

HOUSEHOLD-LEVEL CREDIT CONSTRAINTS IN URBAN ETHIOPIA¹

Abbi M. Kedir², and Gamal Ibrahim³

Abstract

There is a dearth of empirical evidence on the determinants of household credit constraints in Sub-Saharan Africa. Most studies have disproportionately focused either on household credit constraints in rural areas or credit constraints facing firms. There are also a number analytical problems linked with identifying credit constrained households. Using the Fourth Round Ethiopian Urban Household Survey conducted in 2000 which provides a unique set of variables in relation to access to credit, we extended the approach of Jappelli (1990) to identify credit constrained households directly. We find a high percentage of credit-constrained households. After controlling for potential endogeneity and selectivity bias, our econometric models showed that current household resources, number of dependants and location are significant correlates of credit constraints. Further, we discuss the policy implications of our findings.

Keywords: credit constrained households; credit policy; endogeneity; instrumental variables; selectivity bias, urban Ethiopia; Africa

JEL Classification: D12; O12; O55

¹ The final version of this article was submitted in April 2012.

² Corresponding author, Department of Economics; University of Leicester;
E-mail: ak138@le.ac.uk Tel.: +44-0116-252 2894

³ United Nations Economic Commission for Africa (UNECA); P.O.Box 3001, Addis Ababa, Ethiopia; E-mail: Gelbrahim@uneca.org

1. Introduction

A good understanding of the determinants of households' access to credit is an integral part of poverty reduction efforts in poor countries (Amin et al., 2003). The poor are often highly credit constrained because they lack the assets to use as collateral to access loans, which consequently limit their economic opportunities. However, rigorous analysis was hampered by the absence of household-level data that enable 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 constraints. Most studies tend to focus on African firms and rural credit markets in Asia especially in India (Akoten et al., 2006; Bigsten et al., 2003; Fafchamps, 2000; Pal, 2002; Kochar, 1997; Bell, et al., 1997). This study which focuses on empirical analysis of households' credit constraints has significant policy implications as the welfare of households can be better examined if those who are credit constrained can be properly identified

For Ethiopia, there is a recent study that examined the role of private transfers and loans on risk management in urban areas (Alvi and Dendir, 2009). However, investigating what determines credit access is more crucial both from empirical and policy perspectives before estimating private transfer or loan receipt equations. Rigorous analysis on credit constraints and other related issues is hampered by the absence of household-level data. There is also little information, particularly in urban areas on the characteristics of the households who are most likely to be credit constrained and the extent of credit rationing in the formal sector.

Our study is motivated by the fact that the provision of credit to households is an important vehicle through which households acquire working capital, adopt technology, build asset stocks and smooth consumption in the face of random volatility of income. Access to loans plays a pivotal role when insurance markets are incomplete, credit markets are imperfect and subsidized credit leads to rationing and other rent-seeking behavior. Credit constraints matter for households' investment in

education, health and nutrition. In an era of expanding urbanization and ever increasing unemployment problem in some of the fastest growth urban centres, access to finance matters a lot. Lack of credit for investment purposes weakens or severely limits the development of small enterprises and other productive self-employment opportunities (Johnson, Malkamaki and Nino-Zarazua, 2009). There is a great deal of exclusion from the formal credit market for many urban residents as most of the credit demand of urban households is largely addressed via informal networks. Hence, understanding credit constraints and their determinants at the micro level is at the heart of household welfare and economic development.

Hence, our study is responses to the acute lack of studies based on urban household surveys from Africa that directly identify the presence and determinants of credit constraints. Our empirical analyses serve to generate some relevant credit policy suggestions. Most studies focus on African firms and rural credit markets in Asia especially in India (Akoten et al., 2006; Bigsten et al., 2003; Fafchamps, 2000; Pal, 2002; Kochar, 1997; Bell, et al., 1997). This study focuses on empirical analysis of credit constraints faced by Ethiopian urban households.

The remainder of the study is organized as follows. Section 2 discusses the literature on the theoretical and empirical issues surrounding credit constraints. 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 our econometric evidence. Finally, we forward concluding remarks and highlight some policy implications of our results.

2. Credit Constraints: Theory and Empirical Evidence

Credit constraints are well documented in the literature (Boucher et al. 2009; Karlan and Zinman, 2010). The main reasons forwarded include asymmetric information, high transaction costs and risk rationing imposed by borrowers unwilling to lose their collateral (Hoff and Stiglitz, 1990; Aryeety and Udry, 1997; 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 and deter investment in children's

health and education (Udry, 1991; Zeldes, 1989; Becker and Tomes, 1986; Foster, 1995). Credit constraints would also reduce the availability of financial resources which can be used to buy inputs and finance business start ups. In the specific context of Ethiopia, provision of credit for the poor can complement existing reform packages to pro-poor growth (Kedir, 1999).

The most influential model of the demand for household credit is the permanent or the 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 even though they determine the structure and costs of human interaction (North, 1994). However, 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 role in determining the performance of economies, it is perhaps not surprising to see personal savings and credit being used to cope income shocks and replace public sector interventions in situations where the state is too weak to implement effective labour market policies.

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, 2008). Households are more likely to receive gifts from close relatives such as parents, children and loans from more distant relatives (in-laws, uncles and aunts).

Diagne (1999) investigated the impact of household credit constraints on income, consumption, nutrition and agricultural productivity. Our study focuses on identifying the types of urban households that encountered difficulties in obtaining credit in Ethiopia in addition to examining the significant factors responsible for the constraints and the amount of money borrowed. We believe the results from our analysis would enhance the effectiveness of future credit programmes and other policies (Barham et al., 1996; Carter and Olinto, 2003).

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 (Hall and Mishikin, 1982; 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. 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 (Feder et al., 1989; and Jappelli, 1990). The survey by Feder et al. (1989) 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 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 constrained. The authors 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.

The principles of the direct method were 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 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 credit constraints also requires collecting information on households that did not apply for credit. We have data on households that did not apply for loans including the reasons for not doing so (see data section for more details).

Jappelli (1990) identifies credit constrained consumers as those who had their request for credit rejected by financial institutions. It can be envisaged that 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 household 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 household is credit constrained. Households discouraged from taking a loan are categorized 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?”* One may argue that the discouraged are not necessarily constrained if their decision not to apply for a loan is based on interest rate comparisons. In our context, interest rates do not play a discernable role in credit access as most borrowers use informal interest-free sources. Hence, as can be seen in the data section, we also classified discouraged borrowers as constrained. 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 household 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 borrowed. There are downsides to this approach. The credit limit variable will not be totally accurate until all potential borrowers apply.

In an empirical context, heteroscedasticity would also arise since individuals who are close to their credit limit are more able to accurately predict their limit than those who are further away from their limits.

Zeldes (1989) explicitly used Euler equations, following the pioneering work of 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 into two groups, one of which (with low or negative wealth) is being credit constrained. However, if households are credit-constrained, they may change their consumption without violating the Euler equations, thus weakening the usefulness of such tests (Deaton, 1991).

This paper follows a direct approach to identify credit-constrained households in urban Ethiopia and extend the definition of credit constrained households adopted by Jappelli (1990). We classified households as constrained when they receive a loan amount which is less than they applied for. Other constrained households included the discouraged and whose loan application is rejected. Our extended definition allows us to provide a more comprehensive identification of those constrained. This study attempts to make a modest contribution to the existing scanty literature on urban household credit constraints in an era of rapid urbanization and the need for development finance for small enterprise development and employment generation.

3. Data

Our analysis in this study is based on the 2000 Ethiopian Urban Household Survey (EUHS). A longitudinal analysis would have been more informative. However, previous rounds of the same survey could not be used because they do not contain the relevant variables on household credit constraints. The 2000 survey contains detailed data about the socio-economic characteristics of urban households and their members. It includes modules such as household demographics, 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 Ethiopian Central Statistical Authority's (CSA) 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 urban centres (i.e. Bahir Dar, Dessie, Jimma and Mekelle).

Due to the unique nature of our survey information, we identified three categories of credit constrained households. The first category of constrained households constitutes 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?"* The second category of households consists of households that reported receiving a loan amount less than they requested. We strongly think these households are credit-constrained because they settled for less not by their choice but because the lender refused to give them the full amount they wanted. The third category of our constrained households consists of discouraged borrowers. Our data asks the households to supply their reasons why 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'*, and *'loan application takes long time to process'*. In the present application, we considered those households that give the above reasons as credit-constrained. Our extended direct approach provides a more complete identification of credit constrained households than previous studies (Diagne et al., 2000; Jappelli, 1990). In the next section, we discuss some of the contextual characteristics of credit markets in urban Ethiopia which will be useful in interpreting the subsequent econometric results.

4. Credit Markets in Urban Ethiopia

This section explores the structure of credit markets in urban Ethiopia in detail based on our survey data. One of the main observable features of credit markets in developing countries is the presence of segmented formal and informal financial institutions (Aryeetey and Udry, 1997; Bell, 1993). The formal sector consists of commercial banks while the informal sector includes microfinance institutions, indigenous credit sources such as landlords, rotating savings and credit associations (ROSCAs), money lenders, trade creditors and family and friends. MFIs can be hybrids of formal and informal institutions (Akoten et al. 2006). 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.

Sources of loans

The information on sources of loans reveals the significance of the informal sector. Similar results are reported elsewhere (Banerjee and Duflo, 2007). According to Table 1, 79% of the 315 households obtained their loan from the informal and semi-formal sectors as opposed to the 21% of loans secured 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 vehicles of saving mobilization rather than credit institutions (Kedir and Ibrahim, 2011). It is interesting to note that there are few loans obtained from moneylenders who are dominant lenders elsewhere such as in India and Thailand (Bell, 1993). In the formal sector, the microfinance institutions play a major role in lending (45%) while banks and the government provide very few loans.

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)
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: Authors' calculation from EUHS, 2000

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% 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 an 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.

Gender and access to credit

We investigated whether households headed by males and females have differential access to various sources of loans. According to Table 2, on aggregate, both types of households have almost equal access to credit. Interestingly, the number of male headed households that accessed loans is slightly less than that of female-headed households. 55 % of the households that accessed formal loans are headed by females as opposed to 51% in the case of informal loans. While friends and relatives give more loans to males, micro-finance institutions give more loans to females. The high participation by women in informal networks is consistent with other studies in Africa (Hogset, 2005).

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: Authors' calculation from EUHS, 2000

Lending and borrowing behavior

There are very few households that have a bank account (only 16% of them), indicating little use of formal financial institutions even in an urban setting in Africa. This is interesting, given the fact that our data is from seven major urban areas in Ethiopia including the capital city which constitutes 60% of the total sampled households for the survey. This highlights the acute lack of financial depth.

Uses of loans

Households took loans both for consumption and productive purposes. Consumption credit plays the role of insurance by allowing risk pooling among risk-averse households across time. 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%). Given the small amount of loan transactions, very few households took out a loan to build a house (5.7%). Unlike the findings in rural credit markets, consumption finance is the main reason for borrowing in urban Ethiopia (Alvi and Dendir, 2009; Gill and Singh, 1997). 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 shows that informal lenders are indifferent to the nature of the project of the borrower. This is due to the fact that they face a low probability of default given their knowledge of their clients. They do not suffer from severe adverse selection, moral hazard and enforcement problems as formal credit institutions. After friends and relatives, credit associations and microfinance institutions are the next largest lenders, and also tend to lend for various purposes. It is well documented that these institutions have stronger enforcement capabilities than formal institutions and they can afford to be less selective and flexible when they screen potential borrowers.

However, formal sources of credit 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 (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. 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 is one of the salient features of credit markets in developing countries (Banerjee and Duflo, 2001; Fafchamps, 2000). The mean interest rate is only 3.1%. It is argued elsewhere that informal loans with zero or small interest serve insurance purposes in the face of income variability (Fafchamps and Lund, 2003; Udry, 1991). The low interest rate in our sample is not due to the fact that a proportion of the population surveyed is significantly Islamic. In fact, Muslims constitute only 13.3% of all the households interviewed. Hence, the underlying reasons for the low use of interest rates are better understood when we link interest rates with sources of loan. As expected, friends and relatives lend without requiring interest payments. In addition, employers, credit associations, NGOs and governments give a small number of interest free loans. It is true that not all formal sector loans are interest bearing. Micro-finance institutions, banks and credit associations tend to charge interest across the whole range of rates while there is one case of friends and relatives charging the highest rate of 20%. Most of the rates provided by micro-finance institutions are small similar to the rates applied in group lending schemes elsewhere. 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 are concerned, 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 the dominance of exploitative informal moneylenders in credit markets of less developed economies. Our finding on interest rates charged by the formal sector 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 reported the loan amount they borrowed both in cash and in kind. The loan amounts reported in-kind has been converted into cash equivalents during the interview and total borrowing per household is computed by adding the loans in cash

and in-kind. The average annual loan amount of all households is 223 Ethiopian birr with a maximum of 50,000 birr. The majority of households borrowed amounts less than 10,000 birr. To investigate interesting relationships as summarized in Table 3, we linked the loan amount borrowed with some household characteristics. There seems to be little gender bias again, as females receive only slightly less than 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, it shows a decreasing trend. For ethnic groups such as the Gurage and especially Tigre, there appears to be a significantly larger mean of the total loan granted per household relative to other ethnic groups such as the Oromo and the Amhara. Households with Protestant heads also received higher mean loan amount than other households.

Table 3: Total Loan Amount (in Ethiopian birr) 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: Authors' calculation from EUHS, 2000. The birr is the Ethiopian currency with an exchange rate of £1=20.38 and 1USD=13.53 as of 30/06/10.

Constrained households

Credit-constrained households in this study are defined according to the details given in section 3 above. Table 4 shows 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 had deterred them from applying. The results show the presence of a high percentage of credit-constrained households in urban Ethiopia (26.6%) which points to the necessity of addressing the unmet demand for credit.

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 (including unconstrained households)	1455 (100)

It is evident that the discouraged constitute the highest proportion of the credit-constrained households. As the case in some other parts of the developing world such as Asia, 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.

5. Econometric Evidence

i. Standard Probit and Instrumental Variable (IV) probit models

In this section, we present our econometric estimation results. The empirical modeling of the determinants of access to credit or probability of being credit constrained (say P) 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 we can define a dummy dependent variable y which takes a value of either 1 if household i is credit-constrained or 0 otherwise. x_i represents a vector of household characteristics and the μ_i is a normally distributed error term with zero mean and constant variance.

However, one important empirical issue is the potential endogeneity of the household expenditure variable which is entered on the right hand side as one of the predictors of the probability of being credit constrained (see Table 5). Therefore, to control for endogeneity we adopted Amemiya's GLS (generalized least squares) estimator which is sometimes referred to as IV (instrumental variables) probit estimation (Newey, 1987). We used household income as an instrument. The endogeneity of expenditure is also a potential empirical issue in our tobit model of the amount of loan taken by households (see Table 6). In each case, we report the tests for the validity of our instrument using Smith and Blundell (1986) and Wald tests of exogeneity. 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) which has a non-zero correlation with the error term μ_i ; x_{ei} represents

a vector of exogenous variables, γ and β are vectors 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, squared and interaction terms*. The variables reflect both determinants of demand and supply of credit. Hence, we need to recognize the ambiguous effects of the demand and supply side variables as they might be at work simultaneously.

Table 5 presents the marginal effects of parameters of the standard probit and the IV probit models. Unsurprisingly, richer households have a lower probability of being rationed out of the credit market. 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 the probability of being constrained increases as households increase their consumption and demand for credit. 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 a negative but insignificant effect.

Households with dependent children between the age of 6 and 15 and that live in the capital city, Bahir Dar, Dessie, Dire and Jimma are more likely to be credit constrained. The presence of more dependents in households may discourage lenders because it signals higher desired consumption instead of investment, limited earning capacity and higher probability of default. Marital status and gender dummies were insignificant, the latter implying no gender bias in urban credit access confirming our findings in the descriptive section. Location matters in accessing loanable funds. Relative to Mekelle, households in Addis Ababa, Bahir 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. This might also relate to availability of credit provision services in Mekelle relative to other cities.

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

Models	Probit model	Instrumental Variables 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)
Bahir 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 chi ² (1)		1.02
Prob> chi ²		0.31

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

ii. Standard Tobit and IV Tobit models

In this study, we also investigated the factors affecting the volume of loan accessed by households and its determinants using tobit and IV tobit models. 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 the 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 or non-random choice of borrowing households that can if we exclude households with zero loan amount. In addition to adopting the tobit model to handle selectivity bias, we estimate the IV tobit model to account for the endogeneity of the household expenditure variable. The IV tobit model to estimate can be defined as:

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

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

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.

Table 6 reports the marginal effects of parameters of both the standard tobit and IV tobit models. While it can be of use to analyze the determinants of loan amount from the borrower's perspective, thereby reflecting the behavior on the demand side of the credit market, the variables collected here are those determinants which are likely to be used from the lender's perspective to screen the borrowers. Given this, the econometric analysis allows us to highlight the extent of rationing that occurs once the lender has decided to lend. The explanatory variables in the tobit model represent the determinants of rationing mostly on the supply side of the market. The relative

strength of the demand side factors as compared to supply side influences depends 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 or default.

Table 6: Tobit models of loan amount received by households

Models	Tobit model	Instrumental Variables Tobit Model
Variable	Marginal Effects (t-value)	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 chi ² (1)		1.32
Prob> chi ²		0.25

N.B.: (i) Variables 'Adults above 55' and 'Mekelle' are omitted to ensure identification. (ii) *=Significant at the 10% level; **= Significant at the 5% level; and ***= Significant at the 1% level. (iii) In the IV model, the income variable is used to instrument for expenditure.

From Table 6, it is clear that current resources, 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 similar to the evidence identified elsewhere (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 conjecture about the loan amount supplied by lenders. The results reveal an absence of gender, ethnic and religious discrimination in loan allocations in urban areas of Ethiopia. However, the negative "non-Addis" coefficient suggests the presence of discrimination in the volume of loan 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 regional development in Ethiopia. Recent credit schemes that target the elderly in the capital city through the Sustainable Development and Poverty Reduction Program (SDPRP) of Ethiopia proved to be successful in reducing old age poverty (Baleher and Yirsaw, 2003). Therefore, extending similar initiatives to other households in other regions can be an effective poverty reducing strategy.

5. Conclusion

Following Jappelli (1990), we extended the definition of credit constrained households in an empirical context using a large household survey undertaken in urban Ethiopia. Drawing on a unique dataset, our econometric methods were applied to estimate (with and without controlling for endogeneity of households' current resources) the determinants of households' probability of being constrained and the volume of loans accessed by the households.

Our analysis reveals that urban credit markets in Ethiopia are segmented. The informal sector is not only the major source of loans in rural areas but also in major urban centres. 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 viable route to enable households' access to credit. This restructuring should be an integral part of an overall government policy that includes a wide range of policy initiatives designed to revitalise small business and

entrepreneurship. These policy initiatives should target bottlenecks for self-employment through the provision of finance and business support in the form of training, information provision regarding management and marketing skills, and relaxation of locational regulations for new entrepreneurs. The expected outcome of these policies is twofold. Firstly, they would exploit the entrepreneurial potential of emerging businesses. Secondly, they are expected to reduce unemployment and the costs of social programmes associated with it. In this context, Alvi and Dendir (2009) examined the role of private transfers and loans on risk management in urban areas in Ethiopia. We argue that investigating what determines credit access is extremely crucial to estimate the impact of private transfer or loan receipt equations and the overall policy implications on the welfare of households.

Our results also showed that informal finance provide valuable services to those excluded from capital access through saving mobilisation, especially among neighbours, friends and relatives. This is in line with other studies that highlight the important role played by informal institutions in reaching out to the excluded and to address the enormous challenge of unemployment (De Gobbi, 2006; Matin et al., 2002). However, 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 programmes to fill the vacuum.

Another interesting result 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 or constrained households are the poor, uneducated and households with children. These results emphasize the significance of the socio-economic milieu and discrimination in the labour markets as significant factors in understanding credit constraints in urban Ethiopia. Equally, the negative "non-Addis" coefficient suggests the presence of discrimination in the volume of loan 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 regional development in Ethiopia.

References

- Akoten, J. E., Sawada, Y., and K. Otsoka (2006). The determinants of credit access and its impacts on micro and small Enterprises: The case of garment producers in Kenya. *Economic Development and Cultural Change* 54(4): 927-944.
- Alvi, E. and Dendir, S. (2009). Private transfers, informal loans and risk sharing among poor urban households in Ethiopia. *Journal of Development Studies* 45(8); 1325-1343.
- Amin, S., Rai, A. S., and Topa, G. (2003). Does microcredit reach the poor and vulnerable? Evidence from northern Bangladesh. *Journal of Development Economics* 70(1): 59-82.
- Aryeety, E., and Udry, C. (1997). The characteristics of informal financial markets in Sub-Saharan Africa. *Journal of African Economies, Supplement to* 6(1): 161–203.
- Baleher, A. and Yirsaw, F. (2003). Ethiopia: Country Position Paper, Ministry of Finance and Economic Development, Addis Ababa, Ethiopia.
- Banerjee, A. V., and Duflo, E. (2007). The Economic lives of the poor. *Journal of Economic Perspectives* 21(1): 141-167.
- _____. (2001). The Nature of Credit Constraints: Evidence from Indian Bank. Department of Economics, MIT, USA.
- Barham, B. P., Boucher, S., and Carter, M. R. (1996). Credit constraints, credit unions, and small scale producers in Guatemala. *World Development* 24(5): 793-806.
- Basu, K. (1983). The Emergence of isolation and inter-linkage in rural markets. *Oxford Economic Papers* 35(2): 262-280.
- Becker, G. S., and Tomes, N. (1986). Human capital and the rise and fall of families. *Journal of Labor Economics* 4(3): 1-39.
- Bell, C. (1993). Interactions between Institutional and Informal Credit Agencies in Rural India. In Braverman, H. and J. Stiglitz (eds.) *The Economics of Rural Organization: Theory, Practice and Policy*. World Bank, Washington D.C., USA.
- Bell, C., Srinivasan, N., and Udry, C. (1997). Rationing, spillover and interlinking in credit markets: the case of rural Punjab. *Oxford Economic Papers* 49(4): 557-585.
- Bigsten, A., Collier, P., Dercon, S., Fafchamps, M., Gauthier, B., Gunning, J. W., Oduro, A., Oostendoop, R., Patillo, C., Söderbom, M., Teal, F., and Zeufack, A. (2003). Credit constraints in manufacturing enterprises in Africa. *Journal of African Economies* 12(1): 104-25.
- Boucher, S., Guirkinger, C. and Trivelli, C. (2009). Direct Elicitation of Credit Constraints: Conceptual and Practical Issues with an application to Peruvian Agriculture, *Economic Development and Cultural Change*, vol. 57(4):609-640.
- Boucher, S., Carter, M. R., and Guirkinger, C. (2005). Risk Rationing and Activity Choice in Moral Hazard Constrained Credit Markets. Staff Paper, Department of Agricultural and Applied Economics, University of Wisconsin, USA.

- Carter, M. R., and Olinto, P. (2003). Getting institutions "Right" for whom? Credit constraints and the impact of property rights on the quantity and composition of investment. *American Journal of Agricultural Economics* 85(10): 173-186.
- Cox, D., and Fafchamps, M. (2008). Extended Family and Kinship Networks: Economic Insights and Evolutionary Directions. In T. P. Schultz and R. E. Evenson, R. E (eds.) *Handbook of Development Economics*. New York, USA: Elsevier.
- Deaton, A. (1991). Saving and liquidity constraints. *Econometrica* 59(5): 21-48.
- De Gobbi, M. S. (2006). Labour Markets Flexibility and Employment and Income Security in Ethiopia: Alternative Considerations. International Labor Office, Employment Strategy Papers, 2006/1, ILO, Geneva, Switzerland.
- Diagne, A. (1999). 'Determinants of Access to and Participation in Formal and Informal Credit Markets in Malawi. International Food Policy Research Institute, FCND, Discussion Paper No. 67, Washington D.C., USA.
- Diagne, A., Zeller, M. and Sharma, M. (2000). Empirical Measurements of Households' Access to Credit and Credit Constraints in Developing Countries: Methodological Issues and Evidence. IFPRI, FCND Discussion Paper No. 90, Washington D.C., USA.
- Fafchamps, M. (2000). Ethnicity and credit in African manufacturing. *Journal of Development Economics* 61(1): 205-35.
- Fafchamps, M. and Lund, S. (2003). Risk-sharing networks in rural Philippines. *Journal of Development Economics* 71(2): 261-287.
- Feder, G., Lau, L., and LinLuo Xiaopeng, J. Y. (1989). Agricultural credit and farm performance in China. *Journal of Comparative Economics* 13(4): 1151-1157.
- Foster, A. D. (1995). Prices, Credit Markets and Child Growth in Low Income Rural Areas. *The Economic Journal* 105(430): 551-570.
- Friedman, M. (1957). The permanent income hypothesis: Comment. *American Economic Review* 48(5): 990-991.
- Gill, A., and Singh, U. C. (1997). Financial sector reforms, rate of interest and the rural credit markets: The role of informal lenders in Punjab. *Indian Journal of Applied Economics* 6(4): 37-65.
- Hall, R. (1978). Stochastic implications of the life cycle permanent income hypothesis: Theory and evidence. *Journal of Political Economy* 86(5): 971-987.
- Hall, R., and Mishkin, F. (1982). The sensitivity of consumption to transitory income: Estimates from panel data on households. *Econometrica* 50(2): 461-82.
- Hoff, K., and Stiglitz, J. (1990). Imperfect information and rural credit markets: Puzzles and policy perspectives. *The World Bank Economic Review* 4(3): 235-260.
- Hogset, H. (2005). Social Exclusion and Insurance Failure for the Poorest: on Informal Finance through Social Networks in Kenya's Smallholder Sector. Cornell University, New York, USA.
- Jappelli, T. (1990). Who is Credit Constrained in the U.S Economy? *Quarterly Journal of*

- Economics* 105(1): 219-234.
- Johnson, S. Malkamaki, M., and Nino-Zarazua, M. (2009). The role of informal groups in the financial market: evidence from Kenya. Department of Economics and International Development, University of Bath, UK.
- Karlan, D. and Zinman, J. (2010). Expanding Credit Access: using randomized supply decisions to estimate the impacts, *Review of Financial Studies*, vol. 23(1): 433-464.
- Kedir, A. (1999). Modeling poverty and its determinants for urban Ethiopia: The multinomial logit selection model. *Ethiopian Journal of Economics* 6(2): 1-36.
- Kedir, A. and G. Ibrahim (2011). ROSCAs in Urban Ethiopia: Are the Characteristics of the Institutions More Important than those of Members? *Journal of Development Studies* 47(7):998-1016.
- Matin, I., Hulme D., and Rutherford S. (2002). Finance for the poor: From microcredit to microfinancial Services. *Journal of International Development* 14(2): 273-294.
- Newey, W. K. (1987). Efficient estimation of limited dependent variable models with endogenous explanatory variables. *Journal of Econometrics* 36(3): 231-250.
- North, D. (1994). Economic Performance through Time. *American Economic Review* 84(3): 359-68.
- Pal, S. (2002). Household sectoral choice and effective demand for rural credit in India. *Applied Economics* 34(14): 1743-1755.
- Smith, R. J. and Blundell, R. W. (1986). An exogeneity test for a simultaneous equation tobit model with an application to labor supply. *Econometrica* 54(3): 679-686.
- Udry, C. (1991). Credit markets in northern Nigeria: Credit as insurance in a rural economy. *World Bank Economic Review* 4(3): 251-269.
- Zeldes, S. (1989). Consumption and liquidity constraints: An empirical investigation. *Journal of Political Economy* 97(2): 305-346.
- Zeller, M. (1994). Determinants of credit rationing: A study of informal lenders and formal credit groups in Madagascar. *World Development* 22(12): 1895-1907.