



Research Article

Determinants of Coffee Farmers Cooperatives' Demand for Institutional Credit: Empirical Evidence from Ethiopia

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This study explored determinants of coffee farmer cooperatives' demand for institutional credit under the Ethiopian context. The data was collected from 100 farmers primary cooperatives and analysed using descriptive statistics and Heckman two-step selection econometric model. The study reveals that the vast majority of the study cooperatives have potential demand for credit, while the revealed demand was found to be relatively low. Different sets of variables were found to influence cooperatives' potential and actual demand for institutional credit in different ways. In order to address constraints preventing farmer cooperatives from effectively demanding and accessing institutional credit, recommendations are made in relation to the borrower cooperatives, lending banks and government policy.

Key words: Credit, credit demand, farmer cooperatives, determinants of credit demand, Ethiopia

INTRODUCTION

There is a growing consensus that improving access of resource-poor people to appropriate financial services is an effective means of altering the vicious cycle of poverty they are trapped in. In particular, access to adequate and timely financial services for actors operating in the various levels of agricultural value chain has been recognised as a decisive factor for success (KIT and IIRR, 2010). Access to finance is particularly a major driving force in transforming the substance-oriented smallholder agriculture to commercial and market-oriented production. Access to credit helps smallholders to acquire necessary inputs, adopt new technologies, undertake new investments, carry out value addition activities, access better market and generate higher income (Efa and Ndinda, 2017). Access to credit plays an important role in boosting risk bearing capacity of farmers, which allows them to pursue promising but risky technologies and enterprises (Barslund and Tarp, 2008). In general, agricultural credit plays an important role in enhancing resource allocation and technical efficiency and profitability of farmers.

The rural poor and smallholder agriculture in Africa, as in most developing parts of the world, continues to experience severe credit constraints, which hinder their investment activities, expansion, productivity and growth. Formal financial institutions are often reluctant to lend to rural based resource-poor farmers and their primary cooperatives. The findings of a World Bank (1994) study shows that credit allocated to trade activities was larger than the volume extended to agricultural production, agro-processing or other rural enterprises. According to this study, rural credit from formal financial institutions is less than 10 percent of their entire credit portfolio in most sub-Saharan African countries.

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In an attempt to address constraints arising from such credit market imperfections, Governments and donor communities often intervene using various measures such as credit guarantee programmes. In Ethiopia, a five year partial credit guarantee scheme (2011 – 2016) for coffee farmers' cooperatives was initiated and implemented with the support of Common Fund for Commodities (CFC), Rabo Bank, CABI Africa and the Ministry of Agriculture, Ethiopia. The scheme aimed at enhancing access to bank credit among farmer cooperatives to promote up/out-scaling of improved coffee processing technologies/practices and to enable them improve the quality of their coffee and raise their income. The scheme has implemented a number of complementary capacity building activities for the lending banks as well as for the borrower cooperatives.

The general assumption in designing a credit guarantee intervention is that farm-households' and their cooperatives' would exhibit effective demand for availed credit facilities. Because limited access to and participation of the resource-poor smallholders in credit markets is believed to be largely due to constraints related to credit supply. As a result, existing studies and policy interventions tend to focus on credit sources and supply side constraints/gaps. Some however argue that resource-poor farmers may not depict effective demand for availed credit facilities as expected due to various reasons. A study conducted in Ada'a Liben district in Ethiopia (Admasu and Paul, 2010) shows that only 43 percent of the respondent farmers expressed need for credit. In contrast, other analysts (e.g. Bastin and Matteucci, 2007) indicated the presence of huge unmet demand for credit services among farm households in Ethiopia. The findings of studies related to farmers' demand for formal credit and its determinants are largely inconsistent, varying across countries. In particular, empirical studies on determinants of coffee farmer cooperatives' demand for institutional credit in general and under the Ethiopian context in particular are hardly available. This paper aims to bridge this information gap, with special emphasis on demand side constraints in the Ethiopian context. Such findings provide vital information for policy-makers and credit guarantee programmes targeting small-holder farmers and their cooperatives.

The next section provides conceptual and analytical frameworks for estimating credit demand and description of the variables included in the analysis and working hypothesis. This is followed by the study design and methodology. The paper then proceeds to present the empirical findings, interpretation and discussion of the results. The final section provides conclusion and implications.

Estimating Loan Demand: Conceptual and Analytical Framework

Evidence suggests that improving credit supply through credit guarantees may not necessarily generate effective

demand due to a number of reasons. Mpuga (2010) notes that there is a complex set of factors related to the borrowers' attributes that can greatly influence demand for credit. Empirical studies provide different views regarding the lack of demand for institutional credit among the rural poor (Atieno, 1997). Scholars (e.g. Mpuga, 2010; Atieno, 1997) underscore the need for carefully analysing factors influencing the borrowing behaviour of households or firms if the extent of demand for loans and underlying causes for low demand are to be properly understood. Existing studies adopt different approaches in measuring loan demand. The general consensus is that measuring credit demand is a complicated undertaking. A number of conceptual problems are identified in estimating credit demand, particularly in fragmented and imperfect rural credit markets (Atieno, 2001). Nagarajan *et al.* (1998) argue that estimates of loan demand are often biased and inefficient due to use of models that do not properly address selectivity bias or use of data that do not capture loans from multiple sources. Some studies tend to base their analysis on the observed loan amount or approved loan applications, while others use the sum of loans approved and rejected by banks. Scholars (e.g. Atieno, 2001; Wiboonpongse *et al.*, 2006) argue that it is inappropriate to identify the loan demand using information only on observed loan amounts since this merely reflects the existing supply. The analysts note that data truncation by omitting non-borrowers and loan size rationing have been undermined by some of the previous studies that attempted to estimate loan demand (e.g. Atieno, 2001; Wiboonpongse *et al.*, 2006). Similarly, Barslund and Tarp (2008) argue that in instances where only matched (approved) loan applications are observable, the researcher cannot "identify the factors affecting real credit demand at the household level. Even with information on rejected loan applications, identification of 'self-constrained' households/firms is a challenging task". Thus in their analysis of credit demand, they categorised households as demanding credit if they: (i) obtained a loan; (ii) had a loan application rejected; or (iii) did not apply even if they wanted credit. Fletschner *et al.* (2010) affirm that identifying the extent of constraints of non-applicants of loan is more challenging because this group includes heterogeneous individuals or households including: (a) those who do not want a loan due to lack of viable business requiring external finance; (b) those who want loans but do not apply because they are certain to be rejected; (c) those who believe they qualify for a loan but are discouraged from applying by transaction costs, lenders' requirements and associated risks. Kanoh and Pumpaisanchai (2006) note that survey data that include both borrowers and non-borrowers provide several benefits in analysing the issue, including provision of qualitative information about the credit market that cannot be obtained from the observed credit data.

The two aspects commonly assessed with regard to loan demand focus on whether the household or firm wants to borrow (including preferred sources) and volume of loan

demand and factors influencing them. Several studies (e.g. Mpuga, 2010; Zeller, 1994; Zapata, 2006) used binary choice Probit model to examine the determinants of households' or firms' decisions to apply for loans and/or which source to borrow from. Some studies such as Frangos *et al.* (2012) used logistic regression, which is much similar to the Probit model, in assessing factors affecting decision for taking loans. On the other hand, a number of studies (e.g. Mpuga, 2010; Nagarajan *et al.*, 1998; Ajagbe *et al.*, 2012) used Tobit model to estimate the determinants of the amount of loan demanded by households or small entrepreneurs, while Wiboonpongse *et al.* (2006) estimated a Tobit model II to investigate factors affecting the decision to borrow and the volume of loan demanded. As Ukurut *et al.* (2004) note, where the dependent variable measures values, ordinary OLS regression is subject to possible sample selection bias. The common approach for dealing with such sample selection bias is the use of the Heckit or Heckman two-step selection model which accounts for sample selection problems (Ukurut *et al.*, 2004; Sigleman and Zeng, 1999). Sigelman and Zeng (1999) note that the Heckit model has emerged as the *de facto* default alternative to the Tobit model when values cluster at zero due to selection bias rather than censoring. Heckman (1979) argues that those who decide to participate in borrowing constitute a self-selected sample and not a random sample. Moreover, standard Tobit model imposes an assumption which is often too restrictive i.e. exactly the same variables affecting the probability of a non-zero observation determine the level of a positive observation and with the same sign (Verbeek, 2004). However, Heckman estimation assumes that different sets of variables govern the probability of demanding for a loan and the intensity of loan demand. Thus Heckman two-step selection approach offers a mechanism to correct for non-randomly selected samples by accounting for information on those who decided not to participate in borrowing. In other words, it does not consider the demand of those who did not participate completely as zero (Gronau, 1974; Heckman, 1976). This study employs Heckman's two-stage selection model, where selection into the sample of those who demand loans is first modelled, and in the second stage we incorporate the inverse Mills ratio (λ) generated in the selection equation into the equation of interest to overcome the sample selection bias.

Existing studies used a mixed set of quantitative and qualitative variables in the models used to examine factors influencing borrowing decisions. The factors that may affect cooperative's propensity to borrow and amount of loan to borrow can be broadly grouped into: (1) Cooperative's attributes (institutional, managerial and business), (2) loan and lending institutions' characteristics (3) Proxies for other exogenous factors. This paper examines the associations between cooperatives' loan demand and their institutional, business and managers attributes. Existing literature affirms that owner/manager's

attributes (such as age, level of education, etc.) and firms' institutional and business attributes (such as resource endowment, human resources, economic and business activities) influence borrowing decisions and access to loans. Thus these factors are the explanatory variables that will be used in the econometric model presented in the next section.

The loan demand process basically follows two logical stages. In the first stage, the cooperative decides to demand for institutional loan or not. In the second stage, the cooperative decides on the amount of loan to apply for. In this study, we adopted two approaches in measuring loan demand. With the first approach, we considered cooperatives' actual applications for loans, whereby we asked cooperatives whether they applied for a bank loan during the year 2011. This is a dummy variable taking on two values; i.e. if a coop responded "Yes", it will take a value of 1, or 0 otherwise. We then asked those who replied 'Yes' the volume of loan they applied for in 2011. The dependent variable (amount of loan demanded) in this case is a quantitative variable. We designated the credit demand identified through the first approach as Demand-A. We recognise that this does not reflect the true loan demand as most cooperatives are likely to be self-constrained or self-credit rationed due to various reasons. Thus with the intention to identify the potential demand of self-constrained cooperatives as well as to compare this potential demand with the revealed demand, we further employed a second approach. We went on and asked cooperatives if they would seriously and genuinely demand for a bank loan during the following year (2012 coffee season). A value of 1 is assigned to cooperatives that answered 'Yes' to these questions and 0 otherwise. We then asked those who responded "Yes" to this question the amount of loan they demand. The loan demand captured through the second approach was referred to as loan Demand-B. The later approach tends to reflect coops desire and potential to demand for loans which may not be necessarily transformed to actual demand without further interventions.

As indicated above, in our empirical analysis of loan demand, we employed the Heckman two-step selection approach. In step 1, we estimate the probability of a cooperative's demand for a loan, which is done on the basis of the probit model. Though the probit model offers important information about the decision to demand for credit, it does not give us anything about the volume of credit demanded in relation to its institutional, business and managerial characteristics. Thus in the second stage, using the Heckman two-step selection model, we investigated factors affecting volume of loan demanded, which in this context is defined as the amount, in Ethiopian Birr. This was carried out by including the inverse Mill's ratio derived from the probit estimates into the second stage estimation. The specification of the Heckman two-step selection model is as follows.

The Heckman correction takes place in two stages. In the first stage, we formulate a model for the probability of borrowing. The participation or selection equation can be specified with a probit regression of the form:

$$C_i = 1(Z_i\gamma + u_i > 0) \quad (1)$$

Where i is the indexes of cooperatives ($i = 1, \dots, N$), C_i represents the decision to borrow ($C_i = 1$ if the cooperative decides to take credit and zero otherwise), Z_i is a vector of explanatory variables assumed to explain the probability of borrowing, γ is a vector of the parameters to be estimated, and u_i is the idiosyncratic error term.

In the second stage, we correct for self-selection by incorporating a transformation of these predicted individual probabilities as an additional explanatory variable. The demand equation can be specified as follows:

$$Y_i = x_i\beta_1 + \varepsilon_{i1} \text{ if } C_i = 1 \quad (2)$$

x_i denotes a vector of explanatory variables and Y_i denotes amount of loan demanded by coop i . The volume of loan demanded is not observed for cooperatives that do not demand loans.

The term $\phi(Z_i'\beta)/\Phi(Z_i'\beta)$ is known as the inverse Mill's ratio or Heckman's lambda. $\phi(\bullet)$ is the standard normal probability density function and $\Phi(\bullet)$ is the standard normal cumulative density function. The first step is to estimate the correlation term (Heckman's lambda) by maximum likelihood probit modelling. The next step is to estimate the model using ordinary least squares with the estimated bias term as an explanatory variable using only the observations in the truncated sample with $Y_i > 0$.

Under the assumption that the error terms are jointly normal, we have,

$$E(Y_i/X, C=1; Z) = X\beta + \rho_i \lambda(Z) \quad (3)$$

Where ρ is the correlation coefficient between unobserved determinants of propensity to borrow and unobserved determinants of credit demand and λ is the inverse Mills ratio.

Description of Variables and Working Hypotheses

Review of literature and empirical findings of research on rural credit and the current researcher's knowledge of the study areas were used in structuring working hypotheses. Description of explanatory variables related to cooperative managers, institutional and business attributes, which are hypothesized to influence borrowing decisions and included in the Heckman two-step selection model, on a *priori* ground, is outlined below.

Cooperative's manager/chairperson age (AGCHAI): There is a general belief that as age progresses, individuals may become more risk averse, conservative and skeptical. Mpuga (2010) suggests that the young may tend to save and/or borrow more for investment while the old may be less inclined to borrow. It is hypothesised that the cooperative manager's age and probability of borrowing and amount to borrow are inversely correlated.

Educational level of coops manager/chairperson (EDUCATN): This represents the level of schooling attended by the person heading the cooperative. In the current analysis, educational status has two categories which are expressed as a dummy variable represented by zero for no or only informal education and 1 for attending formal schooling. Studies (e.g. Mpuga, 2010; Zapata, 2006) report that education positively affects entrepreneurs' decision to apply for credit, the amount of loan applied for and the chance of getting it. Higher education can also enable the manager to prepare sound business plans and loan applications that can convince the lender. Thus higher education is expected to enhance borrowing decision and amount to be borrowed.

Having professional manager (PROMANG): Having full-time professional manager could be a crucial factor that influences the nature, magnitude and scope of business activities, and overall performance of the cooperatives and their demand for credit. Having full-time paid professional manager is thus expected to increase especially the probability of demanding for a loan.

Age of the cooperative (COOPAG): This refers to the number of years since the formal establishment of the cooperative up to the date of this survey. It is expected that older cooperatives may have better experience, well-established business activities (that may require additional financing), better opportunity to establish links with various institutions as well as to accumulate assets that can be used as collateral to access loans. Zapata (2006) claims that the length of the firms' existence affects the lender's rationing behavior. It is anticipated that the age of the cooperative is positively correlated with its loan demand.

Cooperative's member size (MSIZE): It can be argued that the member size can reflect farmers' interest and confidence towards cooperatives. It can also be related to the magnitude of business activities, because agricultural cooperatives mainly depend on incomes generated by marketing members' produces. Cooperatives with large member size are therefore expected to depict higher demand for bank loans.

Total capital (TOTCAP): Total capital (in Birr) is the proxy for the initial endowment and is calculated as the sum of physical assets, equipment, share/bonds, cash in bank and cash on stock. Several studies (e.g. Zapata, 2006;

Mpuga, 2010; Aga and Reilly, 2011) report that firms that have better assets are more likely to seek or secure credit. This could enhance their ability to provide collateral and is likely to boost lenders' confidence. Thus we hypothesize that the level of total capital is positively associated with a higher probability of demanding loans.

Liability (LIA2012): This refers to the sum of all outstanding loans (when the survey took place) that the cooperative has to repay to the creditor. It can be logically expected that cooperatives with large outstanding liabilities may refrain from taking additional loans. Cooperatives with outstanding liabilities may also look for more loans to settle their outstanding loans and for additional business undertakings. It was therefore hypothesized that liability would have either positive or negative effects on demand for loans.

Total annual income (TOTINC): This refers to the total annual sales revenue generated both from coffee and non-coffee business activities during the year (in Birr). Mpuga (2010) argues that economic activities, needs and expenditure increase with firm's/household's income. It was thus expected that a higher income increases the probability and volume of loan demand.

Total expenditure (TOTEXP): This represents the sum of all kinds of expenditures incurred by the cooperative during the year 2012. The level of expenditure can reflect the magnitude of business activities of the cooperative. It is therefore expected that the greater the level of expenditure the more likely the cooperative is to demand credit.

Experience in coffee business (LENBUSS): Coffee business requires substantial amount of capital. Cooperatives with longer experience are more likely to establish links with various institutions and may undertake better and larger business activities. Moreover, experience enhances the technical and managerial skills of cooperatives. It is thus anticipated that the length of experience in coffee business (in years) increases the probability and amount of loan demand.

Primary activities of the cooperative (MBUSACT): The primary activity in which the borrower is engaged, as Mpuga (2010) notes, influences its demand for credit. Moreover, lenders may relate the growth or riskiness of a firm to the nature and riskiness of the sector which it operates in (Aga and Reilly, 2011). Involvement in various businesses may enable cooperatives to generate cash that would help them self-finance and relax their financial constraints. It is also possible that engagement in diverse activities can raise their appetite for loan. Thus the association of this variable with loan demand can be positive or negative. This is a dummy variable that takes the value of 1 if the coop is engaged in coffee and other trade activities, and 0 if only in coffee.

Membership to union (UNIMEMB): A study in Ethiopia (Aga and Reilly, 2011) reports that a firm that is a member of a business association is more likely to have access to credit. This could be due to the fact that membership of such organisations can increase links, information flow and trust among member firms and with others. Experience shows that cooperatives affiliated to unions appear to have better business activities than non-members. This variable is thus expected to positively associate with demand for loan.

Regional Location (LOCSNNP and LOCOROMO): The location of the firm could be an important factor that determines its demand for and access to credit. This can be related to population density, loan scarcity, market opportunity, and spatial distribution of financial institutions (Aga and Reilly, 2011). In relation to coffee production, location can be related to farming system, production level, processing method, infrastructure, strengths of cooperatives, etc. Barslund and Tarp (2008) found huge regional difference in the demand for credit in Vietnam. However, a priori expectation about the sign of this association is not clear. Taking the cooperatives in the SNNP region as a reference dummy variable, dummy for cooperatives in Oromia (LOCOROMO) was considered in the model. A value of 1 was assigned to cooperatives from the Oromia region and 0 otherwise.

Distance from banks (DISBANK): The distance from the lending institution could be an important factor determining access to loans. It can have implications for awareness about the service, trust between the lender and borrower and transaction costs. Studies (e.g. Barslund and Tarp, 2008) report that the demand for loan is negatively related to the distance between the borrower and the lender. This was however not expected to have significant impact on the volume of loan demand.

Previous default (DEFAULT): This is a dummy variable whereby a value of 1 was assigned if a particular cooperative had ever defaulted, and 0 otherwise. Cases of previous default can prevent cooperatives from accessing new loans. Therefore, it was hypothesized that those cooperatives which defaulted on previous loans would have less probability of demanding for loans. This was however not expected to significantly affect the amount to borrow.

DESIGN AND METHODOLOGY OF THE STUDY

Sampling Procedure

The data reported in this paper was collected using purposive sampling technique. Initially we selected the two major coffee growing regions of Ethiopia – Oromia and Southern Nations Nationalities and Peoples' (SNNP) regions, which account for 99% of the coffee produced in Ethiopia. The former and the later claim 64% and 35% of

the national share, respectively (CSA, 2014). Then all the eight zones taking part in the coffee cooperatives' credit guarantee scheme were purposively selected. These include: West Wellega, East Wellega, West Hararge, East Hararge, Kaffa, Wolayita, Hadiya and Kembata Tembaro. They represent different coffee production systems, agro-ecological conditions and socio-economic set-ups. However, this does not mean that they typically represent all the major coffee producing areas, because some of the zones targeted by the guarantee scheme are marginal coffee producers. The 12 districts participating in the scheme and 26 non-participant coffee producing districts were purposively selected from those eight zones. The decision to include cooperatives from non-scheme districts was made for comparison purpose, as well as due to limited number of coops involved in the coffee business from the scheme districts. A total of 100 primary cooperatives were purposively chosen among the 38 districts identified above. These include all the 22 cooperatives that were selected to participate in the guarantee scheme and another group of 78 non-scheme cooperatives.

Data Collection

Structured questionnaire was used to collect the bulk of the primary data. The survey took place in the last quarter of 2012 and first quarter of 2013. Senior zonal and district level cooperative/coffee experts were trained and administered the questionnaires by interviewing cooperatives' chairperson or managers and by reviewing

their records and documents (audit reports, coffee trade). To ensure accuracy and validity the questionnaires were pre-tested on five cooperatives and amended based on the feedbacks obtained. The enumerators were trained and given clear instructions for data collection. The literature and consultation with relevant experts ensured that the questionnaire is appropriately designed to enable it to capture relevant data.

Data Analysis

Stata 12 was used to analyse the data. Conventional descriptive statistics such as frequency tables, mean and percentage distribution were used to summarise and provide descriptions of various variables. To determine the impacts of cooperatives' institutional, managerial and business attributes on their loan demand, we adopted Heckman two-step selection model. In the first step, we carried out a Probit model based estimation to examine factors influencing the decision to borrow, while the second step estimation analysed determinants of the amount of credit demanded. In the first stage, the dependent variable is a dummy variable, while the dependent variable in the second stage is a continuous variable. The explanatory variables in both cases are a combination of nominal and scale measurements. The Heckman two-step selection model for the present study is expressed as follows:

Using the explanatory variables outlined in the previous section, loan demand (size of loan demanded) is specified as:

$$\text{Log(Loan Demand)} = \beta_0 + \beta_1 \text{LOGAGCHAI} + \beta_2 \text{EDUCATION} + \beta_3 \text{LOGCOOPAG} + \beta_4 \text{LOGMSIZE} + \beta_5 \text{LOGTOTCAP} + \beta_6 \text{LOGLENBUS} + \beta_7 \text{LOGTOTINC} + \beta_8 \text{MBUSACT} + \beta_9 \text{UNIMEMB} + \beta_{10} \text{LOCOROM} + \beta_{11} \text{LOGTOTEXP} + \beta_{12} \text{PROMANG} + \beta_{13} \text{LOGLIA 2012} + u_1$$

and we assumed that loan demand is observed if

$$\gamma_0 + \gamma_1 \text{LOGAGCHAI} + \gamma_2 \text{EDUCATION} + \gamma_3 \text{LOGCOOPAG} + \gamma_4 \text{LOGMSIZE} + \gamma_5 \text{LOGTOTCAP} + \gamma_6 \text{LOGLENBUS} + \gamma_7 \text{LOGTOTINC} + \gamma_8 \text{MBUSACT} + \gamma_9 \text{UNIMEMB} + \gamma_{10} \text{LOCOROM} + \gamma_{11} \text{LOGTOTEXP} + \gamma_{12} \text{PROMANG} + \gamma_{13} \text{LOGLIA2012} + \gamma_{14} \text{LOGDISBANK} + \gamma_{15} \text{DEFAULT} + u_2 > 0$$

Where u_1 and u_2 have correlation ρ .

The elasticity of the k th element of x on its conditional expectation is,

$$\frac{\partial E(Y/Z > 0, X)}{\partial x_k} = \beta_k \cdot \gamma_k \rho \sigma_{\epsilon} \epsilon^{-(1-\gamma_k)}$$

$\frac{\partial}{\partial x_k}$

$$\frac{\partial E(Y/Z > 0, X)}{\partial Z} \frac{Z}{Y} = \beta_k$$

Description of Dependent Variables:

- *Demand for loan-A for the selection equation (Aplon11)* – is the dummy dependent variable captured from a response to the question “Did your cooperative apply for a bank loan in 2011?”
- *Demand for loan-A for the outcome equation (Amn11)* – is the continuous dependent variable captured from response to the question “if your coops applied for a bank loan in 2011, what was the amount applied for?”
- *Demand for loan-B (Needblon3) for the selection equation* – this is the dummy dependent variable captured from the response to the question “does your cooperative seriously and genuinely need bank loan in 2012?”
- *Demand for loan-B (Lonrq12) for the outcome equation* – this is the continuous dependent variable captured from the response to the question “if your cooperative seriously/genuinely needs a bank loan in 2012, what is the amount you would like to obtain?”

RESULTS AND DISCUSSION

Socio-economic and Institutional Characteristics of the Study Cooperatives

This chapter begins by providing some socio-economic and institutional characteristics of the study cooperatives, giving emphasis to variables included in the analysis (Table 2, under Annex). As regards their age distribution, some of the cooperatives were as old as 43 years, while a few were just 2 years old during the survey, with a mean age of 13.38 years. This may have implications for their credit history and experience in coffee business. The majority (85%) were established after 1989, towards and after the end of the military regime. This is not surprising as the recent conducive policy environment appears to encourage the emergence of several forms of cooperatives. The mean member size for the study cooperatives was 579 farmers. The findings show that the vast majority (over 80%) of the cooperatives' chairpersons are found in the middle age group (32 to 50 years), with a mean of 41 years. This appears to be ideally productive and active in pursuing alternative business avenues as well as in gaining sufficient management experience. In terms of educational status, 82% of the coops' chairpersons or managers (82%) attended formal education, while surprisingly 18% have no education or attended only informal education. Likewise, only 11 cooperatives reported having full-time professional managers, while the vast majority (89%) were being managed by committees. This has implications for their institutional and resource management and business performance. Thus there is a need to promote engagement of professionals in cooperatives' management and to modernise their systems.

Most cooperatives are located far away from the local bank branch offices, on average, about 18 Km away. The farthest cooperatives are located up to 89 Km away from the nearest bank. Distance affects the interaction and relationship of cooperatives with the banks; access to information and monitoring and supervision of loans. In terms of union membership, the majority (90%) were members of a cooperative union, which implies that most of the cooperatives in cash crop-growing areas are members of some form of secondary level cooperative structure. With regard to the sector of primary activity, three-quarters of the cooperatives (76%) reported being involved in diverse businesses including coffee and grain trade, input supply and other trade activities. About a quarter were involved only in coffee trade. However, nearly all of the study cooperatives were engaged either solely in coffee trade or together with other business activities. On average, the surveyed cooperatives have 6 years' experience in the coffee business, and this varies from 1 to 15 years. Thus, some of the coops are new and have limited experience in coffee processing and trade.

The cooperatives included in the analysis have a maximum total capital that is worth 12.86 million Birr, while

some had no capital of any value. The mean was 1.186 million Birr. This has implications for loan access as lending banks may lack confidence in cooperatives with assets of poor quality or value. The total income (from coffee and non-coffee trade) during the year ranges between zero and 8.26 million Birr, with a mean of 778,475 Birr. Massive differences were observed in the amount of incomes generated by different cooperatives, which suggests huge variations in their institutional capacity and business activities. The amount of outstanding liabilities cooperatives had to repay varies from zero to 2.18 million Birr. More than half did not have any liability, which possibly suggests their weak participation in borrowing. Likewise, the total expenditure incurred by the interviewed cooperatives during the year ranges between zero and 4.5 million Birr, with a mean of 375,201 Birr. Since their business activities are very limited, most of them did not incur substantial costs. With regard to the case of default, only 10% reported defaulting on previous loans, while the vast majority never failed to repay their loans. The latter group may possibly include those who never borrowed from banks.

Though the majority of cooperatives in Ethiopia lack their own capital and often rely on external loans to finance their operations such as collecting, processing and marketing members' coffee, this study shows that only 45% of the study cooperatives applied for loan during 2011 (the year preceding the survey). The actual loan amount cooperatives applied for vary from 100,000 Birr to 5 million Birr, with an average of 1.31 million Birr per cooperative (Efa, 2016). This amount appears to be on the lower side to carry out meaningful business activities on such commodities.

Asked if they would seriously and genuinely need a bank loan at the prevailing market interest rate for the 2012 coffee season, most cooperatives (88%) responded in the affirmative while only 12% expressed lack of demand for credit during that particular year. The amounts demanded by a cooperative range between 120,000 and 7 million Birr, with a mean of 1.47 million Birr (Ibid). The variation between the number of cooperatives that actually applied for loan in 2011 and those who showed potential demand during the following year (2012) points to presence of obstacles that impede them from effectively seeking loans.

Determinants of Cooperatives' Credit Demand

This section presents the findings and discussions on the determinants of cooperatives' loan demand (decision to borrow and volume demanded). As outlined in the analytical framework, we employed two approaches to capture cooperatives' loan demand. Table 3 and Table 4 present the empirical results from the Heckman two-step selection model based on the two approaches we employed (i.e. loan demand-A and demand-B, respectively). It is important to note that natural logs were considered in the model for all continuous variables to

identify their likely relative effects on credit demand. Thus coefficients on continuous variables measure elasticity in percentage points on amount of credit demanded by cooperatives. The following formula was used to get the expected relative effects for all continuous variables $(\text{Exp}(\text{Coef})^{\wedge}-1)*100$.

As outlined in Table 3, the results reveal that out of the variables included in the model, five and two variables significantly influenced the decision to borrow and the amount of loan demanded-A, respectively. Interestingly, outstanding liability significantly (at 1%) and positively affects the probability of demanding for loan-A. In other words, cooperatives with higher liability are more likely to demand loan. This could be explained by the fact that cooperatives with high liabilities may seek additional loan to settle their outstanding balance that may approach maturity dates. It is also logical to assume that such cooperatives might be short of own cash to finance their operations and may revert to external finance. Likewise, as expected, amount of total capital positively and significantly (at 1%) influences the probability of demanding for loans. This is not surprising as well-established cooperatives with valuable assets are more likely to win banks' confidence and/or provide collateral and access loan. Moreover, such cooperatives are more likely to further expand their business activities which may require additional external financing. Similarly, education and regional dummies for Oromia positively and significantly affect probability of demanding for bank loan-A at 10% and 5%, respectively.

Cooperatives that are managed by persons with formal education are more likely to demand loans than those managed by illiterate or persons with only informal education. This was not surprising as cooperatives having managers with higher educational status are more likely to undertake sound business as well as can prepare viable business plans that can convince lenders. The positive influence of being located in the Oromia region on probability of demanding for loans could be related to the strength of the cooperative marketing system through the Oromia union, the presence of the Cooperative Bank of Oromia and some relatively strong cooperatives in the region. For instance, among those included in the current analysis, cooperatives with professional managers were only found in the Oromia region. Barslund and Tarp (2008), in their study in Vietnam, similarly found massive regional difference in the demand for credit. The regional differences in terms of credit demand suggests the need for strengthening access to market outlets and promoting experience sharing between cooperatives in the two regions. Age of cooperative was found to significantly and negatively affect probability of demanding for bank loan-A. This can possibly suggest the fact that the newly formed cooperatives are short of resources and in dire need of external loans to finance their operations.

The rest of the variables included in the analysis did not significantly affect the likelihood that a cooperative seek for a bank loan-A. In particular, the insignificance of the influence of having a professional manager could be attributed to the fact that a few coops had full-time hired professional managers. In addition, the findings show that most of the cooperative managers or chairpersons are in a fairly productive age group (32 to 50 years), which might have contributed to the lack of significance in this regard. Similarly, lack of a statistically significant association between previous cases of default and the decision to demand loans could be attributed to the fact that a few cooperatives reported defaulting on previous loans. Likewise, the fact that the vast majority of the study cooperatives are members of unions appears to undermine the influence of union membership in demanding for loans. These results call for further investigation by taking larger samples with more cooperatives that have not been affiliated to any union.

The lack of a statistically significant relationship between sector of primary engagement and loan demand could be due to the fact that nearly all of the study cooperatives were engaged in coffee trade alone or in combination with other businesses. Lack of a significant association between member size and the probability of demanding a loan may not be taken as a surprising outcome. Because logically member size can determine level of business activities and correspondingly volume of loan demanded. But though the volume varies, most coops may demand some sort of loan irrespective of their member size as they lack sufficient cash to finance their operations.

In respect of factors influencing amount of loan demand-A, our analysis found a few variables to significantly affect volume of loan-A demanded by cooperatives. Consistent with the theoretical framework, member size and affiliation to a union positively and significantly (at 10%) influence the volume of loan-A demanded. In other words, membership of a union, on average, increases the amount of loan demanded by a cooperative by 331%, while one percent increase in member size raises the volume of loan-A demand of that particular cooperative by 54%. This is an indication of the presence of backward and forward linkages with members (who supply their produce) and output markets for their products through their unions. Access to members' produce and better market outlet for their produce is likely to determine level of their business activities and a corresponding need for financial resources. This is in line with the findings of previous studies (e.g. Aga and Reilly, 2011) which reported that membership to a business or social organisation enhances demand for and/or access to institutional loans. This suggests the importance of supporting cooperatives in mobilizing and promoting members' participation as well as in facilitating their up-ward integration into higher level coops structures.

The remaining variables were not statistically significant at any conventional level of significance in influencing volume of loan-A demanded. This could possibly reflect the fact that majority of the surveyed cooperatives did not have huge variations in terms of the volume of loan they applied for in 2011. However, in particular, the absence of a statistically significant relationship between sector of primary engagement and amount of loan demanded needs further investigation with a larger number of cooperatives and data collected across seasons as coffee production reveals seasonal fluctuations.

Table 3: Heckman two-step selection model for amount of loan demanded and decision to borrow (A)

Variable	Coefficient	Std. Err.	P-value
Volume of loan demanded (Amn11)			
PROMANG	0.1403885	0.5209796	0.788
MBUSACT	-0.5801692	0.5378829	0.281
UNIMEMB	1.461634	0.8464569	0.084
EDUCTN	-0.5825352	0.5081276	0.252
LOG(LIA2012)	-0.0431383	0.0442716	0.330
LOG(EXP2012)	-0.0055172	0.057115	0.923
LOG(LENBUSS)	-0.0724728	0.2934427	0.805
LOG(MSIZE)	0.5399392	0.2871611	0.060
LOG(TOTINC)	-0.0481375	0.052126	0.356
LOG(COOPAG)	0.3234241	0.3781674	0.392
LOG(TOTCAP)	0.2541119	0.2222774	0.253
LOG(AGCHAI)	-1.169952	1.081376	0.279
LOCOROM	0.143685	0.6233337	0.818
Constant	11.39548	5.439346	0.036
Probability of borrowing (Aplon11)			
PROMANG	0.2681765	0.7202767	0.710
MBUSACT	-0.4841777	0.8397229	0.565
UNIMEMB	1.263913	0.9083927	0.164
EDUCTN	0.9243091	0.5431939	0.089
LOG(LIA2012)	0.115598	0.0399705	0.004
LOG(EXP2012)	0.058677	0.0831454	0.480
LOG(LENBUSS)	-0.4937549	0.3932849	0.209
LOG(MSIZE)	0.322028	0.2731652	0.238
LOG(TOTINC)	-0.0167971	0.0642681	0.794
LOG(COOPAG)	-0.8257904	0.3639598	0.023
LOG(TOTCAP)	0.527875	0.2035161	0.009
LOG(AGCHAI)	-0.9114622	1.280513	0.477
LOCOROM	1.254774	0.5055682	0.013
LOG(DISBANK)	-0.0797994	0.2224735	0.720
DEFAULT	0.9383014	0.7089079	0.186
Constant	-6.274852	5.375091	0.243
Lambda	-0.973634	0.7766501	0.210
sigma	0.97363396		
Number of observations	100		
Censored observations	55		
Uncensored observations	45		
Wald chi² (13)	25.74		
Prob > chi²	0.0184		

We further examined potential demand for loans by asking cooperatives if they seriously and genuinely need loans during the following year (2012 coffee season). Among the variables included in the model analysis (Table 4), understandably age of the cooperative manager or chairperson significantly (at 1%) and negatively influences probability of demanding for loan-B. This is consistent with existing literature as farmers become sceptical and reserved as age progresses, while the younger ones are more open to innovate, take risk and expand their businesses, which may require additional finance. Another interesting finding is the statistically significant, but negative association between the probability of demanding for loan-B and being located in the Oromia region (at 1%) and educational level of the cooperative manager or chairperson (at 10%). The aforementioned finding of loan-A demand analysis however revealed a positive relationship between being located in Oromia and probability of demanding for loan. Observations and discussions with key informants reveal that the inverse relation between the two variables could be related to the poor coffee yield in most districts of Oromia (such as West Wellega) during the 2012 coffee season. Moreover, among the interviewed cooperatives, it was observed that those located in the Oromia region appear to have better experience in coffee business. Thus they could be more rational and realistic in demanding for loans by considering prospects of coffee yield, level of business activities and market projection. Surprisingly, the results of model-B indicate that those cooperatives with less educated chairpersons were more likely to demand institutional loans. The reluctance of the more educated chairpersons/managers in demanding loans could be attributed to their ability to articulate, analyse and carefully plan by considering costs, risks and potential benefits. Because this set of loan demand tends to reflect a desire to get bank loans and may not be necessarily grounded on sound analysis and decisions.

As regards factors significantly affecting amount of loan demand-B, the results of the Heckman model reveal that total capital, total expenditure, member size and being located in the Oromia region significantly (at 5%) and positively affect the amount of loan demanded by cooperatives. One percent increase in total capital results in an increase of loan demand-B by 17%. As discussed in the model-A findings, presence of a positive association between total capital and amount of loan demanded was not surprising. Previous studies (e.g. Zapata, 2006) also confirm that size of assets has a direct relationship with the amount demanded and volume of loan allocated by lending institutions. On the other hand, a one percent increase in the cooperative's expenditure raises its loan demand by 14%. The significant effect of total expenditure on amount of loan demanded could probably be due to the fact that higher expenditure might be a reflection of an increase in the magnitude of business activities, which may necessitate external funding. It could also be related

to the need to make further investment in business expansion and infrastructural facilities. Similar to its effects on amount of loan-A demanded, member size was found to positively relate to the volume of loan-B demanded by cooperatives. One percent increase in member size leads to an increase in its loan-B demand by 45%. Again, as discussed in the above section, the reasons for the positive impact of member size on amount of loan demanded are obvious. More interestingly, contrary to its effect on the probability of demanding for loan-A, cooperatives in the Oromia region appear to demand larger volumes of loan-B than their counterparts in the SNNP region. Being located in the Oromia, on average, increases cooperatives' loan-B demand by 162% as compared to their counterparts in the SNNP. The positive association between being located in Oromia and amount of loan-B demanded could be attributed to the fact that they have better coffee business activities and a strong linkage with the Oromia union, which is one of the stronger unions in the country. In other words, whenever they decide to apply for a loan, cooperatives in the Oromia region ask for a larger volume.

Table 4: Heckman two-step selection model for amount of loan demanded and decision to borrow (B)

Variable	Coefficient	Std. Err.	P-value
Volume of loan demanded (Lorrq12)			
PROMANG	-0.138373	0.3452198	0.689
MBUSACT	-0.5187034	0.3214322	0.107
UNIMEMB	-0.1323564	0.4121789	0.748
EDUCTN	0.0107203	0.3801742	0.978
LOG(TOTACAP)	0.1675386	0.0683333	0.014
LOG(LIA2012)	-0.0016561	0.019319	0.932
LOG(EXP2012)	0.141438	0.0670573	0.035
LOG(LENBUSS)	-0.1829646	0.164264	0.265
LOG(MSIZE)	0.4466184	0.1789763	0.013
LOG(TOTINC)	-0.0372878	0.0255494	0.144
LOG(COOPAG)	-0.062153	0.1859289	0.738
LOG(AGCHAI)	1.082387	1.133738	0.340
LOCOROM	0.9647641	0.4481761	0.031
Constant	4.410085	4.156586	0.289
Probability of borrowing (Needblon3)			
PROMANG	0.5271658	0.8258265	0.523
MBUSACT	0.2898444	0.6568349	0.659
UNIMEMB	-0.0694663	0.8176807	0.932
EDUCTN	-1.325225	0.6925296	0.056
LOG(TOTACAP)	-0.117231	0.1096042	0.285
LOG(LIA2012)	0.0166001	0.0401665	0.679
LOG(EXP2012)	0.1047639	0.0901406	0.245
LOG(LENBUSS)	-0.0572499	0.3291322	0.862
LOG(MSIZE)	0.2004843	0.2830207	0.479
LOG(TOTINC)	0.0163903	0.053449	0.759
LOG(COOPAG)	0.1066444	0.3979884	0.789
LOG(AGCHAI)	-3.528254	1.256949	0.005
LOCOROM	-1.527995	0.5658038	0.007
LOG(DISBANK)	0.2796042	0.2287041	0.221
DEFAULT	0.6749462	0.6741069	0.317
Constant	13.95016	5.22519	0.008
Lambda	-0.7542114	0.8904642	0.397

rho	-0.90731
sigma	0.83126135
Number of observations	100
Censored observations	20
Uncensored observations	80
Wald chi ² (13)	52.74
Prob >chi ²	0.0000

CONCLUSIONS AND IMPLICATIONS

This study focused on exploring determinants of coffee farmer cooperatives' demand for institutional credit under the Ethiopian context. We employed two approaches to estimate loan demand. One of the limitations in the first approach is that it fails to capture the demands of credit self-constrained cooperatives and tends to underestimate demand for credit. In contrary, the second approach encounters the risk of reflecting desire of cooperatives in obtaining loans which might not be immediately transformed to actual demand. However, carrying out such separate exercises using both approaches could help to pinpoint to potential demand that could be transformed to revealed demand with necessary support interventions. Different sets of variables with different signs were found to affect the decision to borrow and the volume of loans demanded by coffee farmers' cooperatives. These factors appear to vary with the approaches used in estimating loan demand. Among the variables included in the model, member size, age of cooperative, age and educational level of a cooperative chairperson, regional location, union membership, total capital and expenditure during the year are the significant factors that influence credit demand in different ways. If farmer cooperatives have to effectively demand for and utilize institutional loans, it is critical to strengthen their organizational, management and business capacities. Deliberate efforts also need to be made to improve cooperatives access to financial services through improving physical access to the lending institutions as well as by creating favourable lending terms (and loan products) and regulatory environments. Further research might be carried out with more number of cooperatives and by including those in other major coffee growing areas of the country as credit demand may vary over time and across regions with changes in coffee production, market price and cooperatives' capacity.

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APPENDIX

Table 1: Description of explanatory variables and how they were used in the model

Variable name	Definitions and how these variables were measured
AGCHAI	Age of cooperative's manager or chairperson in years
EDUCATN	Educational level of cooperative chairperson/manager (no and informal schooling = 0, attending formal education = 1)
COOPAG	Age of the cooperative in years (since its establishment)
MSIZE	Number of members of the cooperative
TOTCAP	Total capital (in Birr), is the sum of physical assets, equipment, shares/bonds, cash in bank and cash on stock
LENBUSS	Cooperative's experience in coffee business in years
TOTINC	Total income generated from coffee & non-coffee business during the year (in Birr)
MBUSACT	Primary activity of coops (Coffee & other trade activities = 1, and coffee only = 0).
UNIMEMB	Membership to cooperative union (Member = 1, and 0 otherwise)
LOCSNNP & LOCOROM	Regional location (taking the cooperatives in the SNNP region as a reference dummy variable, 1 for locations in Oromia, and 0 otherwise)
DISBANK	Distance from the nearest banks (in Km)
TOTEXP	Total expenditure incurred by the cooperative during the year 2012 (Birr)
PROMANG	Having professional manager (have manager = 1, and 0 otherwise)
LIA2012	<i>Liability</i> , is the sum of all outstanding loans to be repaid by coops (in Birr)
DEFAULT	Previous case of default (Defaulted on previous loan = 1, and 0 otherwise)

Note: Continuous variables have been converted to natural logs.

Table 2: Descriptive statistics of the variables included in the model

Variables	Max	Min	Std. D.	Mean
Cooperatives member size	2500	44	534.60	579
Age of cooperatives (years)	43	2	9.26	13.38
Age of coop chairperson/manager (years)	62	27	6.73	41
Total capital	12,862,200	0	1,844,330	1,186,000
Total liability as end of 2012 (Birr)	2,182,549	0	449,530	216,276
Total expenditure in the year 2012 (Birr)	4,508,400	0	777,707	375,201
Total income for the year 2012 (Birr)	8,260,129	0	1,488,650	778,475
Distance from the nearest bank (Km)	89	1	16.87	17.55
Experience in coffee business in years	15	1	3.76	5.88
Amount of loan applied for in 2011 (Birr)	5,000,000	100,000	1,387,250	1,310,000
Amount of loan coops demand as of Sept 2012 (Birr)	7,000,000	120,000	1,521,550	1,476,500
	Yes		No	
	Percentage		Percentage	
Have professional manager	89		11	
Cooperative member of a union	90		10	
Educational level of chairperson/manager				
None and informal education	18			
Attended formal education	82			
Did coop apply for bank loan in 2011?	45		55	
Coop seriously needs bank loan at September 2012?	88		12	
Cooperative ever defaulted?	10		90	
Cooperative's main business activity				
Only coffee	24			
Coffee and other trade activities	76			
Regional location				
Oromia	50			
SNNP	50			

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