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WHAT ARE THE DRIVERS INFLUENCING SMALLHOLDER FARMERS' ACCESS TO FORMAL CREDIT SYSTEM? EMPIRICAL EVIDENCE FROM BANGLADESH

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ABSTRACT

The smallholder farmers of Bangladesh are confronting numerous production, marketing and financial limitations, including access to inputs and output markets and new technology. Agricultural credit can play a significant role in overcoming these constraints. However, access to formal agricultural credit by smallholder farmers is still limited. This study employs the Logit model to examine the factors influencing smallholder farmers' access to formal credit through survey data. Results reveal that more than half of the respondents have no access to formal credit which allows money lenders to function effectively in the rural economy. Econometric analysis shows that household head education level, land size, collateral requirement, lengthy application processes and the non-cooperation of staff in lending institutions are significant factors influencing smallholder farmers' access to credit. Enabling credit policies along with proper implementation of policies that enable smallholder farmers' to access credit are important in order to boost agricultural production and living standards.

Contribution/ Originality: The study is one of the very few that have investigated the factors affecting smallholder farmers' access to formal credit in Bangladesh. Remedial policies are required to address smallholders' lack of access to a formal credit system that will allow money lenders to function effectively in the rural economy.

1. INTRODUCTION

Growth of the rural economy is the key element in the reduction of poverty. It requires accelerated growth of the agricultural and rural non-farm sectors where agricultural credit can play a crucial role (Alam *et al.*, 2004; Khatun *et al.*, 2014). Agricultural credit is considered as a necessary input to increase farm productivity and thus contribute to an improved living standard for poor farmers (Okurut *et al.*, 2004; Osmani, 2007; Manganhele, 2010; Lowder *et al.*, 2016). Due to modernization of agriculture, smallholder farmers need capital and credit to run their businesses successfully. Smallholder farmers[1] are defined as those farm households that own and/or cultivate 0.05-2.49 acres of land.

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[1] Small farms operate about 12% of the world's agricultural land (Lowder et al., 2016). The definition of smallholder farmers varies from country to country.

Bangladesh is predominantly an agrarian economy. The majority of the poor people live in rural areas and depend greatly on agriculture for their livelihood and food security (BBS, 2016; Alam *et al.*, 2018). Most Bangladeshi farmers are impoverished and possess little land or capital (Khatun and Bashar, 2010). Smallholder s in Bangladesh hold about 96 per cent all operational land 69 per cent of the total cultivated area (Thapa and Gaiha, 2011; Khatun, 2018). They may, therefore, play a significant role in the transforming Bangladeshi agriculture from subsistence to commercial. However, they also face numerous obstacles affecting production, marketing, finance, access to inputs and output markets, and new technology and information.

Agricultural credit is a crucial input for smallholders which enables them to establish and expand their farms, so contributing to a higher income and capacity to repay loans (Latif, 2001; Pitt *et al.*, 2006; Mahmood *et al.*, 2009; Khatun and Bashar, 2010). Due to the modernization of agriculture, Bangladeshi farmers are increasingly using a variety of purchased inputs such as high yielding seeds, fertilizers, insecticides, and additional labor which require significant infusion of credit (Bashar and Alam, 1985; Alam *et al.*, 2004; Khatun and Bashar, 2010). Without the provision of agricultural credit, it is hardly possible for poor farmers to access these resources using their own financial, physical and labor resources. However, the unavailability of credit continues to impede the injection of technology and investment into agriculture (Alam *et al.*, 2004; Khatun *et al.*, 2014).

Lacking access to credit from established financial institutions, many small farmers have resorted to money lenders who charge extremely high interest rates which frequently results in inability to repay and consequently impoverishment. There are few international studies on this issue (e.g. Atieno, 2001; Bigsten *et al.*, 2003; Iqbal *et al.*, 2003; Hussien, 2007; Chauke *et al.*, 2013; Ololade and Olagunju, 2013) even fewer on the situation in Bangladesh. This study uses cross-sectional survey data to obtain information on smallholder farmers' access to formal credit with new insights on the determinant factors affecting their access. Two questions are addressed:

(i)   What are the socio-economic conditions of the smallholder farmers? and

(ii)   What are the drivers affecting smallholder farmers access to formal credit?

Section 2 of the paper explains the research methodology. Results are presented in section 3, while section 4 provides the conclusion and suggested policies.

2. RESEARCH METHODOLOGY

2.1. Description of Study Area

A multi-stage sampling technique was used to collect the data. First one district and then one upazila from the district and then four villages from the upazila were selected. Respondents were chosen randomly from each village. Mirpur upazila of the Kushtia district was selected. It is about 250 km far from Dhaka, the capital of Bangladesh, with an area of 1621.15 sq km and a population of 1740,155. The area is renowned for agricultural production and this, predictably, is the population's primary source of income. There are a large number of formal and semi-formal financial institutions working at Kushtia. The villages examined for this study were Kachubaria, Poary, Fulbaria and Ramnagar.

2.2. Sampling Techniques and Data Collection Method

The unit of analysis was the rural smallholder households and the households' head was the survey participant. A complete list of the smallholder farmers was collected from the Upazila Agriculture Office. Finally, a random selection of120 respondents were interviewed; 30 from each village.

Survey data were collected between July and September 2017 using face-to-face interview through a structured questionnaire. In each village one focus group discussion was conducted with a group of six to ten respondents to obtain their views on socio-economic and access to credit related variables. These opinions were used to cross-validate the information obtained from the survey and the key informants. The interview schedule was prepared based on the objectives of the research. The draft questionnaire was pre-tested to ensure adequacy of the

information and reliability of the interview schedule. In light of this experience the final interview schedule was prepared with necessary corrections, modifications and changes. The questionnaire contains the information on the households' socio-economic conditions, such as demographic information, income and expenditure, livelihood, savings and credit-related information.

2.3. Processing and Analysis of Data

The filled survey questionnaires were cleaned and validated at the field level. Then the collected data were tabulated into an Excel spreadsheet. The data were also cleaned by producing frequency tables for each question and checking the outliers. For regression analysis, the Excel data was imported in the Stata twelve.

2.4. Econometric Modelling

The farmers' access to credit is hypothesized as either access to credit or no-access to credit. The model can be termed as a response model of dichotomous variable because the observed dependent variable H_i^c (household $i's$ access to credit) is binary in nature (access or no-access). The model can be written as follows where $\emptyset_i$ is the probability of access to credit as shown in Equation 1:

$$\emptyset_i = \text{Prob} \left(H_i^c = 1/X_i \right) = \frac{1}{1+e^{-(\beta_1 + \beta_2 X_i)}} \qquad (1)$$

In the analysis of binary response (e.g., yes or no), two parametric models are employed – logit and probit (Maddala, 1992). In this study a logistic regression model was used to estimate the probability of an event occurring for more than one independent variable, that is, for k independent variables. The logistic regression model of access to credit can be written as in Equation 2:

$$\left(\frac{\emptyset_i}{1-\emptyset_i} \right) = \frac{1+e^{zi}}{1+e^{-zi}} \qquad (2)$$

Where, $Zi = \beta 1 + \beta_2 X_i$ and $\left(\frac{\emptyset_i}{1-\emptyset_i} \right)$ indicates the odds ratio. Taking the natural log of (2) we obtained the Equation 3 as follows (Gujarati, 2003):

$$\text{Ln} \left(\frac{\emptyset_i}{1-\emptyset_i} \right) = \beta_o + \sum_{j=1}^{n=k} \beta_j X_{ij} + \varepsilon_i \qquad (3)$$

Where, $\emptyset_i$ is the conditional probability of farmers having access to credit or not, β_j's parameters are to be estimated and $X_{ij}'s$ are the independent variables. The error term is ε_i which is assumed to be uncorrelated with the explanatory variables. Maximum likelihood estimates and the results of marginal effects were used. The marginal effects are the partial derivatives of probabilities with respect to the vector of independent variables and are computed at the means of the explanatory variables.

For estimation, the variables included in Equation 3 are demographic (age and sex), economic (education, income, and land size) and other (collateral requirement, distance of financial institutions, high interest rate, lengthy formalities, non-cooperation). These are hypotheses that will be either positive or negative associations with the response variable Table 1. The selection of these variables is based on the literature review and field experience.

Table-1. Measurement of variables with their expected sign.

Variables	Unit	Expected sign	Source
Explained Variable			
Access to credit	1= if household access to credit, otherwise 0		
Explanatory variable			
Age of household head	Years	+/−	(Bigsten *et al.*, 2003; Khatun and Bashar, 2010).
Gender	Dummy, 1= Male and 0 = Female	−	(Hussien, 2007; Ololade and Olagunju, 2013)
Education of household head	Year of schooling	+	(Hussien, 2007; Chauke *et al.*, 2013)
Land size	Decimal	+	(Bigsten *et al.*, 2003; Khatun *et al.*, 2014)
Lengthy procedure/ formalities (dummy)	Dummy, 1= if they consider this as a barrier, and 0 = otherwise	−	(Chauke *et al.*, 2013; Ololade and Olagunju, 2013)
High interest rate (dummy)	Dummy, 1= if they consider this as a barrier, and 0 = otherwise	−	(Ololade and Olagunju, 2013; Khatun *et al.*, 2014)
Distance of financial institutions (more than 3 km) (dummy)	Dummy, 1= if they consider this as a barrier, and 0 = otherwise	−	(Atieno, 2001; Chauke *et al.*, 2013)
Collateral requirements (dummy)	Dummy, 1= if they consider this as a barrier, and 0 = otherwise	−	(Hussien, 2007; Ololade and Olagunju, 2013)
Non-cooperation	Dummy, 1= if they consider this as a barrier, and 0 = otherwise	−	(Chauke *et al.*, 2013; Khatun, 2018)

3. RESULTS AND DISCUSSION

In this section, the results are described in different phases. In 3.1, the socio-economic characteristics of the respondents are presented followed by access to credit in Section 3.2, and econometric results in Section 3.3.

Table-2. Some selected socio-economic characteristic of the study households.

Characteristics/Variables	Percentage
Age of HH head (Mean :48; Range:25-67)	
25-45 years	50
46 -60 years	35
<61-67 years	15
Gender of HH head	
Male	94
Female	6
HHs family member (Mean :4.21; Range:2-11)	
2-3	37
4-5	55
≤ 6 members	8
Occupation	
Agriculture	70
Business	21
Service	9
Education	
Illiterate	12
Primary	27
Secondary	34
Higher secondary and above	7
Land Ownership	
Less than 1 acre	31
1 to 2 acres	48
2.01 to 2.49 acres	21

Source: Field survey, 2017.

3.1. Socio-Economic Characteristics of the Farmers

The information on household socio-demographic characteristics are very useful for formulating effective policy interventions. Age and sex distributions are important to effective farm business operations. With this end in view, household head age was categorized into three groups:

(i) 25-45 years;

(ii) 46-60 years; and

(iii) Over 60 years.

 Although the working labor force was defined as those who belonged to the age groups between 25 and 60 years, people aged 25 to 45 tend to be more energetic and inclined to risk taking.

As seen in Table 2, half of the household heads in the study area belong to the younger age category. The average age of the household heads was around 48. Younger people tend not to be risk averse, and if supported properly, have the capacity to bring innovation to the farm sector. The great majority of household heads in the study area were male (94 per cent). The average family size of four is relatively smaller than national average of five (BBS, 2014). Only eight per cent of households had six members or more.

In regard to occupation, about 70 per cent of household heads were dependent in agriculture followed by business (21 per cent) and service (nine per cent). The mean education level of the household was below primary school (3.17 years). It is important to note that more than twelve per cent of respondents did not attend school at all. In Bangladesh, the estimated literacy rate was 61.5 percent in 2015 (UNESCO (The United Nations Educational Scientific and Cultural Organization), 2015). While a majority of household heads had an education level between primary and secondary level, only seven per cent went beyond secondary. Although the respondents were all smallholder farmers, fully 31 per cent held less than an acre, 48 per cent held 1 to 2 acres, and 21 per cent 2.01 to 2.49 acres (see Table 2).

3.2. Access to Credit

Agricultural credit is considered to be a necessary input for poor farmers to accelerate productivity and increase income, but it has already been demonstrated that a great many have no access to it. The various reasons for this are canvassed below:

About 61 per cent of farmers stated that they could not borrow from established financial institutions. Table 3 shows the most common reasons for this: non-cooperation from the institutions (96 per cent), collateral requirement (84 per cent) and lengthy formalities (71 per cent).

Table-3. Reasons for not getting/borrowing credit from the formal institutions.

Reasons	Responses* (%)
Interest rate is too high	32
Do not get credit in time	65
Lending institution is far (distance)	47
Too much requirements/formalities	71
Lack of guarantees/collateral	84
Repayment time is not flexible	49
High cost of credit (bribe)	34
Non-cooperation	96

Source: Field survey, 2017. *There were multiple options.

Also mentioned were the physical distance from the institutions (47 per cent) and high interest rates (32 per cent). Some respondents (34 per cent) stated that bribes and/or political influence were required to get credit. In these circumstances it is hardly surprising that as many as 21 per cent of households sought loans from informal money lenders charging usurious rates of interest.

3.3. Econometric Results

The results of the logit[2] analysis are at Table 4. The issue of collinearity was checked using the correlation matrix with all the explanatory variables which are found to be relatively low, that is below 0.47 in all cases. In case of potential multicollinearity detection, the VIF ranges from 1.07 to 1.53 which does not reach the conventional threshold of 10 or higher used in regression diagnosis (Kennedy, 1998).

Table-4. Regression results for the likelihood determinants of access to formal credit.

Variables	MLE estimates (Logit)/ Marginal effect	
	Coefficient	**Std. error**
Age of household head (years)	− 0.071	0.048
Gender	− 0.021	0.035
Education of household head (years)	1.104**	0.402
Land size (decimal)	1.082**	0.398
Lengthy procedure/formalities (dummy)	−1.058*	0.429
High interest rate (dummy)	− 0.042	0.023
Distance to financial institutions (dummy)	− 0.013	0.073
Collateral requirements (dummy)	− 0.102**	0.036
Non-cooperation (dummy)	−1.110***	0.371
Constant	10.587***	
Prob > χ^2	0.000	
Goodness of fit (Pseudo R^2)	0.631	
Log likelihood	−76.129	
LR (chi-square)	158.07	
Number of observations	120	

Note: Dependent variable: Access to formal credit. ***p<0.001; **p<0.05 and *p<0.10.

Overall, the model offers a good fit with the factors predicting access to formal credit by the respondents. The chi-square value (LR-158.07) indicates the strong explanatory power of the model. In other words, the joint null hypothesis that all variables are jointly significant is accepted. The model's good fit (given by McFadden Pseudo R^2) indicates a reasonable explanatory power as at Table 4. Importantly, all variables display the best model fit in terms of the expected sign and significance level. A description of the explanatory variables is given below:

In case of education, the result of marginal effects yielded, as expected, a significant positive relationship between household heads' educational attainment and access to formal credit (1.104; p<0.05). Usually, household heads with higher educational attainment are more interested in adopting modern agricultural technology, fertilizer and better agronomic management. These require more capital (Deressa *et al.*, 2009; Alam *et al.*, 2016). The marginal effect of education implies that a one unit (year) increase in a participant's level of education will increase the probability of household access to formal credit by 1.104, while the effect on the remaining options is negligible. The same interpretation holds true for other variables.

In regard to land size, the study found a positive association between land size and access to formal credit (1.082; p<0.001). Land is the most important collateral for obtaining a loan. In fact, formal credit is sought and used mostly for agricultural production purposes and investment in non-farm income generating activities.

With respect to formalities of getting a loan, the study found a negative association between lengthy procedures and formalities and the success of a loan application (-1.037; p<0.05). The procedures employed by formal institutions take little account of the exigencies of impoverished farmers. The study found a highly significant negative relationship between non-cooperation of staff within formal institutions and access to credit (-1.110; p<0.001). Poor and uneducated smallholder farmers are typically risk-averse when applying for credit.

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[2] This study used STATA 12 to estimate the model.

The requirement for collateral is another major obstacle with a negative association between this and access to credit (-1.02; $p<0.05$). These barriers often push many poor farmers to go to informal credit sources where collateral is not required.

Most farmers allege they received little or no cooperation or assistance from formal financial institutions. Respondents were also hesitant to engage verbally with the staff due to their poor education. Other variables such as age of the household head, high interest rates and distance to financial institutions were not found to be significant in this context.

3.4. Level of Satisfaction on Service Delivery

Most respondents affirmed that credit is a necessary input for their business. However, they reported significant dissatisfaction as regards the service delivery of formal financial institutions. All respondents mentioned formal credit as their first choice, however only 39 per cent were successful in obtaining it. Moreover, they were unable to apply the loan funds in the most efficient manner. Suggestions from respondents for the better use of loan funds are at Table 5 below. Most notably, 98 per cent mentioned simplification of application procedures and a more friendly and empathetic attitude by bank staff.

Table-5. Suggestions for using credit effectively.

Suggestions	Responses* (%)
Providing training	64
Simplified procedures and friendly/empathetic behavior by bank staff	98
Supervision and guidance	87
Insurance in case of crop failure	73

Source: Field survey, 2017. *There were multiple options.

4. CONCLUSIONS AND POLICY IMPLICATIONS

Agricultural credit plays a crucial role in triggering the modernization of the agricultural sector and the commercialization of the rural economy to the general improvement in the lot of smallholder farmers. This study examined the factors influencing access to formal credit using Mirpur upazila of Bangladesh as a case study. It employed a logit model, and the issues of multicolinearity and heterodastacity are addressed by statistical tests.

Results reveal that more than half of the households depend on agriculture for their livelihood. Formal credit is the first choice of the respondents, however, majority of them (about 61 per cent) are found to have no access to formal credit which permits informal money lenders to function in the rural economy and charge usurious interest rates. The main reasons for lack of access were revealed as non-cooperation from formal institutions, collateral requirements, and lengthy formalities. Farmers also mentioned the necessity to employ bribes and seek political influence as factors limiting their access to credit.

The maximum likelihood estimates of the logistic regression model shows that of eight explanatory variables, five are found be significant:

(i) education;

(ii) land size;

(iii) the requirement for collateral; and

(iv) lengthy procedures/formalities and uncooperative staff

The remaining variables were not found to be statistically significant.

It is suggested that formal financial institutions should simplify their lending procedures by reducing paperwork and changing attitudes towards potential clients. More attention should be given to timely extensions of institutional credit to the farmers under proper supervision, which should also result in more efficient application of loan funds by farmers to their businesses. But enabling credit alone is insufficient. Monitoring to

ensure the appropriate execution of policies is also vitally important, most particularly ensuring that access to credit brings with it a boost to agricultural production and a significant improvement in the living standards of Bangladeshi small-hold farmers, and perhaps those in other countries.

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