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Determinants of Access to Credit and Loan Amount: Household-level Evidence from Urban Ethiopia

Abi Kedir

Abstract

Household level analysis of credit rationing is restricted to rural data sets collected mainly from South East Asia. In Africa, credit constraints are often investigated using firm level data. Empirical evidence on determinants of credit constraints and amount borrowed by urban households is almost non-existent from Sub-Saharan Africa. Using an extended direct approach, we analyzed the Fourth Round Ethiopian Urban Household Survey (2000) to separate households that do not have access to credit from those who do. We find a high percentage (i.e. 26.6%) of credit-constrained households, the majority of which constitute discouraged borrowers. A probit model and a tobit procedure that allows potential selectivity bias identified factors affecting households' likelihood of being credit constrained and the volume of loan amount respectively. Our analysis found geographical location of households, current household resources, schooling of the household head, value of assets, collateral, number of dependants, marital status and outstanding debt as significant factors. Finally, we consider the policy implications of our results.

Key words: household debt, credit constraint; credit rationing, Africa, Ethiopia
JEL Classification: D12; O12; O55

1. Introduction

The aim of this paper is to shed light on the following two important questions; 1) what are the factors that determine households' likelihood of being credit constrained in urban areas of Ethiopia? and 2) what are the determinants of the volume of household debt? We answer both questions by analyzing an urban household survey data collected from seven urban centers in Ethiopia in 2000. The study follows a direct approach to identify credit-constrained households. We extend the definition of credit constrained households adopted by Jappelli (1990) by taking into account households who have applied for loan but who got a loan amount which is less than the amount they have applied for. After establishing the extent of rationing in the formal sector, we examine the characteristics of the households who are likely to be constrained. In an econometric framework, we identify factors that affect the probability of being credit constrained and the volume of loan amount demanded by households. The results of our paper contribute to the existing little survey-based

quantitative evidence on households' access to credit in Africa particularly from urban areas. Identifying the characteristics of credit-constrained households can be a useful guide to policy makers as to where targeting is needed to remove constraints and enhance the risk-pooling/productive capacity of households.

In this study, we found a high percentage (i.e. 26.6%) of credit-constrained households after accounting for 'size rationing' in which households borrow less than they desired. We have not found support for the rationing hypothesis which assumes that formal credit is the cheapest credit available (Pal, 2002; Bell et al 1997). Our econometric analysis revealed that households' probability of being credit constrained and the volume of loan amount are significantly affected by current household resources, collateral, schooling of the household head, number of dependants, location, marital status and outstanding debt.

Despite important recent advances in providing financial services to the poor through microfinance initiatives, there are still many opportunities to improve practice when we look at household survey evidence on credit access. We maintain that a better understanding of the workings of financial institutions (both formal and informal) and determinants of households' access to credit is an integral part of poverty reduction efforts in poor countries (Amin et al 2003). Such an understanding has been hampered by the absence of household-level data that enables one to identify the factors associated with credit-constraint. There is also yet little firm evidence, particularly, from urban areas of Africa about the characteristics of the households who are likely to be constrained and the extent of credit rationing in the formal sector (Diagne, 1999). In Africa, credit constraints are investigated using firm level data mainly due to lack of data from household surveys (Bigsten et al 2003; Fafchamps, 2000). Most household level studies focus on rural credit markets in India (Pal, 2002; Banerjee and Duflo, 2001; Kochar, 1997; Bell et al, 1997). The existing literature particularly on credit constraints and the demand for loan amount focuses on developed countries (Crook, 2001 and Jappelli, 1990).

The life-cycle permanent income hypothesis (LCPIH) of consumption assumes the presence of perfect capital markets and abstracts from certainty. This postulate has been attacked by substantial empirical evidence using mainly data sets from

developed countries (Zeldes, 1989; Jappelli, 1990). Except for Jappelli (1990), these studies have shown the presence of credit rationing by identifying the presence of credit constrained households using indirect evidence which is executed by testing the sensitivity of current consumption to transitory income. Uncertainty can induce precautionary behavior and a dependence of consumption on transitory income even in the absence of credit constraints. In addition, empirical testing of both credit constraints and precautionary behavior simultaneously leads to identification problems. Furthermore, simulation results have shown that with precautionary saving, a credit-constrained household can smooth consumption. Hence one can conclude that the violation of an implication of the hypothesis is neither a sufficient nor a necessary condition for being credit-constrained (Diagne et al, 2000). The test for permanent income hypothesis also suggests the presence of panel data sets which is a demanding requirement in the context of household surveys conducted in less developed countries.

The existence of credit constraints has implications for a variety of issues. These include tests for the LCPIH of consumption, the effectiveness of fiscal policy, the distributional effects of fiscal policy, competition in credit markets, and the supply, demand and distribution of credit between applicants (Crook, 2001). Credit constraint can arise due to imperfect information and adverse selection effects that are strong enough to push some households out of capital markets (Aryeety and Udry, 1997; Stiglitz andWeiss, 1981). The importance of access to credit for policy purposes lies in several strands. First, access to credit guarantees the availability of financial resources which can be used to buy inputs; finance business start ups and hence reduce poverty. Second, it can also help households to smooth consumption in the face of idiosyncratic and/or covariate risks (Udry, 1991; Eswaran and Kotwal, 1990). Third, 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).

The remainder of the study is organized as follows. Section 2 briefly describes the various approaches of identifying credit-constrained households. Section 3 gives a description of the data and our definition of credit constrained households. Section 4

gives insight into the structure of credit markets in urban Ethiopia. Section 5 presents and discusses econometric evidence. Finally, we forward concluding remarks and highlight some policy implications of our results.

2. Approaches to Identify Credit Constrained Households

Empirical methodologies of identifying credit constrained households have been based on two major approaches. The first of these approaches, is an indirect one, due to Hall (1978) which infers the existence of credit constraints by testing the life cycle/permanent income hypothesis. This hypothesis states that, with standard convex preferences, in the absence of liquidity and borrowing constraints, transitory income shocks should not affect consumption (Diagne et al, 2000; Zeldes, 1989). The second approach is a direct one and exploits information about the status of loan applications of households (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 credit than they were granted. Non-borrowing households were asked their reason for not borrowing. If it was not due to sufficient own-liquidity, but due to inability to obtain credit, then this group was classified as constrained.[1] Jappelli (1990) defines credit constrained consumers as those who had their request for credit rejected by financial institutions. He also identified households who are discouraged from taking a loan as constrained. The discouraged were 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?"* Fairly recently, others argue that the direct approach classifies households into discrete groups which does not allow one to measure the extent of the credit constraint faced by households (Diagne et al, 2000). This line of research argues for 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

[1] Feder et al (1989) 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 analysed in terms of whether they are credit-constrained or not.

borrower is not constrained if the optimal amount desired by her/him is less than the amount that *can* be borrowed. Using this procedure, evidence is found from surveys conducted in Malawi and Bangladesh.[2].

3. Data

The analysis in this study is based on the 4th 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 were selected from seven major urban centers of the country. The total sample size was distributed over the selected urban centers 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.

An extended definition of credit-constrained households

Due to a unique nature of our survey information, we identified three categories of credit constrained households. The first category of constrained households are 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

[2] There are of course 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.

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 are 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 for not applying such as *'we will not have any chance of success', 'loan application takes long time to process', 'high interest rate',* ...etc. In the present application, we considered those households that give the above reasons as 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.

4. 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). 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 features of the urban credit market in Ethiopia as gleaned from our data.

Sources of loans

The information on sources of loans reveals the importance of the informal sector. According to table 1 below, 79.4% of the 315 households obtained their loan from the informal and semi-formal sectors while 14% of loans were obtained from the formal sector. The most predominant source within the informal sector is '*friends and relatives'* (59%). Not a great proportion of loans originate from group schemes such as Rotating Savings and Credit Associations (Roscas). This is not surprising because Ethiopian Roscas are primarily formed as vehicles of saving mobilization rather than

credit institutions. It is also interesting to note that there are few loans obtained from moneylenders who are dominant lenders elsewhere such as India. In the formal sector, the microfinance institutions play the dominant role in lending (9.2%) while banks and the government provide very few loans. Despite the fact that our households are located in major urban centers where it is normally expected that the formal sector is relatively active in providing capital to households, not many of the households appear to have obtained their loans from banks[3].

[Table 1 about here]

Is there a link between the source and 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 lenders while loans with long-term repayment period were extended by the formal sector. 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.

Do male-headed households have 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, both types of households have equal access to credit; the number of male-headed households that accessed loans being slightly less than that of female-headed households. This is somewhat surprising in a society where males are often favored over females. While friends and relatives give more loans to males, formal institutions such as banks and micro-finance institutions give more loans to females. For instance, the number of females who accessed loans from micro-finance institutions is more than twice as large as the number of males. This is an indication of the success achieved by micro-finance institutions in reaching disadvantaged groups. It is also interesting to note that

[3] Only 16 % of the households reported to having a bank account indicating to the acute lack of financial depth even in the major urban centers of the country.

58 percent of the individuals who accessed formal loans are females as opposed to 48 percent in the case of informal loans.

[Table 2 about here]

Uses of loans

Households took loans both for consumption[4] 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%). 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 because they have a better knowledge of their clients and hence do not suffer from severe adverse selection, moral hazard and enforcement problems as formal credit institutions (Stiglitz and Weiss, 1981). 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 other consumption activities 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

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.

[4] 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).

The minimum rate was 0% while the maximum was 20%, with 33% of loans being interest free. The mean interest rate is only 3.1% and this is not due to the fact that a proportion of the population surveyed is significantly Islamic[5] because Muslims constitute only 13.3% of all the households interviewed. 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 lent 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. Equally 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 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. This is in sharp contrast to the extensive literature on dominance of exploitative 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 birr[6] with a maximum of 50,000 birr. The majority of households took out a loan 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

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

males (230 birr). Total loan is found to be increasing in household size, but for very large households, this loan amount falls. Large households are often characterized by low levels of standard of living and the lower mean loan amount can be an indication of the severe quantity rationing that poor households suffer from. 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 of 1500 households, 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. 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 or transaction cost (5.42%) were also mentioned as deterrents to applying.

5. Econometric Evidence

[6] 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.

In this section, we adopt a multivariate analysis to address the two major issues raised at the introductory part of the study. To predict the probability of being credit constrained (say P), we estimated a probit model and the determinants of loan amount has been modeled using a tobit model which controls for potential non-randomness/selectivity bias in observing borrowing households. We present the results from probit and tobit models respectively.

The empirical modeling of the determinants of access to credit or likelihood of being credit constrained is handled by estimating a probit model and this is due to the binary nature of the dependent variable. Assume an underlying latent response variable y_i^* which is defined by the relationship $y_i^* = \beta' x_i + \mu_i$. 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 represents a vector of household characteristics and the μ_i is the error term which is normally distributed with zero mean and constant variance.

Our independent variables (x) are grouped into five 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) a proxy for past credit history such as outstanding debt, (iv) demographic variables and (v) regional variables. 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 probit model estimates are presented in table 5 below.

The coefficients of the proxies for current resources have the expected negative signs and are significant at the 5% level. The coefficient on years of schooling is also negative and significant at the 1% level. Therefore, richer households and those with educated heads have a lower probability of being rationed out of the credit market. The negative coefficient on education suggests 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.

In contrast, households with outstanding debt, with dependent children between the age of 6 and 15 and that live in the capital city and Bahar Dar are more likely to be credit constrained. Among these constraining variables, outstanding debt increases the probability by a substantial margin. This suggests that information about previous credit history is used by lenders to judge the repayment ability of potential borrowers. In addition, 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 (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 and Bahar Dar 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, the tobit model is 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 estimated parameters (i.e. marginal effects) are reported in table 6 below. 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 and household assets. 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 (total value of assets but not total household expenditure), the value of collateral, outstanding debt, age of the head and the presence of number of children aged between 6 and 5 are significant positive factors in affecting the volume of loan households received. The estimation also reveals a significant quadratic relationship between the age of the head and the volume of loan. Households receive smaller volume of loans if they are headed by a married person. Except for the sign on variables such as marital status, the number of dependant children and outstanding debt our results are consistent with our a priori theoretical expectation about the loan amount supplied by lenders. But due to the simultaneity of demand and supply factors, the negative marital status dummy can be an indication of the financial stability of the household and its accompanied declining demand for loans. Likewise the positive coefficients on variables such as the number of dependant children and outstanding debt reflect the households' financial stress and their increased demand for loans. The positive coefficient of the collateral variable reinforces the theoretical argument that collateral can serve to mitigate some of the consequences of asymmetric information (Bardhan and Udry, 1999).

CONCLUSION

The study was motivated by the absence of empirical evidence with regard to the credit rationing hypothesis in urban Ethiopia. We showed the main features of credit markets in urban Ethiopia, identified credit constrained households and the associated factors that affect the probability of credit constrained. In the final part of our analysis we also examined the determinants of the loan amount received/demanded by households. Our analysis reveals that credit markets are slightly segmented and surprisingly the informal sector is the major source of loans even if we examined an urban data set. The most predominant source of loans within the informal sector is 'friends & relatives' as opposed to the traditional money lender. Another interesting feature is the absence of gender, ethnic and religious discrimination in loan allocations. As often is the case elsewhere, more female-headed households are served by micro-finance institutions than males. In our sample, households took loans both for consumption smoothing and investment purposes. The greater proportion of these loans are either interest free or carry low interest rates and we do not find support for the rationing hypothesis because the formal sector is not the cheapest source of finance.

An extended direct approach has identified 26.6% of the sampled households as credit constrained and the majority of these households are discouraged borrowers. A multivariate analysis showed that the probability of being credit constrained is significantly affected by current household resources, schooling of the household head, outstanding debt, dependency ratio and location ('*macro credit rationing*' factors). In addition, current resources, collateral, outstanding debt and marital status of the head were found to be significant determinants of the loan amount households managed to access ('*micro credit rationing*' factors). The findings suggest that poverty is an issue to be tackled not only in its own right, but also because it spills over into the credit market by limiting their participation. Too few years of education is another determinant raising the probability of being credit constrained possibly by signaling poor repayment potential of households in the long run. This provides justification for government focus on education policy to enhance employment opportunities and individuals' future income. Collateral is one of the main deterrents of applying for those who are discouraged borrowers. As it is the case in many countries, land is a major collateral used by lenders in Ethiopia. Currently, there is limited access to bank loans using land lease deeds as collateral hence limiting access

to credit. There is also an uneven distribution of land due to hindrances in administrative procedures and other sensitive political interventions. The role for government policy here is to ensure a more equal distribution of land and some form of intervention in the regional governments' control over land leases. These considerations are important, otherwise inequities in the land market feed into inequities in the credit market.

As for general credit policy, there are further implications provided by this study. We observed that micro financing institutions from the formal sector and credit associations from the semi-formal sector also provide a large proportion of loans and for varied uses. By exploiting existing strong social ties policy may do well to focus on building such institutions to enhance access to credit. In addition, the formal sector can enhance loan delivery as well as loan recovery by tackling inefficiency of staff, extensive bureaucracy and corruption. In our data, micro-finance institutions have been shown to be reaching vulnerable/relatively poorer groups such as women that are rationed out of the formal sector. These institutions can be used to ease the credit constraints households face and alleviate the government failure in credit delivery.

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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)[7]	5 (1.6)
Formal	
Micro-finance institutions	29 (9.2)
Banks	10 (3.2)
Government/NGOs	5 (1.6)
Other formal	21 (6.7)
Total	**315 (100)**

Source: Own-calculation from EUHS, 2000

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

Source of loan	**Male**	**Female**	**Total**
Money lender	5	5	10
Family/relative	85	76	161
Credit/association	18	18	36
Employer	3	5	8
Other informal	2	3	5
Banks	3	5	8
Government/NGOs	2	2	4
Micro-finance institutions	8	18	26
Other formal	11	8	19
Total	**137 (49.5%)**	**140 (50.5)**	**277**

Source: Own-calculation from EUHS, 2000

[7] Roscas in many parts of Ethiopia are known by the name *Equb*.

Table 3: Total Loan Amount by Household Characteristics

Characteristics	Mean	Frequency (%)
Gender		
Male	230.25	832
Female	213.54	591
Household size		
1 to 5	160.85	667
6 to 10	270.56	683
Greater than 10	191.87	73
Ethnic groups		
Amhara	197.37	732
Oromo	136.97	258
Gurage	265.62	162
Tigre	386.72	157
Religion		
Orthodox	213.04	1147
Catholic	66.92	13
Protestant	311.54	52
Muslim	220.89	180
Location		
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: A probit model predicting the probability of being credit constrained

Variable	Marginal Effects (t-value)
Constant	-0.721 (1.97)
Total expenditure	-6.34e-04 (2.30)**
Value of assets	-8.92e-06 (2.55)**
Years of schooling	-0.009 (2.61)***
Outstanding debt	0.540 (10.41)***
Age	0.004 (0.85)
Age ^{2}	-4.3e-04 (0.83)
Household size	-0.032 (1.00)
Children under 6	0.035 (0.88)
Children between 6 and 15	0.065 (1.96)**
Adults between 16 and 54	0.028 (0.85)
Married	-0.007 (0.17)
Female	-0.008 (0.19)
Addis	0.115 (1.99)**
Awassa	0.027 (0.31)
Bahar Dar	0.156 (1.97)**
Dessie	0.122 (1.51)
Dire	0.234 (3.18)***
Jimma	0.0247 (0.32)
Number of observations	1310
LR chi ^{2} (14)	221.90
Prob> chi ^{2}	0.0000
Pseudo R Squared	0.13

N.B.: Collateral was dropped automatically due to multicollinearity with the other income proxies. Variables 'Adults above 55' and 'Mekele' are omitted demographic and location variables to ensure identification.*=Significant at the 10% level;**= Significant at the 5% level; and ***= Significant at the 1% level.

TABLE 6: A Tobit model of loan amount received by households

Variable	Marginal Effects (t-value)
Constant	-705.77 (4.98)***
Total expenditure	-3.263 (0.38)
Value of assets	13.63 (1.99)**
Collateral	0.033 (11.41)***
Years of schooling	2.366 (0.94)
Outstanding debt	446.75 (12.05)***
Age	10.99 (2.11)**
Age ^{2}	-0.11 (2.09)**
Children under 6	7.11 (0.41)
Children between 6 and 15	34.12 (3.94) ***
Adults between 16 and 54	1.05 (0.17)
Married	16.93 (0.55)
Female	33.94 (1.11)
Addis	-72.54 (1.72)*
Awassa	-82.58 (1.39)
Bahar Dar	-94.58 (1.59)
Dessie	-68.62 (1.17)
Diredawa	-63.16 (1.14)
Jimma	-88.08 (1.45)
Log likelihood function	-2714.28
Number of observations	1310

N.B.. Variables 'Adults above 55' and 'Mekele' are omitted demographic and location variables to ensure identification.*=Significant at the 10% level;**= Significant at the 5% level; and ***= Significant at the 1% level.