



DEPARTMENT OF ECONOMICS

**HOUSEHOLD-LEVEL CREDIT CONSTRAINTS
IN URBAN ETHIOPIA**

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Abstract

Empirical evidence on determinants of credit constraints and the amount borrowed by urban household in Sub-Saharan Africa is almost non-existent. Using an extended direct approach by virtue of the unique data set we have (the Fourth Round Ethiopian Urban Household Survey), we analysed the determinants of credit constraints and the amount borrowed by urban households. We find a high percentage of credit-constrained households, the majority of which constitute discouraged borrowers. Discrete choice models that control for potential endogeneity and selectivity bias have been fitted to our data. Our analysis shows current household resources, number of dependants, and location as significant correlates.

Keywords: credit constrained households; credit rationing; endogeneity; instrumental variables; urban Ethiopia; Africa

JEL Classification: D12; O12; O55

1. INTRODUCTION

Credit constraints are well documented in the literature. The main reasons are: imperfect information and adverse selection effects that are strong enough to push some households out of capital markets (Hoff and Stiglitz, 1993; Stiglitz and Weiss, 1981; Braverman and Guasch, 1993; Aryeety and Udry, 1997); high transaction costs in obtaining credit, or risk rationing imposed by borrowers unwilling to lose their collateral (Boucher et al., 2005).

Households' credit constraints have detrimental effects on asset accumulation and

poverty reduction. Credit constraints reduce the capacity to smooth consumption in the face of idiosyncratic and/or covariate risks (Udry, 1991; Eswaran and Kotwal, 1990; Zeldes, 1989) and deter investment in children's health and education (Becker and Tomes, 1986; Foster, 1995). Credit constraints would also reduce the availability of financial resources which can be used to buy inputs, finance business start ups and hence reduce poverty. In the specific context of Ethiopia, provision of credit for the poor can complement existing reform packages to pro-poor growth (Dercon and Krishnan, 2001; Kedir, 1999).

A good understanding of the determinants of households' access to credit is an integral part of poverty reduction efforts in poor countries (Mosley, 1999; Matin, et al., 2002; Amin et al., 2003). However, rigorous examinations have been hampered by the absence of household-level data that enables researchers to identify credit-constrained households. There is also yet little information, particularly in urban areas on the characteristics of the households who are likely to be constrained and the extent of credit rationing in the formal sector. This study is motivated by the lack of studies based on survey data collected from urban households in Africa that directly test the presence of credit constraints¹. Most studies focus on rural credit markets in Asia especially in India (Pal, 2002; Kochar, 1997; Bell, et al., 1997). Empirical specification of households' credit constraints is pertinent as the welfare of households can be better examined if those who are credit constrained can be identified.

The remainder of the study is organized as follows. Section 2 discusses some theoretical issues of credit constraints² followed by the various empirical approaches

of identifying credit-constrained households in section 3. Section 4 gives a description of the data and our definition of credit constrained households. Section 5 gives insight into the structure of credit markets in urban Ethiopia. Section 6 presents and discusses our econometric evidence. Finally, we forward concluding remarks and highlight some policy implications of our results.

2. CREDIT CONSTRAINTS IN LOW INCOME COUNTRIES

The most influential model of the demand for household credit is the permanent/life-cycle model of consumption (Friedman, 1957). The model assumes the presence of perfect capital markets. An implicit assumption of this neo-classical model is that institutions (economic and political) do not matter (North, 1993), even though they determine the structure and costs of human interaction. In developing countries, especially low-income countries such as Ethiopia, markets are characterised by institutional rigidities that deny the sustainability of the neo-classical assumptions of well functioning markets, perfect competition and mobility of factors of production. With institutions playing a critical factor in determining the performance of economies, it is perhaps no surprise that savings and credit have played the role of coping mechanisms in times of income loss and in situations where the state is too weak to implement effective labour market policies. After more than a decade of neo-liberal reform with the assistance of the IMF to bring about well functioning labour markets, employment creation in Ethiopia was negative (De Gobbi, 2006).

Households face an environment characterized by underdeveloped capital markets,

ubiquitous information asymmetry and weak mechanisms to enforce formal contracts. The main coping mechanism for poor households is informal networks, which act as risk sharing mechanisms (Cox and Fafchamps, 2007). Households are more likely to receive gifts from close relatives such as parents, spouses children and loans from more distant relatives (in-laws, uncles and aunts). Krishnan and Sciubba (2004) highlight the significant role played by extended family and kinship relationships in pooling labor in Rural Ethiopia.

A number of studies have analyzed the issue of credit constraints at the household level and its impact on welfare outcomes such as income, consumption, nutrition and agricultural productivity (Diagne, 1999). This study focuses on determining which types of households have encountered difficulties in obtaining credit and their characteristics as well as the determinants of the likelihood of being rationed out of the credit market and the volume of loan accessed by households. This can be a useful guide to policy makers as to where targeting is needed to remove constraints. In other words, determining which households are credit constrained could increase the effectiveness of credit programs for the poor (Barham et al., 1996; Carter and Olinto, 2003).

3. EMPIRICAL APPROACHES TO IDENTIFY CREDIT-CONSTRAINED HOUSEHOLDS

Empirical studies aiming to identify credit constrained households are based on two major approaches. Most of the studies follow an indirect approach based on the sensitivity of current consumption to transitory income as indicated in the life

cycle/permanent income hypothesis (Hall, 1978; Hall and Mishkin, 1982; Hayashi, 1985; Zeldes, 1989; Diagne et al, 2000). It is assumed that, with standard convex preferences, and in the absence of liquidity and borrowing constraints, transitory income shocks should not affect consumption (Diagne et al., 2000; Zeldes, 1989). These indirect tests could result in imprecise estimates of the effects of credit constraints. Also, uncertainty can induce precautionary behavior and a dependence of consumption on transitory income even in the absence of credit constraints.

The second approach is a direct one, which exploits information about the status of loan applications of households (see Feder et al., 1989; and Jappelli, 1990). Feder et al's survey of China asks households whether at the going interest rate they would have liked to borrow more institutional credit³ than they were granted. Non-borrowing households were asked about their reason for not borrowing. If it was not due to sufficient credit, but due to inability to obtain credit, then this group was classified as constrained⁴. This method was also used by Barham et al (1996). Households were asked whether they have applied for credit; if so, whether their application was rejected; and if it was approved, whether they have obtained the full amount that they requested. Feder et al. (1989) found that defining credit-constrained households this way was compatible with data on the overall liquidity of the households. However, using this method of determining whether households are credit-constrained also requires collecting information on households that did not apply for credit. This point is analogous to the argument for including discouraged workers in unemployment statistics.

Jappelli (1990) identifies credit constrained consumers as those who had their request for credit rejected by financial institutions. A household will be credit constrained if:

$$C^* - Y - A(1+r) > D \quad (1)$$

where C^* is optimal consumption, Y (income) and A (nonhuman wealth) are the resources available to each consumer, r is the real interest rate and D is the amount that the consumer can borrow.

As can be seen from Equation (1), both supply side and demand side factors are at play and will jointly determine whether the consumer is credit constrained: on the left hand side the difference between his optimal consumption and his overall wealth and on the right hand side the number of financial institutions (formal and informal) that can provide credit.

Jappelli (1990) also identifies households who are discouraged from taking a loan as credit constrained. The discouraged are those who answered “yes” to the question: *“Was there any time in the past few years that you (or your husband/wife) thought of applying for credit at a particular place but changed your mind because you thought you might be turned down?”* In general terms, and after considering both demand and supply factors, a household will be credit constrained if its demand for credit is higher than the available credit supply. Some of the variables that will determine the extent of the binding constraint are: (i) households’ current resources, (ii) proxies for future income, (iii) demographic characteristics and (iv) proxies for past credit history and

institutional constraints.

Based on surveys conducted in Malawi and Bangladesh, Diagne (1999) and Diagne (et al., 2000) argue that the direct approach that classifies households into discrete groups fails to measure the extent of the credit constraints faced by households. This line of research stresses the importance of the data collection methodology that identifies a credit limit variable – the maximum that the lender is willing to lend. This limit is not the maximum the lender is able to lend to any borrower. The borrower is not constrained if the optimal amount desired by her/him is less than the amount that can be borrowed⁵.

Other tests of credit constraints have been conducted in the context of the analysis of consumption. Since the theory of the optimization of consumption over time says that household consumption is constrained only by its lifetime budget constraint, if true, this means that households' propensity to increase consumption is less if they receive a temporary increase in income than if they receive a permanent increase in income. However, empirical studies have shown that consumption is more sensitive to temporary income changes than this theory would suggest, perhaps because households suffer from credit constraints.

Zeldes (1989) explicitly used Euler equations (as first done by Hall 1978) to test the hypothesis that households maximize their lifetime utility subject to credit constraints. He proceeds by specifying a model and split the sampled households in advance into two groups, one of which (with low or negative wealth) is being credit constrained.

However, some authors have argued that if households are credit-constrained, they may change their consumption without violating the Euler equations, thus weakening the usefulness of such tests (Deaton, 1992).

This paper follows a direct approach to identify credit-constrained households in urban Ethiopia. We extend the definition of credit constrained households adopted by Jappelli (1990) by taking into account households who have applied for loan but received an amount which is less than what they have applied for. Our extended definition allows us to provide a more comprehensive measure of credit constraints which includes self-imposed rationing resulting from high default risk. After establishing the extent of rationing in the formal sector, we examine the characteristics of the households who are likely to be constrained and identify the factors that affect the probability of being credit constrained and the volume of loan amount demanded by households. The results of our paper would contribute to the existing survey-based quantitative and direct evidence on households' access to credit in developing countries.

4. DATA AND AN EXTENDED DEFINITION OF CREDIT-CONSTRAINED HOUSEHOLDS

The analysis in this study is based on the fourth round socio-economic survey of urban households in Ethiopia (EUHS, 2000) which has been collected by the Department of Economics of Addis Ababa University in collaboration with the Department of Economics of the University of Goteborg, Sweden. The survey questionnaire was designed to capture the major socio-economic characteristics of

urban households. It included modules on household demographics including education, credit, rural-urban migration, employment and income, consumption, ownership of durables, housing, health, welfare and welfare change indicators.

A sample of 1500 households was selected from seven major urban centres of the country. The total sample size was distributed over the selected urban centres proportional to their populations, based on the CSA's (Central Statistical Authority) 1992 projections. Accordingly, the sample included 900 households in Addis Ababa (the capital city), 125 in Dire Dawa, 75 in Awassa, and 100 in each of the other four towns.

Due to a unique nature of our survey information, we identified three categories of credit constrained households. The first category of constrained households is defined as those households that report a positive response to the following question: *“During the last 12 months, did any member of your household apply for a loan and was the loan completely rejected?”* In addition, our data consists of information on two more other categories of households. The first category of households consists of households that have applied for a loan and who reported less than 100 percent as the loan percentage approved. These households are credit-constrained because they applied for a loan but got a loan amount less than the amount they applied for. The third category of constrained households is what we classify as ‘discouraged borrowers’. Our data asks households to supply their reasons if they failed to apply for a loan in the last 12 months. For instance, households have cited many reasons such as *‘we will not have any chance of success’*, *‘loan application takes long time to process’*, and *‘high interest rate’*. In the present application, we included those

households that give the above reasons among credit-constrained households. Our extended direct approach enabled us to provide a more complete definition of credit constrained households unlike previous studies (Diagne et al., 2000; Jappelli, 1990). In the next section, we discuss some of the characteristics of credit markets in urban areas in Ethiopia.

5. MAIN FEATURES OF THE CREDIT MARKET IN URBAN ETHIOPIA

This section explores the structure of credit markets in urban Ethiopia in detail. One of the main observable features of credit markets in developing countries is the presence of segmented and well-defined formal and informal financial institutions (Aryeetey and Udry, 1997; Bell, 1993; Basu, 1983). The formal sector consists of commercial banks while the informal sector includes microfinance institutions⁶, indigenous credit sources such as landlords, rotating savings and credit associations (ROSCAs), money lenders, trade creditors and family and friends.

The degree to which these sectors are affected by adverse selection, moral hazard and enforcement problem determines the nature of the transactions between lenders and potential borrowers. The discussion below highlights the main feature of the urban credit market in Ethiopia.

Sources of loans

The information on sources of loans reveals the importance of the informal sector. According to table 1 below, 79% of the 315 households obtained their loan from the

informal and semi-formal sectors while 21% of loans were obtained from the formal sector. The most predominant source within the informal sector is '*friends and relatives*' (75%). Not a great proportion of loans originate from group schemes such as ROSCAs. This is not surprising because Ethiopian ROSCAs are primarily formed as vehicles of saving mobilization rather than credit institutions. It is interesting to note that there are few loans obtained from moneylenders who are dominant lenders elsewhere such as India and Thailand (Bell, 1993). In the formal sector, the microfinance institutions play the dominant role in lending (45%) while banks and the government provide very few loans.

[Table 1 about here]

Duration of loans

Almost half of the households that reported taking out loans did not report the due date of their loans. For those we observe valid responses, most of the loans are short-term loans. For instance, 96 percent of the loans have to be repaid within one year. A further examination of the data reveals that most of the short-term loans have originated from informal lender. Therefore, there is a strong link between the source and duration of the loan – a link that might extend to the purpose for which the loan amount is used.

Who has a preferential access to different sources of loans?

We investigated whether households headed by males and females have differential

access to various sources of loans. According to table 2 below, on the aggregate, both types of households have almost equal access to credit; the number of male headed households that accessed loans being slightly less than that of female-headed households. 55 percent of the individuals who accessed formal loans are females as opposed to 51 percent in the case of informal loans. While friends and relatives give more loans to males, institutions such as micro-finance institutions give more loans to females. The high participation by women in informal networks is consistent with other studies in Africa, which show that women, especially married women use informal networks to protect their earnings against claims by their husbands (Hogset, 2005).

[Table 2 about here]

Lending and borrowing behavior

There are very few households that have a bank account (only 16% of them), indicating little use of formal institutions for borrowing and/or saving purposes. This is interesting, given that our survey information is collected from the seven major urban areas in Ethiopia. This indicates the acute lack of financial depth even in the major urban centers of the country.

Uses of loans from each source

Households took loans both for consumption⁷ and productive purposes. The two major reasons for taking out a loan related to food purchases (28.5%) and expansion/

setting up businesses (27.6%). Other important reasons include payment of utilities and related expenses (13.8%), financing health, education and transport expenses (13.4%) and purchase of consumer durables (11.0%). Very few households took out a loan to build a house (5.7%). Unlike the findings for rural credit markets, consumption finance is the main reason for borrowing in urban Ethiopia (Gill and Singh, 1997; Swaminathan, 1991; Timberg and Aiyar, 1984).

In an attempt to uncover whether there is any systematic relationship between purpose and source of loans, we found that friends and relatives provide loans practically for all purposes. This confirms the fact that informal agencies ensure a lower probability of default given a better knowledge of their clients and do not suffer from severe adverse selection, moral hazard and enforcement problems as formal credit institutions (Basu, 1983). After friends and relatives however, credit associations and microfinance institutions are the next largest lenders, and tend to lend for various purposes.

However, formal sources such as banks do not fund consumption but provide loans for business start ups/expansion suggesting a certain degree of segmentation. This indicates quite a high degree of exclusiveness of loans from the various sectors which results from asymmetric information limiting the extent to which formal lenders can monitor borrower activities, hence excluding borrowers from formal sector loans (Hoff and Stiglitz, 1990).

*Interest rates*⁸

Apart from the interest rates charged, there are no data on any other conditions imposed on loans by lenders such as interlinkages of contracts with other markets. The minimum rate was 0% while the maximum was 20%, with 33% of loans being interest free. The presence of extreme variability in the interest rate charged by lenders within an economy is one of the salient features of credit markets in developing countries (Banerjee, 2001; Fafchamps, 2000). The mean interest rate is only 3.1%. We argue that this is not due to the fact that a proportion of the population surveyed is significantly Islamic⁹ because Muslims constitute only 13.3% of all the households interviewed. Hence the underlying reason for low use of interest rates could be explained if we link interest rates with sources of loan. As expected, friends and relatives lend without requiring interest payments. In addition, employers, credit associations and even NGO/Government too give a small number of interest free loans. Therefore, not all formal sector loans are interest bearing and not all of the loans obtained from friends and relations are interest free. For instance, micro-finance institutions, banks and credit associations tend to charge interest across the whole range of rates while there is one case of friends or relatives charging the highest rate of 20%. Most of the rates provided by micro-finance institutions are small which is consistent with the rates common in group lending schemes. The nature of interest rates seems to indicate that credit markets in urban Ethiopia are likely to be characterized by low interest rates as far as the informal lenders go, however the consideration of default risk by these lenders is not altogether absent (Basu, 1983). This is in sharp contrast to the extensive literature on dominance of exploitative informal moneylenders in credit markets of less developed economies. Our finding does not also support the rationing hypothesis which is based on the assumption that formal credit is the cheapest credit available (Pal, 2002; Bell et al., 1997)

Loan amount and Household Characteristics

Households are asked to report the loan amount they borrowed both in cash and in kind. The loan component reported in-kind has been converted into cash equivalents during the interview. The average annual loan amount of all households is 223 birr¹⁰ with a maximum of 50,000 birr. The majority of households borrowed an amount less than 10,000 birr. To investigate some interesting relationships, we linked the loan amount borrowed with household characteristics. Table 3 shows summary statistics of total loan amount by household characteristics. There seems to be little gender bias again, as females receive only slightly less of the mean total loan amount (213 birr) than males (230 birr). Total loan is found to be increasing in household size, but for very large households, this loan amount falls. For the ethnic groups Gurage and especially Tigre, there appears to be a significantly larger mean of the total loan granted as compared to the other ethnic groups. Household with Protestant heads also received higher mean loan amount than other households.

[Table 3 about here]

Constrained households

Credit-constrained households in this study are defined according to the details given in section 3 above. Table 4 gives the number of constrained households. 293 households have applied for a loan and supplied their reasons for borrowing. 17 of these households have failed to report the status of their application. Therefore, they

are excluded from the sample. Out of the original sample, 1179 did not apply for a loan and reported various factors that deter them from applying. The results show the presence of a high percentage of credit-constrained households in urban Ethiopia (26.6%).

[Table 4 about here]

It is evident that the discouraged constitute the highest proportion of the credit-constrained households. This is not surprising because the banking sector in Ethiopia is dominated by bureaucratisation and buck-passing (Banerjee and Duflo, 2001). The two major reasons for discouragement are households' perception of the success probability of their loan application and lack of collateral. For instance, 47.9% of the discouraged borrowers did not apply because they believed they would not be successful while 32.8% of them did not apply because they did not have collateral. The interest rate (13%) and loan processing time (5.42%) were also mentioned as deterrents to applying.

6. ECONOMETRIC EVIDENCE

In this section, we present the results from various discrete choice and discrete-continuous models. The first one is a conventional probit model to predict the probability of being credit constrained (say P). However, one important empirical issue is the potential endogeneity of the household expenditure variable which is entered as a right hand side variable in the probit model predicting the probability of credit constrained. Therefore, we carried out maximum likelihood estimation of Amemiya's GLS (generalized least squares) estimator which is sometimes referred to

as IV (instrumental variables) probit estimation to control for the endogeneity associated with the household expenditure variable (see Newey, 1987). Our instrument is the income variable which is strongly correlated with the potential endogenous expenditure variable¹¹. Finally, in order to study the determinants of the loan amount demanded/received by households respectively we estimated two additional models: a tobit and a instrumental variables tobit model.

The empirical modeling of the determinants of access to credit or probability of credit constraint can be handled by estimating a probit model due to the binary nature of the dependent variable. Assume an underlying latent response variable y_i^* which is defined by;

$$y_i^* = \beta' x_i + \mu_i. \quad (2)$$

In practice, we do not observe y_i^* but a dummy dependent variable y which takes a value of either 0 or 1. In the present context, a value of 1 is assigned to credit-constrained households and zero otherwise. x_i represents a vector of household characteristics and the μ_i is the error term which is normally distributed with zero mean and constant variance. In the IV probit context, equation (2) can be specified as

$$y_i^* = \gamma' y_i + \beta' x_{ei} + \mu_i \quad (3)$$

Where y_i is the variable that is potentially endogenous (i.e. total household expenditure) – the variable we suspect to have a non-zero correlation with the error term; x_{ei} our exogenous variables, γ and β are vector of parameters to be estimated.

Our independent variables (x) are grouped into four groups: (i) proxies for **current resources** such as total household expenditure and the value of household assets, (ii) proxies for **expected future income** such as years of schooling, (iii) **demographic variables** and (iv) **regional variables** and squared and interaction terms. It is important to note that these variables can reflect both determinants of demand for credit and determinants of supply of credit. Hence in some cases the effects of the independent variables on the probability of being credit constrained may be *a priori* ambiguous as demand and supply factors may be working in the same direction. The conventional probit model estimates and the instrumental variables probit estimates are presented in Table 5.

The most striking feature of our empirical results is that, as in Jappelli (1990), richer households (broadly measured by a household's level of expenditure) have a lower probability of being rationed out of the credit market. The presence of both a significant positive effect of the level of expenditure and a negative coefficient in the quadratic term indicate the presence of non-linear effects on the probability of being credit constrained. While at lower levels of expenditure (proxy for income) the probability of being constrained increases (as the household increases its consumption and its demand for credit) richer households are, as expected, less likely to be credit constrained.

While the coefficient of the value of households' assets has the expected negative sign and is significant at the 5% level, its impact on the probability of being credit constrained is rather small (close to zero). Expected future income, measured by the number of years of schooling has also a negative but insignificant effect on the

probability of being credit constrained. The negative coefficient on education could have suggested that it is supply side (rather than demand) considerations that act to relax the credit constraint. These results indicate that lenders use both current and future expected income as important criteria for judging creditworthiness of a borrower.

To further investigate this issue we now focus on the impact of the squared and interaction terms for expenditure, wealth and some demographic variables. The results indicate that households with dependent children between the age of 6 and 15 and that live in the capital city and Bahar Dar, Dessie, Dire and Jimma are more likely to be credit constrained. The presence of more dependants in a given household may discourage lenders from lending because it has direct implication in terms of earning capacity, as well as causing higher desired consumption by borrowers thereby tightening the credit constraint. Household size, age and its square term do not feature as significant determinants of P. However, these are household characteristics that other studies have found to be highly significant (e.g. Zeller, 1994). Marital status and gender dummies were also found to be insignificant, the latter implying no gender bias and confirming our findings in the previous section. Location matters in accessing loanable funds in urban Ethiopia. Relative to Mekele, households in Addis Ababa, Bahar Dar, Dessie, Dire and Jimma are more likely to be credit constrained suggesting the presence of regional variations in the ways credit markets function in the country.

[Table 5 about here]

In this study, we also investigated the factors affecting the volume of loan accessed by households. To allow for the censored nature of the dependent variable, we have estimated a tobit model assuming a correlation between the unobservables affecting households decision to borrow with their decision on how much to borrow. Since the model of determinants of the volume of loan amount can be perceived as a model of credit demand, it is not reasonable to exclude households with zero loan amounts. The tobit model handles the potential selectivity bias that arises due to the non-random choice of borrowing households. In addition, both the tobit and the IV tobit models are chosen over other possible two-stage estimations techniques (e.g. Heckman two-stage selection model) due to a lack of any theoretical guide as to the choice of appropriate identifying restrictions at the second stage of the estimation.

The IV tobit model to estimate is defined by:

$$y_i = \begin{cases} y_i^* & \text{if } y_i^* > 0 \\ 0 & \text{otherwise} \end{cases} \quad (4)$$

$$y_i^* = y_i\beta + x_{ei}\gamma + \mu_i = z_i\delta + \mu_i \quad (5)$$

Where y_i^* denotes the dependent variable (i.e. loan amount), y_i is the variable that is potentially endogenous (i.e. total household expenditure), and the rest of the variables are as defined earlier. The estimated parameters of both standard tobit and IV tobit models (i.e. marginal effects) are reported in table 6.

While it can be of use to analyze the determinants of loan amount from the borrower's perspective, thereby reflecting behavior on the demand side of the credit market, the variables collected here are those determinants likely to be used from the lender's perspective to screen borrowers. Given this, the econometric analysis allows us to see the extent of rationing that occurs once the lender has decided to lend.

The explanatory variables in the tobit model represent determinants of rationing mostly on the supply side of the market. The expected signs differ this time, for example, total loan amount is likely to be *increasing* in current income/expenditure. While demand side influences may be simultaneously at play, their relative importance as compared to supply side influences would depend on the relative bargaining power of borrowers and lenders. However, the main influence on the total loan amount granted is likely to be the degree to which the lender expects the borrower to repay/default.

[Table 6 about here]

From table 6, it is evident that current resources (measured by both household expenditure and the interaction term expenditure*assets), the value of collateral, and the presence of number of children aged between 6 and 15 are significant positive factors in affecting the volume of loan households received. The positive effect of households' welfare position on the size of the loan is corroborated by evidence for India (Gill and Singh, 1997). The estimation also reveals a significant quadratic relationship between the age of the head and the volume of loan.

Except for the sign of the negative value of the assets coefficients, our results are consistent with our a priori theoretical expectation about the loan amount supplied by lenders. Also, due to the simultaneity of demand and supply factors, the marginally significant negative marital status dummy can be an indication of the financial stability of the household and its accompanied declining demand for loans.

The results reveal an absence of gender, ethnic and religious discrimination in loan allocations. However, the negative “non-addis” coefficient suggests the presence of discrimination in the volume of loan amounts received, in favor of the capital city. This highlights the importance of credit as an integral part of any effective poverty reduction strategy, which aims to combat uneven development in Ethiopia. As pointed out in the recent activities related to Ethiopia’s Poverty Reduction Strategy Paper – the Sustainable Development and Poverty Reduction Program (SDPRP)- credit schemes that target the elderly in the capital city proved to be successful in reducing old age poverty (Baleher and Yirsaw, 2003). Therefore, the provision of similar schemes to other households in other regions can be an effective poverty reduction strategy.

CONCLUSION

Our analysis reveals that credit markets are slightly segmented and that the informal sector is not only the major source of loans in rural areas in Ethiopia as shown by Krishnan and Sciubba (2004), but also dominates the urban areas. Most of the credit constrained households are the discouraged. Hence the removal of barriers by restructuring the banking sector via reduced bureaucracy and transaction costs should be a promising route to enable households access credit. Another interesting feature is

the absence of gender, ethnic and religious discrimination in loan allocations. The significance of current household resources both in affecting credit access and the volume of loan borrowed provides justification for government's targeting of economic exclusion.. The excluded have been identified in this paper as the poor, uneducated and households with children.

Informal and semi-formal sectors provide a large proportion of loans. By exploiting existing strong social ties policy targets may focus on financial linkages between formal and informal sectors to enhance access to credit. Micro-finance institutions have been shown to be reaching vulnerable/relatively poorer groups such as women. However, as long as formal and informal institutions keep apart, far reaching developmental processes are unlikely to happen. Traditional financial systems in Africa usually undertake minimum intermediation and often specialize in either deposit-taking or lending. Therefore, an integral aspect of targeted intervention should include social inclusion programs to fill the vacuum, where informal networks fail.

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Table 1: Source of Loans

Informal and Semi-formal	Number of households (%)
Friends/relatives	186 (59.0)
Credit Association	40 (12.7)
Money Lender	10 (3.2)
Employer	9 (2.9)
Other informal (e.g. ROSCAs)	5 (1.6)
<hr/> Formal	
Micro-finance institutions	29 (9.2)
Banks	10 (3.2)
Government/NGOs	5 (1.6)
Other formal	21 (6.7)
Total	315 (100)
<hr/> Source: Own-calculation from EUHS, 2000 <hr/>	

Table 2: Distribution of the number of males and females head of households by source of loan

Source of loan	Male	Female	Total
Money lender	3	3	6
Friends/relative	40	37	77
Credit/association	9	14	23
Employer	2	2	4
Other informal	2	2	4
Banks	1	2	3
Government/NGOs	2	2	4
Micro-finance institutions	4	9	13
Other formal	6	3	9
Total	69 (48.25%)	74 (51.75%)	143

Source: Own-calculation from EUHS, 2000

Table 3: Total Loan Amount by Household Characteristics

Characteristics	Mean	Frequency (%)
<i>Gender</i>		
Male	230.25	832
Female	213.54	591
<i>Household size</i>		
1 to 5	160.85	667
6 to 10	270.56	683
Greater than 10	191.87	73
<i>Ethnic groups</i>		
Amhara	197.37	732
Oromo	136.97	258
Gurage	265.62	162
Tigre	386.72	157
<i>Religion</i>		
Orthodox	213.04	1147
Catholic	66.92	13
Protestant	311.54	52
Muslim	220.89	180
<i>Location</i>		
Addis Ababa	99.28	445
Non- Addis Ababa	32.03	328

Source: Own-calculation from EUHS, 2000

Table 4: Constrained Households

Type of households	Number (%)
Discouraged households	332 (22.8)
Households with rejected applications	15 (1.0)
Households that received a loan amount less than the amount they applied for	41 (2.8)
Households with successful loan applications	220 (15.1)
Total	1455 (100)

Table 5: Probit models predicting the probability of being credit constrained

Models	Probit model	Instrumental Variables
	Probit Model	Probit Model
Variable	Marginal Effects (t-value)	Marginal Effects (z-value)
Expenditure	0.262** (2.35)	4.987 (1.56)
Expenditure squared	-0.025*** (2.90)	-0.351** (1.70)
Assets	-0.000** (2.27)	-0.000*** (2.95)
Assets squared	-0.000 (0.64)	-0.000 (1.51)
Expenditure*Assets	0.000** (2.07)	0.000*** (2.52)
Years of schooling	-0.003 (0.43)	-0.027 (1.07)
Age	0.002 (0.34)	0.135 (1.32)
Age squared	0.000 (0.27)	0.000 (0.10)
Age*Expenditure	-0.001 (0.66)	-0.022 (1.38)
Household size	-0.003 (0.48)	0.007 (0.27)
Children under 6	0.010 (0.52)	-0.009 (0.14)
Children between 6 and 15	0.020* (1.78)	0.032 (0.67)
Adults between 16 and 54	-0.003 (0.29)	-0.024 (0.029)
Married	0.020 (0.64)	0.026 (0.25)
Female	-0.018 (0.60)	-0.105 (1.07)
Addis	0.268*** (3.65)	0.843*** (2.42)
Awassa	0.170 (1.26)	0.508 (1.58)
Bahar Dar	0.381*** (3.07)	0.961*** (2.74)
Dessie	0.425*** (3.53)	1.078*** (3.00)
Dire	0.391*** (3.25)	1.180*** (4.04)
Jimma	0.272*** (2.12)	0.715** (2.21)
Number of observations	1384	1384
LR chi ² (21)	80.28	
Prob> chi ²	0.0000	
Wald test of exogeneity: chi ² (1)		1.06
Prob> chi ²		0.30
Smith-Blundell test of Exogeneity		1.02
chi ² (1)		
Prob> chi ²		0.31

N.B.: (i) Variables 'Adults above 55' and 'Mekele' are omitted demographic and location variables to ensure identification. (ii) *=Significant at the 10% level; **= Significant at the 5% level; and ***= Significant at the 1% level. (iii) In the Instrumental Variables specification the income variable is used to instrument for expenditure.

Table 6: Tobit models of loan amount received by households

Models	Tobit model	Instrumental Variables
	Marginal Effects (t-value)	Tobit Model Marginal Effects (z-value)
Expenditure	2078.88* (1.66)	-4897.45 (0.33)
Expenditure squared	-105.65 (1.09)	356.85 (0.36)
Assets	-0.90*** (4.25)	-0.72* (1.67)
Assets squared	-0.00*** (1.97)	-0.00 (0.37)
Expenditure*Assets	0.12*** (4.04)	0.09 (1.13)
Years of schooling	-0.20 (0.00)	27.14 (0.32)
Household size	-111.66*** (1.91)	-141.54 (1.62)
Collateral	0.68*** (12.63)	0.70*** (10.68)
Age	18.56 (0.31)	-190.58 (0.43)
Age ²	0.60* (1.93)	0.62* (1.92)
Age*Expenditure	-13.31 (1.59)	20.13 (0.28)
Children under 6	133.19 (0.83)	204.53 (0.92)
Children between 6 and 15	260.46*** (2.75)	301.30*** (2.32)
Adults between 16 and 54	116.27 (1.55)	150.70 (1.42)
Married	-401.00 (1.52)	-355.04 (1.23)
Female	116.27 (0.45)	204.52 (0.63)
Non-Addis	-350.58* (1.63)	-522.12 (1.23)
LR chi ² (17)	184.78	
Prob> chi ²	0.00	
Wald test of exogeneity: chi ² (1)		0.22
Prob> chi ²		0.63
Smith-Blundell test of Exogeneity		1.32
chi ² (1)		
Prob> chi ²		0.25

N.B.: (i) Variables ‘Adults above 55’ and ‘Mekele’ are omitted demographic and location variables to ensure identification. (ii) *=Significant at the 10% level; **= Significant at the 5% level; and ***= Significant at the 1% level. (iii) In the Instrumental Variables specification the income variable is used to instrument for expenditure.

¹ There are some studies that have investigated firm-level credit constraints in Africa (Fafchamps, 2000; Bigsten et al, 2003).

² For a detailed discussion of credit rationing and other relevant theoretical literature on households’ access to credit, the reader can refer to Stiglitz and Weiss (1981) and Hoff and Stiglitz (1993).

³ In this study, the share of formal credit in total volume of new credit is 66.5% during the study period. The bulk of credit granted that was not easily monitored/fungible was found to be from the formal sector (87%).

⁴ Feder et al. thus drop the crucial assumption made in previous studies in the literature, of homogenous credit demand and supply situations for borrowers and non-borrowers. The reason is that often non-borrowers do not borrow, not because they are not credit-worthy or cannot obtain credit, but because they have sufficient liquidity of their own. Furthermore, the liquidity position of unconstrained households as compared to constrained households is found to be much higher. This implies that surplus cash incomes for some households do exist. The reasonable assumption made, therefore, is that households should be analyzed in terms of whether they are credit-constrained or not.

⁵ There are downsides to this approach too, as the authors point out. The credit limit variable will not be totally accurate until all potential borrowers apply. Heteroskedasticity would also arise since individuals who are nearer their credit limit are more able to accurately predict their limit than those who are further away from their limits.

⁶ Although microfinance institutions (MFIs) are generally classified as informal, some of them are classified as 'hybrids' as they provide banking services as well (Akoten et al., 2006).

⁷ Consumption credit enables risk pooling among risk-averse households across time in an attempt to smooth consumption under uncertain income streams and thus plays the role of insurance (Eswaran and Kotwal, 1990).

⁸ In another paper, we are investigating the link between interest rates and credit demand in a similar framework advanced by Gross and Souleles (2002).

⁹ Udry (1991) shows this is a main feature of the workings of informal credit institutions in a Nigerian village.

¹⁰ Note that this average is computed by including households with zero loan amount. The birr is the Ethiopian currency; for instance, £1=13.20 birr or 1USD=8.50 birr.

¹¹ In each case we report the tests for the validity of our instrument (Exogeneity test of the expenditure variable): Smith and Blundell (1986) and Wald tests of exogeneity.