more likely to access credit than are comparable illiterates. Regional inequalities in access to credit are high among farmers in all regions, except the western region where the cooperative movement was very strong. Unlike access to credit, the amount of credit is also influenced by many factors. The Heckman selectivity corrected OLS model shows that variables such as caste, household size, age, education level, and land size determine the amount of formal credit. Similar to access to credit, the higher education level of the household head increases the amount of credit. As a result, both socially and economically weaker sections are facing difficulties in accessing and availing formal credit.

Therefore, we urge the government to reduce caste-based inequalities and differences in access to agricultural credit. The RBI's priority sector lending (PSL) scheme has allocated 10% of total credit to weaker sections. Although both SCs and STs are prioritised along with other sub-categories under this section, still both of their access to credit is low. Therefore, the PSL scheme has to be revamped either by creating separate fund allocation for SC/STs or increasing the allocation of funds further from 10% for better access to credit. Schemes such as SCs Special Component Plan and STs

Tribal Sub-Plan were also channelised for the agricultural activities of both SCs and STs. We also urge the government to implement the reservation system in agricultural lending to ensure that marginalised communities are included in the financial system. Wilful defaulting is a major problem in the credit market, and to avoid this problem, lenders must be more attentive towards selecting rightful households. If one SC/ST is a wilful defaulter, then the loan amount should be given to another prosperous SC/ST farmer. From our results, we observed that education is a panacea to improve agricultural productivity, which also has an impact on access to credit by SCs and STs. Therefore, policy intervention is needed to improve AHHs' human capital. To ensure SCs, STs, marginal and small beneficiaries are benefitting properly, a special department can be set up to monitor them. Also, to combat inequality of credit access and caste-based discrimination, proper implementation and evaluation of programmes and policies are needed, as only then social justice can be achieved.

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Appendix I: Details of the Regions and States

Regions	States
North	Jammu & Kashmir, Himachal Pradesh, Delhi, Rajasthan, Punjab, Haryana, and Chandigarh
Central	Chhattisgarh, Uttarakhand, Uttar Pradesh, and Madhya Pradesh
West	Goa, Gujarat, Maharashtra, and the Union Territories of Daman & Diu, and Dadra & Nagar Haveli
East	Bihar, Jharkhand, Orissa, Sikkim, West Bengal, and Andaman & Nicobar,
North-East	Assam, Arunachal Pradesh, Meghalaya, Manipur, Nagaland, Tripura, and Mizoram
South	Andhra Pradesh, Telangana, Karnataka, Kerala, Tamil Nadu, and the Union Territory of Puducherry.

Source: RBI-Basic Statistical Returns of Scheduled Commercial Banks, 2017.

Appendix II: Mean and Standard Deviation of the Regression Variables

Variables name	Description of the Variables	Probit model		OLS model	
		Mean	Std Dev	Mean	Std Dev
Dependent variables	If household's (HH) access to credit from formal sources =1, otherwise=0	0.317	(0.465)	-	-
	Amount of credit given to farmers from formal sources	-	-	10.531	(1.142)
Social characteristics					
FC	If social group is general=1, otherwise=0	0.233	(0.423)	0.276	(0.447)
OBC	If social group is OBC=1, otherwise=0	0.433	(0.496)	0.471	(0.499)
SC	If social group is SC=1, otherwise=0	0.158	(0.365)	0.122	(0.328)
ST	If social group is ST=1, otherwise=0	0.176	(0.381)	0.130	(0.336)
Economic characteristics					
Irri area	Irrigated land (acre)	1.174	(2.602)	0.816	(1.477)
Ln Asset	Log of asset values (Rs) of land, machineries and implements, financial assets, livestock's, ornaments and buildings	16.071	(2.152)	13.972	(1.099)
Marginal	If land size is <2.47 ac =1, otherwise=0	0.707	(0.455)	0.126	(0.332)
Small	If land size is >2.47ac &<4.94ac=1, otherwise=0	0.170	(0.376)	0.168	(0.374)
Semi-medium	If land size is >4.94ac &<9.88ac=1, otherwise=0	0.085	(0.279)	0.186	(0.389)
Large	If land size is >9.88ac =1, otherwise=0	0.038	(0.190)	0.044	(0.206)
Demographic characteristics					
HH size	Family members (No.)	5.088	(2.440)	0.529	(0.499)
Age	Age of household head (HHH) (years)	49.034	(13.274)	0.239	(0.426)
Illiterate	If HHH is illiterate =1, otherwise=0	0.526	(0.499)	0.153	(0.360)
Prim	If HHH is educated 1st to 5^{th}class =1, otherwise=0	0.121	(0.326)	0.079	(0.270)
Middle	If HHH is educated 6th to 8^{th}class =1, otherwise=0	0.157	(0.364)	5.427	(2.690)
Second	If HHH is educated 9th, 10th, 11th, 12th, and certificate courses =1, otherwise=0	0.159	(0.366)	50.558	(12.803)
Grad	If HHH is graduated =1, otherwise=0	0.037	(0.188)	0.475	(0.499)
Geographic characteristics					
North	If the state belongs to northern part =1, otherwise=0	0.125	(0.331)	-	-
Central	If the state belongs to central part =1, otherwise=0	0.301	(0.459)	-	-
East	If the state belongs to eastern part =1, otherwise=0	0.209	(0.407)	-	-
West	If the state belongs to western part =1, otherwise=0	0.143	(0.350)	-	-
North-east	If the state belongs to north-eastern part =1, otherwise=0	0.071	(0.257)	-	-
South	If the state belongs to southern part =1, otherwise=0	0.150	(0.357)	-	-
IMR	Inverse mills ratio (λ)	-	-	1.001	(0.332)
N	Number of observations	31162		9891	

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