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Access to Credit: Awareness and Use of Formal and Informal Credit Institutions*

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Abstract: In this paper we study the determinants of use of formal and informal credit sources. Given that awareness is a necessary step towards use of credit, in order to control for the possible selection bias we decompose the decision to use credit as a two stage decision process in which first, households form their choice set by deciding which type of institutions they want to consider as possible lenders (awareness), and then choose among them (use). Additionally, we allow for correlation between being aware of a specific source of credit and using it. We find evidence that supports the hypothesis that the formal and informal credit markets in Mexico attend different segments of the population. However, our results also show that informal lending sources' characteristics are valued per-se by consumers in certain situations, such as emergencies.
Keywords: Credit demand, consideration set, informal credit, formal credit, Mexico.
JEL Classification: D1, D14, G2.

Resumen: En este artículo se estudian los determinantes del uso de fuentes formales e informales de crédito. Debido a que el conocimiento de una fuente de crédito es necesario para su uso, para controlar por posible selección descomponemos el proceso de decisión de los hogares de usar fuentes de crédito en dos etapas. En la primera etapa de este proceso los hogares conforman su conjunto de elección al decidir qué tipo de instituciones quieren considerar como posibles prestamistas (conocimiento) y en la segunda, los hogares deciden qué fuente usar dentro de las fuentes que pertenecen a su conjunto de elección (uso). Además, permitimos que haya correlación entre el conocimiento de una fuente de crédito específica y el uso de esa fuente. Se encuentra evidencia que apoya la hipótesis de que el crédito formal y el informal en México atienden a diferentes segmentos de la población. No obstante, los resultados muestran que las características de las fuentes de crédito informales son valoradas per-se por consumidores en ciertas situaciones como por ejemplo, en emergencias.
Palabras Clave: Demanda por crédito, conjuntos de elección, crédito informal, crédito formal, México.

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1 Introduction

It has been widely acknowledged that broad financial services have a positive impact on growth and welfare (Claessens, 2005; Demirgüç-Kunt and Levine, 2008; Clarke, Xu, and Zou, 2003; Honohan, 2004; Dehejia and Lleras-Muney, 2007; Levine, 2005). It is in this context that it becomes pertinent to understand the determinants of credit access in Mexico. Moreover, the literature on credit has found that limited access to formal financial services could encourage the development of informal financial institutions which could act as a complement or substitute of the formal sector (Eswaran and Kotwal, 1989; Braverman and Stiglitz, 1989; Kiiza and Pederson, 2002). Thus, it is relevant to understand the demand for credit in a context where formal and informal institutions coexist.[1]

Awareness of credit institutions, either formal or informal, is an essential demand-access element of credit. Individuals cannot choose to ask for a loan in an institution that they don't know. It has been recognized that access to financial services must be studied from the supply and demand sides of the market (Claessens, 2002; Claessens, 2006 and Beck and Demirgüç-Kunt, 2008). With respect to the demand side of the market Claessens (2002) explains that individuals are voluntarily excluded of the credit market if they are not aware of the service, do not need the service, or assume rejection. Thus, she suggests that in order to have access to the credit market individuals should decide to be aware of the services. Even though awareness is the first step towards use, not much has been explored about the determinants of awareness of credit sources and their use.

In this manner when we study use of lending sources we face a selection problem. In order to deal with this problem, we study demand for credit as a two stage decision process in which individuals first choose which type of institutions they want to consider as possible lenders and then choose among them. Using household data for Mexico we estimate the first stage using a model of credit use with consideration set formation (Andrews and Srinivasan, 1995). The estimation strategy uses all the information about household's knowledge on all possible credit sources rather than focusing on the knowledge of a particular credit institution. Additionally, it allows us to exploit information on households that are excluded from the formal, informal or both credit markets because they are not aware of the institutions, rather than focusing only on the households that are already participating in the credit market. In the second stage estimation we model the decision process as a multinomial logit taking as given the household's choice set formed in the first stage. To deal with the possible

[1]Formal lenders are institutions regulated by the government and the Central Bank whereas informal lenders operate beyond the regulatory framework of the financial system (Zeller, 1994). As formal institutions we study banks, savings banks, and government loans. Informal insitutions considered in the study are: money lenders, pawnshops, and family or friends.

selection bias, we allow for correlation between awareness of a specific source in the first stage and its use in the second stage (Green, 2006; Terza, 2002).

The estimation in this paper allows us to disentangle the effect of household and locality characteristics on awareness and use of different types of credit. The results highlight the importance of knowing the specific channel (use or awareness) through which different variables affect access to formal and informal credit. It also allows us to differentiate those households that are aware of credit sources but decide not to participate from those that are not aware of credit sources.

In general, our results suggests that the formal and informal credit sectors are attending different types of households. However, we also find evidence that the informal sector plays a complementary role to the formal sector. There is a positive relationship between income and use of formal institutions such as banks and savings banks but a negative relationship between income and the use of informal sources such as money lenders and friends or family. With respect to formal credit institutions we find that schooling, age, and type of employment affect awareness of these institutions. With respect to the determinants of informal credit demand, we find that household size has a positive effect on awareness and use of informal credit institutions. Women use more pawnshops as lending sources and education has a negative relationship with the use of this source.

Moreover there is some evidence that suggests that the characteristics of the institutions that conform the informal sector such as their flexibility and rapid access to loans, are valuable to households (Pearlman, 2010; Beck and de la Torre, 2007). Such is the case of family and friends as lending institutions. We find that the awareness and use of family and friends as credit lenders increase when households suffer a negative income shock. This proposes that some characteristics of this credit institution make it a better choice than formal institutions when the household suffers a negative shock. This points out to the existence of some complementarity between the formal and informal sectors in Mexico.

The rest of the paper is organized as follows: the next section gives a description of the financial sector in Mexico, Section 3 provides a literature review; Section 4 describes the methodology used in the estimation; Section 5 presents the data and summary statistics; Section 6 presents the results; and Section 7 concludes.

2 Formal and informal credit institutions in Mexico

This paper studies awareness and use of both formal and informal credit sources in Mexico. Following the definition of formal lenders being institutions regulated by the government who operate inside the regulatory framework of the financial system, the formal sources addressed in our study are: banks, savings banks, and government credit programs; while, informal sources are: money lenders, pawnshops and family or friends.

Banks are formal financial institutions that are primarily engaged in accepting deposits from the public for active credit operations. Banks can be either commercial or development banks. Commercial banks are privately owned while development banks are publicly managed and target their credit to specific activities.

Savings bank and cooperatives are both regulated financial institutions and they are considered to be Peoples Financial Sector institutions by the National Banking and Securities Commission (CNBV). For this reason savings banks and cooperatives are typically located in low income municipalities. They mainly offer savings and credit services but can also offer other services such as payments from government social programs, recipient of remittances, payment of electricity or water bills, and insurances. The difference between savings banks and cooperatives is that while cooperatives are nonprofit institutions that provide services only to their members, savings banks offer services to the general public.

Government credit in this study mainly considers two programs One's word credit (Crédito a Palabra) and Mexican Institute of Social Security's credit (IMSS) or Institute of Social Security and Services for Government Workers' credit (ISSSTE). One's word credits are funds that are granted to low-income farmers that have no more than 20 hectares of land under cultivation during the rainy season and that are not eligible for bank credit. The payment of these credits stays in the community and is used for work that benefits the community or to promote savings banks. IMSS and ISSSTE are in charge of the provision of public health systems. ISSSTE covers federal government workers only and IMSS covers formal private workers. They offer registered individuals credits such as house funding or funeral support for the death of family members. Additionally, IMSS gives out loans to employees from their own pension funds and they pay them through their monthly salary. ISSSTE gives out personal loans according to the employees' salary and the time they have been working for the federal government.

A money lender is considered to be any group or person that gives out loans. Money lenders can get resources form personal surpluses or borrow from other credit institutions (Toby, 1991). The literature considers that they can lower information costs and that they present the highest interest rates (Varghese, 2005; Hernández-Trillo, Pagán and Paxton,

2002). According to Hernández-Trillo, Pagán and Paxton (2002) in Mexio money lenders offer loans for an average term of 4 to 9 months, which is considered medium term investment, while friends and family give out short term loans and banks long term credit. However, there is not much information on use or availability of money lenders.

According to the Mexican Economic Census data, pawnshops are a growing business in Mexico, even when they have monthly interest rates that go from 10 to 23%. The number of pawnshops went from 1,589 to 5,948 from 2004 to 2009. Moreover, in 2010 according to Federal Consumer Protection (PROFECO) that is in charge of the regulation of pawnshops, 90% of pawnshops are private or commercial and have an average annual cost of 257% of the borrowed amount; the other 10% of the pawnshops are institutions of private assistance and have an average annual cost of 120%. The average loan in pawnshops varies between the 25% and 45% of the value of the pledge pawned. PROFECO also reports that 80% of the pawnshops users are housewives and the other 20% are in their majority merchants, students, unemployed and retired people.

Regarding credit from friends and famlily, according to National Survey of Microenterprises (ENAMIN) loans from this source are also the most frequently used at the time a firm starts up in Mexico.

3 Literature Review

Previous literature has provided evidence of the effect that financial services have on economic growth and poverty alleviation (Claessens, 2005; Demirgüç-Kunt, and Levine, 2008; Clarke, Xu, and Zou, 2003; Honohan, 2004; Dehejia and Lleras-Muney, 2007; Levine, 2005; Peachey and Roe, 2004). Beck, Demirguc-Kunt and Martinez (2008) find that both outreach and depth indicators of financial systems are positively correlated with economic development, quality of institutions and development of physical infrastructure. Moreover, access to finance for large parts of the population has been recognized to be important to expand opportunities, for driving democracy and market economy, and enhance technological progress (Rajan and Zingales, 1998; King and Levine, 1993). Furthermore, access to finance has been compared with access to basic needs such as water, education, and health services (Peachey and Roe, 2004).

The literature on access recognizes that access to financial services is not only a matter of availability of institutions but an interaction between access-supply and access-demand factors (Claessens, 2006; Beck and de la Torre, 2007; Beck, Demirguc-Kunt and Martinez, 2008). With respect to the supply side of the market (supply-access), access has been widely identified with availability of services (Claessens, 2005). From the demand side (demand-access),

Claessens (2002) classifies types of access in three groups, two groups that are excluded from the market and one that is not. The first group is called involuntary exclusion and it is composed by people that have been rejected due to their high risk profile, discrimination, price, product, income, or respondent features. The second group, voluntary exclusion group, includes those that do not need the service, those that are not aware of the service, and those that assume rejection. Finally, the third group is composed by those that are consumers of financial services. Furthermore, this literature recognizes that it is important to distinguish between access and use when discussing financial sector outreach and finds that the actual demand for credit can be lower due to lack of access because of reasons such as financial illiteracy or lack of awareness (Beck and de la Torre, 2007).

Another strand of literature that is relevant for our work is the one related to the role of the informal financial system in demand for credit. It has been explained that the existence of scale economies and network externalities makes individuals living in small communities or individuals with the need for small credit transactions unprofitable for formal financial service providers (Peachey and Roe, 2004). Because of the limited access to formal financial services, it has been argued that the informal sector faces the residual demand from the formal sector (Eswaran and Kotwal, 1989; Braverman and Stiglitz, 1989; Kiiza and Pederson, 2002). In this sense, it has been said that the poor rarely have access to voluntary deposit or credit services offered by formal institutions so they are obliged to save or ask for a credit in an informal source, which often has higher costs, risks, illiquid and indivisibility (Beck and de la Torre, 2007). On the other hand, it has been explained that formal and informal credit sources interact horizontally especially when low-cost credit is available through informal sources (Bell 1990; Kochar 1997; Conning and Udry, 2007; Guirkinger, 2008).

In particular, previous literature has considered friends and family loans to be a way of risk sharing that is beneficial for a group of people, specially in developing countries like Mexico and among individuals that are exposed to shocks in their income. Furthermore, credit between friends and family are considered to be effective because of peer monitoring (Besley, 1995). Pearlman (2010) finds that in Peru and Ecuador family and friends are the main source of funds when dealing with an enterprise or family emergency. The author explains that this is mainly because flexibility may be very important to poor borrowers who face high levels of risk and limited means of managing it. Large shocks such as robbery, bribes, extrusion and natural disasters limit the ability to meet rigid repayment schedules usually adopted by formal credit sources. For these reasons, in this paper we use data on awareness and use of formal and informal services which allows us to characterize the determinants of access of both types of sources in Mexico.

With respect to use of credit, access to formal and informal financial services has been

studied so far as a decision process in which the individual or household decides whether to use or not a specific service. In this sense, Besley and Levenson (1996) and Anderson and Baland (2002) study participation in Roscas in Taiwan and Kenya respectively using a one-stage probit model. The use of financial services from the demand side has also been studied through the use of multinomial models. By using multinomial probit models Bendig, Giesbert, and Stainer (2009) simultaneously estimate the demand (use) for savings products, loans, and insurances in Ghana. Wydick, Hayes and Kempf (2011), using a multinomial logit model, measure the extent to which social networks determine use of different sources of credit in Guatemala. Finally, Tang, Guan and Jin (2010) use a multinomial product model to study the demand for formal and informal credit in China.

Use of financial services has also been studied through two-stage models. Zeller (1994) uses univariate probit models to see how individual and household's characteristics and events might affect the probability of an individual asking for credit and being granted such credit. To see the difference between formal and informal sources of credit, the author estimates the model separately for the formal and informal sectors. In order to study whether formal credit rationing in rural India exists, Pal (2002) first estimates the probability that a household demands informal or formal credit using a multinomial logit model and then, estimates the demand on informal loans conditional on having one formal loan. However, none of these studies account for the fact that no participation/use could be due to lack of awareness of the financial institutions that are studied.

Our paper follows more closely the literature that considers the selection that exists derived from the awareness of a specific source when studying use of financial services. Okaten and Osil (2004) estimate the impact of social networks on access to credit in Indonesia with a non-simultaneous, three-stage selection model. The authors explain that the survey used presents a selection bias due to the fact that only individuals that report knowing a source of credit are asked whether they borrowed or not. In order to correct this bias, the first stage in this paper presents an equation for selection based on whether the individual knows any source of credit or not. They find that social networks are important in knowing a place to borrow, as well as for loan approval. Differently, in our paper we consider each of the lending sources a household is aware of (we study 6 different sources, 3 formal and 3 informal). Thus in the second stage of our model we use a multinomial logit while Okaten and Osil (2004) use a probit model.

Finally, our estimation is based on papers that explain how to model two-stage multinomial logits. In this sense we used Andrews and Srinivasan's (1995) consideration set formation model. We also considered literature on instrumental variables in multinomial logits such as Terza (2002), which studies the effect of alcohol abuse on employment conditions

and addresses endogenity in a multinomial logit model. Additionally, we used Green's (2006) multinomial logit model with sample selection. Lastly, we based the computational estimation of our model on Haan and Uhlenforff (2006) suggested routine for multinomial logit models with unobserved heterogeneity using maximum simulated likelihood.

What makes our model different form all others is that, first, we study the demand of credit from various institutions simultaneously through a multinomial logit, second, we correct for selectivity due to awareness of a source, and third, when we estimate the household decision to use a specific source of credit we allowed each household to choose only from the sources it is aware off.

4 Estimation

According to previous literature, choosing which alternatives to consider when making a decision is relevant because a choice might be made when alternatives are not physically present, because consumers must know what they are looking for or because households lack the motivation to locate and examine multiple alternatives (Andrews and Srinivasan, 1995). Moreover, consumers create consideration sets with specific characteristics, they prefer to create a consideration set from alternatives that are easier to compare or that have a high likelihood of containing their optimal alternative. Consumers often use their past experiences to narrow down their awareness set, this is called screening criteria and it is used when consumers face a large set of alternatives in order to reduce the number of alternatives they will choose among. Screening criteria can rely on familiarity of the alternative or memory accessibility (Chakravarti and Janiszewski, 2003). Additionally, as it has been mentioned earlier, the literature on access to credit considers unawareness of credit sources as voluntary exclusion which suggests that individuals decide to be aware or not of lending institutions (Claessens, 2006).

Given that we can only observe the decision to ask for credit from those individuals that are aware of a specific source and that individuals choose which sources to know, there is a selection bias on the sample that uses financial services. In order to deal with this problem we use the two stage model developed by Andrews and Srinivasan (1995) correcting for selection as suggested by Greene (2006) and Terza (2002).[2] In the first stage households decide which institutions they will consider when deciding to ask for a loan, i.e. each household forms its consideration set of lending institutions. In the second stage, decision makers decide which

[2] Andrews and Srinivasa (1995) developed the model to study the demand with consideration set formation for scanner data. Consideration set formation is the process in which the individuals decide which options they want to consider when making a decision.

institution among the ones in their consideration set maximizes their utility. We allow for correlation between awareness of a source and the use of that specific source in order to account for the endogeneity that might exist between being aware and use of a source.

In our model there are six different institutions that provide loans: $K = \{$banks, savings banks, government, money lenders, pawnshops, family and friends$\}$. We observe the use/non use of a specific institution only if the household knows the source. A household (j) knows an institution (k) if $z_k^{j*} = 1\left(z_k^j > 0\right)$, where

$$z_k^j = \alpha' X_{jk} + \gamma W_{jk} + \eta_{jk}.$$

Where $\eta_{jk} \sim N[0,1]$, X_{jk} referes to household characteristics and W_{jk} is a set of instruments for being aware of a source and that are not directly related with use of a lending source. Thus, for every household we have a consideration set $C_j \subset P$, determined by $\{z_k^{j*}\}_{k=1}^6$, and P is the set of all possible subsets of set K (lending institutions) excluding the empty set. We assume that in addition to the institutions that the household decides to consider (household's j consideration set), the household's choice set ($S_j \subset \Omega$) also includes the option *not asking* for a loan, i.e. $S_j = C_j \cup \{not\, asking\}$. Hence, the set of possible choice sets is $\Omega = \cup_{C_j \in P}\{C_j\} \cup \{not\, asking\}$.

Therefore, in the second stage the household decides to apply for a loan or not, taking as given it's choice set S_j. The household maximizes its utility and solves:

$$\max\{u_{jk}\}_{k \in S_j}$$

where $u_{jk} = X_{jk}\gamma + \sigma_k \upsilon_j + \varepsilon_{jk}$ and $\varepsilon_{jk} \sim GEV$ (generalized extreme value distribution), $\upsilon_j \sim N[0,1]$ is a random parameter that captures the unobserved factors through which sample selection operates. Following Greene (2006) the probability that household j chooses option $k \in S_j$ follows the multinomial logit model with sample selection:

$$p(k|S_j, X_{jk}, \upsilon_j) = \begin{cases} \dfrac{e^{\left(X_{jk}\gamma + \sigma_k \upsilon_j\right)}}{\sum_{n \in S_j} e^{\left(X_{jn}\gamma + \sigma_n \upsilon_j\right)}} & \text{if } k \in S_j \\ 0 & \text{if } k \notin S_j \end{cases} \tag{4.1}$$

Note that in our case the data are characteristics of the individual rather than attributes of the choices, then the coefficients are renormalized. In the second stage of the estimation (use) not asking for a loan will be used as the baseline category and then all the coefficients should be interpreted with respect to it.

In order to correct for the possible endogeneity between the first stage decisions and the second stage, we allow for correlation between the error terms of the first and second

stage: $\left(\eta_{jk}, \upsilon_j\right) \sim N\left[(0,1),(1,\rho_k,1)\right]$. By joint normality $f\left(\eta_{jk}|\upsilon_j\right) = N\left[\rho\upsilon_j,(1-\rho^2)\right]$. The parameters σ_k, in equation (4.1), and ρ will correct for the endogeneity between the sencond and first stage.

In order to construct the maximum likelihood $p(k)$ we need the probability of choosing institution k given that the household has choice set $S_j : p(k|S_j)$, and the probability of being aware of the institutions belonging to the set $S_j : p(S_j)$. The latter probability is computed as:

$$\begin{aligned} p(S_j|X_{jk},W_{jk},\upsilon_j) &= \prod_{n\in S_j} p(z_n^{j*}>0)\prod_{n\notin S_j}\left(1-p(z_n^{j*}>0)\right) \\ &= \left[\prod_{n\in S_j}\Phi\left(\frac{\alpha' X_{jn}+\gamma W_{jn}+\rho_n\upsilon_j}{\sqrt{1-\rho_n^2}}\right)\prod_{n\notin S_j}\Phi\left(-\frac{\alpha' X_{jn}+\gamma W_{jn}+\rho_n\upsilon_j}{\sqrt{1-\rho_n^2}}\right)\right] \end{aligned}$$

Note however, that υ_j is not known, is a random variable that captures the unobserved heterogenety. Thus in order to compute the maximumlikelihood function we need to integrate over the distribution of υ_j. We asume that household heterogeneity υ_j is the same among households and is independent across households. Then, the probability of observing the demand for credit in institution k is:

$$L = p(k) = \prod^{J}\int_{-\infty}^{\infty}\left(\sum_{S_j\subset\Omega} p(k|S_j,X_{jk},W_{jk})p(S_j|X_{jk},W_{jk})\right) f\left(\upsilon_j\right)d\upsilon_j \tag{4.2}$$

We estimate equation 4.2 by simulation in STATA.[3]

$$\ln L = \sum^{J}\ln\left[\frac{1}{R}\sum_{r\,=1}^{R}\left(\sum_{S_j\subset\Omega} p(k|S_j,X_{jk},W_{jk},r)p(S_j|X_{jk}.W_{jk},r)\right)\right]$$

The simulation draws R values (r) from the unobserved heterogeneity (υ_j) distribution, for each draw the maximumlikelihood is estimaded and then the average is computed. Instead of using random draws we follow Green (2006) and Hann and Uhlendorff (2006) and base the simulation using Halton sequences. It has been shown that Halton draws provide a wider coverage of the range of integration (Hann and Uhlendorff, 2006).

[3]The code is avaliable upon request to the authors.

5 Data and summary statistics

We use data from The Mexican Family Life Survey (MxFLS) for the year 2002.[4] MxFLS is a longitudinal household survey that collected information from a representative sample of approximately 8,400 households or 35,000 household members in 150 localities throughout Mexico. The survey includes information on household members, households, and localities. The survey covers household member characteristics like educational attainment, labor market participation, and income; household characteristics such as assets, expenditure, and credit availability; and locality characteristics such as population, credit opportunities, and infrastructure. MxFLS is representative at the national, urban-rural, and regional level. Data for 2005 has also been released by MxFLS, however expansion weights are under construction and not available. Due to the fact that the design of the survey sample is very complex (three-staged, by conglomerates and stratified) the use of expansion weights is essential.

In the present study we use the credit survey in MxFLS answered by the members of a household that are 15 years old or older. In this survey the interviewer first ask if the household member knows a credit source.[5] If the answer is "no" then they don't ask any more credit questions; if the answer is "yes" then they name different options from which household members have to specify the ones they know. If the household member does know at least one source of credit they proceed to ask if in the last 12 months they have borrowed from any of the sources they know and to specify from which of them have they borrowed. The fact that credit questions are only asked to household members that are aware of a source of credit presents a sample selection bias when studying use of credit.

The survey provides information about eleven different types of credit sources: bank, savings bank or cooperatives, *Crédito a Palabra* program, IMSS or ISSSTE credit (social security institutions), other government credit, money lender, pawnshop, work, family, friends, and other. We grouped friends and family and the three types of government credit (*Crédito a Palabra* program, IMSS or ISSSTE credit and other government credit), in order to have more observations in those groups.[6] Due to the lack of detail on what sort or credits are work credits and other they were not considered in this study. We were left with six different sources of credit: bank, savings bank, government credit, money lender, pawnshop and family or friend.

[4] MxFLS only exists for the years 2002 and 2005.

[5] "Do you know any person or place where you can borrow or ask for a credit?" The answer can either be "yes" or "no" and that is why our awareness variable takes values 1 and 0 only.

[6] Other sources of credit were not grouped because they have unique characteristics and have different effects on outcome variables when comparing them to the rest of the credit sources.

In our analysis a unit of observation is a household. This is because the survey provides more information at a household level than at a household member level.[7] Additionally, it is not strange to think that awareness of a source of credit is easily shared among the household members and that income is shared within the household members, therefore if a household member needs a loan other household member could act as an intermediary. The fact that households are the unit of observation means that a specific source of credit is part of a household's consideration set if there is at least one member in that household that knows that source of credit. Hence, the choice set of a household is the union of all the different sources of credit known by their members.

Similarly, a household is considered to have asked for a credit from a bank, savings bank, government credit, money lender, pawnshop, and family or friend if at least one of its members asked for a credit in that source. Since an important assumption in multinomial logit models is that only one alternative is chosen, for the households that have loans in more than one source of credit, we assign the source in which the borrowed amount was the largest.[8]

Table 1 provides a description of the sources of credit that households are aware of. Panel A shows the number of credit sources that households in the sample know, which is the cardinality of their consideration set. As it can be observed, 47% of the households in the sample do not know any of the six sources of credit considered in this study, therefore their consideration set is empty. The large amount of households that report not knowing a source of credit can be due to a measurement error in the survey. This can be caused by the way household members interpret this question. Knowing a source of credit has a wide range of interpretations, from being aware of its existence to having the knowledge of payment conditions and interest rates. However, it would be difficult to dimension this measurement error due to the impossibility of comparing the data with other surveys because of the particularity of the characteristics and questions in the MxFLS. Around 35% of the households are aware of only one source of credit while 17% of the households in the sample are aware of two or more different types of credit. Moreover, only 0.1% of the households in the sample is aware of all the credit sources considered in this study. Panel A also provides a description by source of credit. It can be seen that the source that households are more aware of is family and friends, followed by bank, and the one that they are least aware of is government credit. This also holds for households that are aware only of a single credit source. Out of the households that are aware of more than one credit source a large number

[7] Data at household member level has a lot missing values and therefore very few observations. Due to the large number of parameters that are estimated in the model, it needs more observations to converge. In order to have more observations data was aggregated by household.

[8] Only 1.97% of the households in the sample report having a loan in more than one source of credit.

of them have family or friends as part as their choice set. Around 38% of the households that know a family or friend from which they could get a credit also know other sources of credit, making family and friends the largest alternative source of credit known. For example, 73% of the households that know a bank in which to ask for a loan know other sources of credit. 48% know a family and friend and only 25% know an other source.

Table 1, Panel B presents the percentage of households in the sample that know and demand each type of credit. Out of the 53% of households that do know a source of credit only 16% applied for a credit. Family and friends is the most commonly known and used source of credit, 35.7% of households know a family member or friend who could lend them money and 10.1% of the households are actually in debt with a family member or a friend. From Panel B it can be seen that bank occupies the second position in sources of credit known but only 0.7% of households actually demand a credit from a bank. Government credit lends only to 0.6% of the households.

To control for household characteristics we use the household size, which is the number of household members; the household head's sex (dummy variable where 1 is male and 0 female) and age; average schooling of the head and spouse in a household; the log of the household's annual income, where a household's annual income is the sum of the annual income of all of its members. Controls such as negative shocks and employment condition are built from other variables in the survey. A household is considered to have a negative shock to its income if the household has experienced one or more of the following events in the past 5 years: death of a household member, illness or serious accident that required hospitalization, unemployment or business failure, house or business lost due to an earthquake, flood or other natural disaster, total loss of crops, robbery, or death of production animals. We use two variables on the employment condition of the head of the household as controls, these variables are whether or not the household head is formally or informally employed. To define formal employment we consider two cases: first, an employee is considered to be formal when she receives social security, private medical insurance provided by the employer or pension found; second, a self-employed worker is considered to be formally employed if she receives social security. A worker is considered to be informally employed if she works but is not a formal worker.

Locality controls were built using the variable to identify localities in the survey.[9] The average income in a locality is the average income of the households that report their income in a locality.[10] Table 2 shows the means of the variables in the sample at a household level,

[9]Even though this survey is not representative at a locality level, due to the lack of locality identifier, locality controls were constructed using the survey and not Census data.

[10]In order to control for geographic barriers we also tried using dirt roads, post office, and bus terminal in locality. Additionally, we tried using income and schooling variables from the Mexican Census (a representative survey) at municipality level. Results didn't change.

therefore the mean of the variables bank in locality, savings bank in locality, government credit in locality, pawnshop in locality and money lender in locality are the percentage of households that live in a locality that has that source of credit.

In order to identify availability of credit sources in the locality we create a set of variables that take value one if there is a branch of that type of credit institution in the locality and zero otherwise. Bank in locality, savings bank in locality, government credit in locality and pawnshop in locality are variables built from the *Communities* questionnaire in the survey. Money lender in locality was not used due to the large proportion of missing values this variable has. A locality is considered to have access to government credit if the members of the locality are beneficiaries of programs such as government credits (Créditos Gubernamentales) or housing subsidies (Ahorro, Subsidio y Crédito para la Vivienda Progresiva, VivAh). We use availability variables in order to control for transportation costs.

Table 3 presents the percentage of localities by the number of sources of credit they have and the percentage of the households in the sample that live in these localities. It can be observed that 39.1% of the localities in the sample don't have any source of credit and 31.8% have only one source of credit. We can also observe that only 4.6% of all localities in the sample have the four different credit sources. The fact that there are so many localities without credit sources or with a single type of credit source, and so few localities with all types of credit sources means that the members of a household must travel to other localities in order to use a specific type of credit.

In the sample only 41% of the households live in localities where there are banks and 39% live in localities where there are saving banks. In the sample, government credit is the sources of credit that most localities have. The percentage of localities that have government credit as its only source of credit is around 27.2% of all localities in the sample and 64% of the households live in a locality where government credit is offered, most of these localities are rural and have an average income below the mean. Differently, pawnshops are the source least present in localities in the sample and only 25% of the households in the sample live in localities where there are pawnshops. Pawnshops are only situated in localities where there is at least another different source of credit.

In order to avoid identification problems selection models include independent variables in the selection equation that are excluded from the main equation. These are instrumental variables and they have to fulfill two conditions. First, that instruments are strongly correlated with awareness and second, that they are uncorrelated with use of credit. In this study, the variables used for awareness (selection equation) that are excluded from use are: previous serious accident or health problem, previous natural disaster in the locality, public

transportation in the locality, and change in infrastructure in the locality.[11] A household is consider to have had a previous serious accident or health problem if they report that they had one in the past but they are no longer affected by it. [12] A locality is considered to have a previous natural disaster if there was a flood, earthquake, landslide, fire, hurricane, draught, plague, frost, or hailstorm before 2000. The existence of public transportation inside the locality is directly reported in the Communities questionnaire. A change in infrastructure in the locality is considered to be the construction of roads, introduction of drainage, introduction of clean water systems, telephone, construction of health services, and construction of new schools. Summary statistics of these variables are also presented in Table 2.These variables fulfill the two conditions mentioned above. First, we find that they are strongly correlated with awareness by conducting a Wald test where the null hypothesis is that all the parameters of the instruments in each of the awareness equations are jointly equal to zero. The null hypothesis is rejected at the 5% level for awareness of bank and money lender, and at the 15% level for awareness of savings bank, government credit, pawnshops and family and friend. They also fulfill the second condition. Previous incidents that happened a long time ago and do not affect households' income in the present are correlated with awareness of sources because they might have needed to borrow money in the past and aren't correlated with use because they are no longer affected by these shocks. Public transport is correlated with awareness of credit sources because it allows household members to cover longer distances and get to know more sources, and it does not explain use of credit. Finally, infrastructure not only increases communication inside the locality but also might become more attractive for credit sources to open a branch in that locality. Both situations increase information about sources of credit without affecting its use.

6 Results

In Table 4 we present the results of the model with consideration set formation. Panel A shows the results for awareness and Panel B the results for use conditional on awareness for each source allowing for correlation between the errors in the first and second stage. Note that awareness and use of the six sources is computed simultaneously. In order to control for possible error correlation within localities we compute the standard errors using clusters

[11] Following Terza (2002) we use variables at locality level to instrument for variables at household level.

[12] This variable is different from negative shock, because negative shock to the income caused by health problem and accident that required hospitalization is in the previous 5 years and can still be affecting the household. Differently, previous accident or health problem refers to a problem that was faced in the past and is no longer affecting the household's income.

at this level.[13]

Results in Table 4 Panel B are estimated using the information on the choice set of each household and they present the effect of each variable on conditional use corrected for selection. In order to interpret the results it is important to note that the first stage presented in Panel A (*awareness*) is modeled using a normal distribution, therefore coefficients can be interpreted as the change in the predicted probability that the source of credit is part of the households' choice set or the probability that the households are aware of it, when there is a change in one of the independent variables holding everything else constant.[14] Table 5 Panel A presents the marginal effects at the mean. The base category in the estimation in Panel B (*use)* is not asking for a loan, so all the results in this column should be interpreted with respect to this variable. The magnitude of the coefficients in the second stage (*use*) can be interpreted as coefficients of a standard multinomial logit model using odds ratios. The odds ratios for the second stage are presented in Table 5 Panel B.

From Table 4 we can see the effect that different variables have on the awareness and use of different sources of credit. We find evidence that suggest that the formal and informal sectors attend different segments of the population and that the informal sector seems to have a complementary role derived from its characteristics such as flexibility and rapid lending procedures.

Our estimation provides information on the segmentation of the credit market when analyzing how income affects demand of different credit sources. Results show that there are two different effects of income. The first effect is positive and is through awareness of credit sources, the probability of being aware of credit sources, either formal or informal, is increasing in income. An increase of 1% of income rises the probability of being aware of bank, savings bank, government credit, and family and friends by 0.04, 0.03, 0.003, and 0.02 percentage points respectively, in comparison with the probability of households with the mean income. However, the second effect is reflected in use and is different for formal and informal sources. Income has a positive effect on using formal credit and a negative effect on the use of informal credit conditional on awareness. In increase in 1% of annual income increases the odds of asking for a credit in a bank by 2.05 times and decreases the odds of asking for a credit from family and friends 0.2 times. This provides evidence of what has been mentioned in past literature about income having a positive impact on access to credit from formal institutions while some sources of informal credit attend the residual demand which includes households with lower income (Beck and de la Torre, 2007; Eswaran

[13] When estimating the model in Stata through maximum likelihood there exists the option vce(clusters id_loc), where id_loc is the variable that has the locality ID.

[14] The interpretation of these coefficients is the same as the interpretation of a probit regression. Awareness of each source of credit is modeled as a probit.

and Kotwal, 1989; Braverman and Stiglitz, 1989; Kiiza and Pederson, 2002). As Peachey and Roe (2004) explain, this could be happening because lower income households ask for small credit transactions unprofitable for formal financial service providers or because poor households have a lack of income stability or collateral. In addition, we find that average income in locality has no effect on awareness but conditional on awareness localities with higher average income use less credit form both formal and informal sources.

Age and schooling affect the demand-access of formal credit institutions. Age and age squared have a positive effect on being aware of formal sources of credit. A household with a household head that is one year older than the mean has a probability of being aware of bank credits 0.002 percentage points greater than a household with a household head that is 46.2 years old (age mean). However, age is negatively correlated with using formal sources. An increase of one year would decrease the odds of using a credit from a bank 0.13 times. Older people are more likely to be aware of these sources, but out of the ones that are aware of them the younger ones are the ones that use them. Schooling is positively correlated with being aware of formal sources, yet, when looking at use, we observe that schooling is no longer significant in explaining use of banks and it is negatively correlated with using savings banks. On one hand, one year of schooling above the mean increases a household's probability of being aware of banks by 0.009 percentage points with respect to those households with average schooling. On the other hand one more year of schooling decreases the odds of using savings banks by 0.14 times. Moreover, we find that higher average schooling in a locality has no effect on awareness but it affects use of formal credit positively.

Employment condition is also an important determinant of the demand of formal sources of credit. A variable that affects banks, in particular, is being formally employed. This variable has no effect on knowing a bank but has a positive effect on using it. For formally employed head of households, the odds of using credit form a bank are 5.71 times as large as the odds for informally employed or unemployed of using such credit. This could be explained because having a formal job might make it easier for the household members to show that they have a stable job and income which is necessary to get a loan from a bank. Awareness of government credit is negatively affected if the head of the household is informally employed. However, use of government credit is negatively affected if the household head has a formal job.

Additionally, we find evidence that suggest that availability of formal institutions affects demand-access. The availability of banks and savings banks has a small but positive impact on households being aware of that particular source. However, it should be noted that the availability of any type of credit source has no effect on use of that particular source. These

results suggest that having access to a source of credit in the locality doesn't have an effect on a household decision on whether to ask for a credit or not conditional on knowing that source of credit. Furthermore, the results show that availability of formal sources has a negative effect on the use of money lender, which provides evidence on the fact that substitution between formal and informal sources of credit exists.

With respect to the informal market a determinant of demand-access is household size. This variable has a positive effect on knowing and using informal sources of credit. An increase of one family member above the mean increases the probability of a household of being aware of money lender, pawnshop and family or friends by 0.006, 0.007, and 0.02 percentage points respectively in relation to households that have the average number of members. An additional member in a household increases the odds of using money lender credits 1.22 times and pawnshop credits 1.30 times. The positive effect on use could be explained by assuming that the household head or spouse have more members to support, they need more resources in their daily expenses and therefore they get loans form informal sources since these sources can lend smaller amounts in little time.

When analyzing pawnshops we notice that this source of credit has some interesting characteristics. Male and female household heads are both equally likely to be aware of pawnshops; however when it comes to using pawnshops women are more likely to use them than men. The male-female odds ratio of using pawnshop credit is 0.75 to one. Additionally, schooling is negatively correlated with use of pawnshops. An increase in a year of schooling decreases the odds of using pawnshops by 0.10 times.

Moreover, our results suggest that the informal sector also acts as a complement of the formal sector. The informal sector, and more specifically credit from family and friends, seems to be an important source of credit to face unexpected events. This can be seen in the positive effect that the variable negative shock to the income has on awareness and on use of family and friends as a source of credit. The fact that a household has faced a negative shock increases the probability of being aware of family and friends and the odds of using credit from family and friends by 1.73 times with respect to those households that have not faced a negative shock to their income. This is consistent with the literature that explains that family and friends networks are used as a way of sharing risk and as funds when dealing with an enterprise or family emergency due to its flexibility and rapid lending procedures (Pearlman, 2010). Negative shock also has a positive effect on knowing government credit; however it is not significant in explaining its use.

We find evidence of selection supported by the significance of ρ in all sources and σ in all except bank. Moreover, we conducted a Wald test where the null hypothesis is that the σ parameters of all sources are jointly equal to zero. The test statistic is equal to 61.88 (p-

value is 0.00), hence the null hypothesis is rejected at the 0.1% level. This provides further evidence on the need of correcting for selection due to awareness when studying use of credit.

7 Robustness

In order to show the relevance of estimating a model of consideration set formation correcting for selection we also present the results of an unconditional multinomial logit model and a consideration set formation model without selection. Table 6 presents the unconditional multinomial logit model where it is assumed that all households know all the credit institutions and choose the type of credit that maximizes its utility. Comparing our results with those of the multinomial logit model allows us to establish more clearly the mechanism, awareness or use, through which variables affects demand for credit. Multinomial logit coefficients sometimes seem to be capturing the awareness effects and sometimes the use effect. This estimation does not capture some important effects that impact demand through awareness and use. For example, the multinomial logit fails to capture the effect of sex when using pawnshops, the impact of household income on use of some informal sources, and the effect that schooling has in formal sources.

Table 7 presents the consideration set formation model without selection. This model fails to capture various effects such as the effect that household size has on being aware of some informal sources of credit, awareness of government credit due to negative shocks, and the effect that sex has when using pawnshops. On the other hand, this model has effects that disappear when correcting for selection such as the effect that sex has on using money lender and savings bank. Moreover, coefficients in this model are under or over estimated. The difference in these results emphasizes the importance of having a two stage model with consideration set formation correcting for selection.

In order to gain statistical efficiency and check our results we grouped the sources of credit in formal and informal. Results are presented in Table 8. We find that some of the general results presented still hold, however, other results disappear because of contrary effects that some variables have within formal or informal sources. Household size still affects awareness of informal sources but no longer its use, due to the fact that it was only significant for two of the four informal sources. We still get that male household heads are more likely to be aware of informal sources and that schooling and formal employment variables have a positive effect on awareness of formal sources. Grouping the sources can be misleading. For example, we find that income affects awareness only of formal sources and it would seem like income doesn't have an effect on the use of any type of credit source. Also, when looking at negative shock variable, we observe that it has a positive effect on knowing both formal and

informal sources and that it has no effect on the use of neither. These results would lead to conclude that informal and formal sources are acting similarly when facing a negative shock when in Table 4 we can see that they aren't.

8 Conclusions

In this paper we estimate the effect that different variables have on awareness and use of formal and informal credit sources in Mexico using a model of consideration set formation and correcting for selection. We assume that the first step for using a specific credit source is being aware of it, therefore it is important to consider the selection problem when studying use of credit. Furthermore, we include the fact that different households are aware of different sources of credit through the formation of households' consideration sets in the estimation.

We find evidence that suggest that the formal and informal sectors attend different segments of the population and that the informal sector seems to have a complementary role derived from its characteristics such as flexibility and rapid lending procedures.

The fact that formal and informal sectors attend different segments of the population can be seen through the impact that some variables have on awareness and use of formal and informal sources. Income has a positive effect on awareness of both formal and informal sources; however, it has different effects in their use, income has a positive effect on the use of formal sources and a negative effect on the use of informal sources. Awareness and use of formal and informal sources are also differently affected by schooling. On one hand, households with higher average schooling are more likely to be aware of formal sources and schooling in locality has a positive impact on the use these sources. On the other hand, schooling has a negative effect on using pawnshops. Availability of banks and savings banks has a positive effect on awareness of those sources but has no effect on their use. Availability of formal sources also has a negative effect on use of some informal sources which suggests that substitution between formal and informal sources exists. Additionally, we find that awareness and use of informal sources is positively affected by household size and that women are more likely to use pawnshops.

Moreover, informal credit institutions, particularly friends and family, play an important role for households when they suffer an income shock. This suggests that the informal sector acts as a complement of the formal sector due to its characteristics, such as flexibility and quick approval of loans, that might be valuable per se in certain situations such as emergencies.

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Table 1: Access description

Panel A: Awareness

Number of sources known	Households	Percentage
0	3784	46.9%
1	2875	35.6%
2	853	10.6%
3	324	4.0%
4	166	2.1%
5	54	0.7%
6	9	0.1%
Total	8,065	100.0%

Source	Aware of the source	Aware of that only source	+Framily or friends	+Any other
Bank	12.8%	25.6%	48.7%	25.7%
Savings bank	9.7%	30.4%	47.9%	21.7%
Government credit	1.9%	29.8%	52.3%	17.9%
Money lender	10.6%	29.0%	54.5%	16.5%
Pawnshop	8.9%	24.9%	50.3%	24.8%
Family and Friend	35.7%	63.0%	-	37.0%

Panel B: Use

	Ask for loan (use)	**Knows credit source (awareness)**	**Use conditional on awareness**
Bank	0.7%	12.8%	5.4%
Savings bank	2.3%	9.7%	23.9%
Government credit	0.6%	1.9%	31.8%
Moneylender	1.5%	10.6%	14.0%
Pawnshop	1.0%	8.9%	11.7%
Family or friends	10.1%	35.7%	28.4%
Total	16.3%		

Observations are number of households in the sample.

Source: Mexican Family Life Survey 2002

Table 2: Summary Statistic

	Mean
Household controls	
Household size	4.25
	(2.04)
Households with male head (proportion)	77.9%
Household head's age	43.79
	(15.80)
Head of house formally employed (proportion)	13.8%
Head of house informally employed (proportion)	51.7%
Average schooling of head and spouse (years)	8.11
	(3.02)
Anual household income (pesos)	33,715
	(64,999)
Negative shock (proportion)	29.9%
Formal savings (proportion)	17.2%
Does not own a house (proportion)	26.3%
Temporary migrant (proportion)	9.5%
Locality controls	
Urban (proportion)	59.0%
Average household annual income in locality (pesos)	39,047
	(19,782)
Average schooling in locality (years)	7.88
	(1.37)
Bank in locality (proportion)	35.2%
Savings bank in locality (proportion)	29.5%
Government credit in locality (proportion)	60.0%
Pawnshop in locality (proportion)	21.7%
Instruments	
Previous serious accident or health problem	16.1%
Previous natural disaster in locality	46.9%
Public transport in locality	68.9%
Change in infrastructure in locality	88.6%

*Standard deviation in parenthesis. Data presented using weights.

Source: Mexican Family Life Survey 2002

Table 3: Credit sources in a locality

Number of credit sources	Number of localities	Percentage localities	Number of households	Percentage households
0	59	39.1%	2680	33.2%
1	48	31.8%	2198	27.2%
2	22	14.6%	1372	17.0%
3	15	9.9%	1209	15.0%
4	7	4.6%	612	7.6%
Total	151	100.0%	8071	100.0%

Source: Mexican Family Life Survey 2002

Table 4: Panel A - Awareness correcting for selection

Probability that a source of credit is considered in a choice set using a normal distribution

Dependent variable is awareness of sources of credit

	Bank	Savings Bank	Government credit	Money Lender	Pawnshop	Family and Friend
Household controls						
Household size	0.0317	0.0134	0.0118	0.0420**	0.0495*	0.0704***
	(0.0196)	(0.0172)	(0.0413)	(0.0205)	(0.0275)	(0.0164)
Household head's sex	0.0285	0.0541	0.00424	0.378**	0.207	0.198*
	(0.108)	(0.125)	(0.227)	(0.149)	(0.139)	(0.101)
Household head's age	0.0104**	-0.00499	0.000222	0.00449	0.00343	0.00329
	(0.00519)	(0.00522)	(0.00831)	(0.00548)	(0.00498)	(0.00414)
Household head's age squared	6.86e-05	0.000175***	4.61e-05	7.18e-06	3.13e-05	-1.10e-05
	(5.01e-05)	(4.77e-05)	(9.54e-05)	(5.84e-05)	(5.34e-05)	(5.23e-05)
Head of house formally employed	0.146	0.586***	-0.184	0.0855	0.132	-0.162
	(0.179)	(0.175)	(0.254)	(0.184)	(0.206)	(0.135)
Head of house informally employed	0.103	0.230*	-0.492***	0.245	-0.0696	-0.0377
	(0.138)	(0.139)	(0.171)	(0.152)	(0.183)	(0.107)
Average schooling of head and spouse	0.0467***	0.0321*	-0.0205	0.0148	0.0176	0.0187
	(0.0121)	(0.0171)	(0.0240)	(0.0118)	(0.0141)	(0.0133)
Anual income (log)	0.186***	0.173***	0.0948*	0.0369	0.0626	0.0672**
	(0.0528)	(0.0477)	(0.0552)	(0.0477)	(0.0489)	(0.0271)
Negative shock	0.0625	0.0852	0.246*	0.111	0.0846	0.142**
	(0.0714)	(0.0851)	(0.138)	(0.0768)	(0.0967)	(0.0622)
Locality controls						
Urban	0.167	0.0914	-0.00629	0.0154	0.260	0.0285
	(0.119)	(0.195)	(0.215)	(0.178)	(0.174)	(0.115)
Average income in locality (log)	0.0975	-0.0823	-0.0896	-0.195	0.220	-0.114
	(0.155)	(0.178)	(0.200)	(0.182)	(0.219)	(0.102)
Average schooling in locality	-0.00212	-0.155*	0.117	-0.0137	0.0301	-0.0636
	(0.0524)	(0.0840)	(0.0794)	(0.0696)	(0.0668)	(0.0395)
Bank in locality	0.243*	0.101	0.236	0.118	0.235	0.116
	(0.132)	(0.227)	(0.184)	(0.140)	(0.228)	(0.0772)
Savings bank in locality	0.209**	0.494***	0.188	0.361**	0.0445	-0.0192
	(0.0960)	(0.163)	(0.187)	(0.154)	(0.150)	(0.0997)
Government credit in locality	-0.117	0.00703	0.195	0.0212	-0.108	0.0691
	(0.0930)	(0.141)	(0.172)	(0.139)	(0.119)	(0.0797)
Pawnshop in locality	-0.153	0.169	-0.513**	-0.131	0.0141	0.128
	(0.150)	(0.243)	(0.205)	(0.158)	(0.265)	(0.105)
Instruments						
Natural disaster in locality	-0.0243	-0.153	0.346**	-0.323***	0.0314	0.0248
	(0.106)	(0.147)	(0.157)	(0.111)	(0.210)	(0.0747)
Previous serious accident or health problem	-0.0700	0.195**	0.193	-0.0363	0.00383	0.144*
	(0.0897)	(0.0919)	(0.153)	(0.0941)	(0.122)	(0.0859)
Public transport in locality	-0.0555	0.166	0.128	0.193	0.225*	0.0299
	(0.123)	(0.162)	(0.236)	(0.217)	(0.131)	(0.0989)
Change in infrastructure in locality	-0.323***	-0.0752	-0.210	-0.208	-0.190	0.165*
	(0.114)	(0.167)	(0.199)	(0.136)	(0.154)	(0.0992)
Constant	-5.134***	-2.123	-3.122*	-0.494	-5.593**	-0.347
	(1.326)	(1.742)	(1.753)	(1.580)	(2.266)	(0.906)
Observations	3,683	3,683	3,683	3,683	3,683	3,683

Note: *** significant at 0.1% level **significant at 1% level * significant at 5% level. Robust errors with clusters by locality in parenthesis, there are 129 localities in the sample. The number of observations is smaller from the number of households in the survey due to missing values in some variables. Analytical weights used.

Table 4: Panel B - Use of credit conditional on awareness correcting for selection

Multinomial logit with sample selection and consideration set

Dependent variable is use of sources of credit

	Bank	Savings Bank	Government credit	Money Lender	Pawnshop	Family and Friend
Household controls						
Household size	0.103	-0.0414	0.386	0.195**	0.269*	0.0618
	(0.178)	(0.0859)	(0.320)	(0.0942)	(0.142)	(0.0469)
Household head's sex	-0.589	0.996	1.594	0.945	-1.388*	0.0697
	(0.696)	(0.611)	(1.165)	(0.756)	(0.827)	(0.250)
Household head's age	-0.145***	-0.0649**	0.305*	0.0629**	-0.00983	-0.00648
	(0.0274)	(0.0270)	(0.177)	(0.0284)	(0.0209)	(0.0184)
Household head's age squared	0.00116***	1.94e-05	-0.00315*	-0.000754***	-0.000178	-0.000112
	(0.000413)	(0.000242)	(0.00180)	(0.000221)	(0.000349)	(0.000196)
Head of house formally employed	1.743*	-0.405	-3.411**	-0.179	-1.159	0.212
	(1.020)	(0.790)	(1.414)	(0.717)	(0.845)	(0.266)
Head of house informally employed	1.323	-0.585	1.023	-0.605	-0.661	-0.370
	(0.835)	(0.735)	(1.288)	(0.508)	(0.979)	(0.251)
Average schooling of head and spouse	-0.0326	-0.146**	0.202	0.108	-0.106*	0.0153
	(0.147)	(0.0739)	(0.249)	(0.0845)	(0.0626)	(0.0356)
Anual income (log)	0.717***	-0.0626	-0.869	-0.443*	-0.0767	-0.229***
	(0.273)	(0.217)	(0.791)	(0.231)	(0.368)	(0.0849)
Negative shock	0.670	0.129	-0.141	0.0468	-0.158	0.547***
	(0.656)	(0.339)	(0.886)	(0.361)	(0.679)	(0.144)
Locality controls						
Urban	-1.419	-0.338	0.474	0.978**	-0.0190	0.597**
	(0.879)	(0.715)	(2.555)	(0.469)	(1.034)	(0.248)
Average income in locality (log)	-2.437***	-1.256*	-0.792	-0.604	-2.478**	-1.044***
	(0.716)	(0.674)	(3.567)	(0.399)	(1.202)	(0.208)
Average schooling in locality	0.725***	0.117	2.196**	-0.0165	0.0194	0.0277
	(0.263)	(0.203)	(0.937)	(0.249)	(0.544)	(0.0922)
Bank in locality	0.119	0.786*	-1.312	-1.093**	0.848	0.144
	(0.685)	(0.459)	(1.263)	(0.425)	(1.055)	(0.239)
Savings bank in locality	-0.789	-0.843	3.500	-0.486	-0.413	-0.637***
	(0.738)	(0.585)	(2.359)	(0.383)	(0.883)	(0.236)
Government credit in locality	0.868	-0.579	1.501	0.138	0.0517	0.188
	(0.730)	(0.503)	(1.397)	(0.304)	(0.727)	(0.184)
Pawnshop in locality	0.873	1.389**	-3.148	0.131	-0.447	0.669**
	(0.736)	(0.593)	(2.045)	(0.690)	(0.794)	(0.263)
Constant	13.01*	17.12**	-13.07	6.372*	28.46**	11.94***
	(7.069)	(6.858)	(29.07)	(3.592)	(12.92)	(2.285)
Sigma	1.316	1.685***	0.964	1.073**	2.115**	0.514***
	(0.924)	(0.419)	(0.748)	(0.460)	(1.001)	(0.129)
Rho	-0.862***	-0.487***	-0.413***	-0.502***	-0.617***	-0.293***
	(0.0590)	(0.0786)	(0.101)	(0.0731)	(0.101)	(0.0491)
Observations	3,683	3,683	3,683	3,683	3,683	3,683

Note: *** significant at 0.1% level **significant at 1% level * significant at 5% level. Robust errors with clusters by locality in parenthesis, there are 129 localities in the sample. The number of observations is smaller from the number of households in the survey due to missing values in some variables. Analytical weights used.

Table 5: Panel A - Coefficient interpretation, marginal effects on awareness correcting for selection

Probability that a source of credit is considered in a choice set using a normal distribution

Dependent variable is awareness of sources of credit

	Bank	Savings Bank	Government credit	Money Lender	Pawnshop	Family and Friend
Household controls						
Household size	0.0063	0.0023	0.0004	0.0076***	0.0066*	0.0269***
Household head's sex	0.0039	0.004	-0.001	0.0534***	0.0203	0.0693*
Household head's age	0.0021*	-0.0008	0.00001	0.0008	0.0005	0.0013
Household head's age squared	0.00002	0.00003***	0.000002	0.000002	0.000005	-0.000004
Head of house formally employed	0.0402	0.1032***	-0.0045	0.0211	0.022	-0.0581
Head of house informally employed	0.0328	0.0445*	-0.0139***	0.0515	-0.0031	-0.0092
Average schooling of head and spouse	0.0095***	0.0055*	-0.0006	0.0028	0.0025	0.0073
Anual income (log)	0.0374***	0.0286***	0.003*	0.0063	0.008	0.0254**
Negative shock	0.0122	0.014	0.0087*	0.0199	0.0109	0.0541**
Locality controls						
Urban	0.0296	0.0139	-0.0005	0.0007	0.0306	0.0095
Average income in locality (log)	0.0141	-0.0161	-0.0035	-0.0373	0.0262	-0.0447
Average schooling in locality	-0.0001	-0.0256*	0.0038	-0.0021	0.0043	-0.0242
Bank in locality	0.05*	0.0164	0.0078	0.0206	0.032	0.0437
Savings bank in locality	0.0407**	0.0928***	0.0061	0.0699***	0.005	-0.0084
Government credit in locality	-0.0237	0.0008	0.0059	0.0034	-0.0145	0.0265
Pawnshop in locality	-0.0247	0.0327	-0.0115**	-0.0201	0.0041	0.0517
Instruments						
Natural disaster in locality	-0.0071	-0.0259	0.0113**	-0.0576***	0.003	0.0088
Previous serious accident or health problem	-0.0114	0.0373***	0.0073	-0.0048	0.0023	0.0569*
Public transport in locality	-0.0051	0.0299	0.0048	0.0371	0.0321*	0.0142
Change in infrastructure in locality	-0.081***	-0.0161	-0.0086	-0.0446	-0.0308	0.0591*

Note: Marginal effects are calculated at the mean. *** significant at 0.1% level **significant at 1% level * significant at 5% level.

Table 5: Panel B - Coefficient interpretation, odds ratios of use conditional on awareness correcting for selectio

From multinomial logit with sample selection and consideration sets

Dependent variable is use of each source

	Bank	Savings Bank	Government credit	Money Lender	Pawnshop	Family and Friend
Household controls						
Household size	1.11	0.96	1.47	1.22**	1.30*	1.06
Household head's sex	0.55	2.71	4.92	2.57	0.25*	1.07
Household head's age	0.87***	0.94**	1.36*	1.06**	0.99	0.99
Household head's age squared	1.001***	1.00	0.99*	0.99***	1.00	1.00
Head of house formally employed	5.71*	0.67	0.03**	0.84	0.31	1.24
Head of house informally employed	3.75	0.56	2.78	0.55	0.52	0.69
Average schooling of head and spouse	0.97	0.86**	1.22	1.11	0.90*	1.02
Anual income (log)	2.05***	0.94	0.42	0.64	0.93	0.80***
Negative shock	1.95	1.14	0.87	1.05	0.85	1.73***
Locality controls						
Urban	0.24	0.71	1.61	2.66**	0.98	1.82**
Average income in locality (log)	0.09***	0.28*	0.45	0.55	0.08**	0.35***
Average schooling in locality	2.06***	1.12	8.99**	0.98	1.02	1.03
Bank in locality	1.13	2.19*	0.27	0.91**	2.33	1.15
Savings bank in locality	0.45	0.43	33.12	0.62	0.66	0.53***
Government credit in locality	2.38	0.56	4.49	1.15	1.05	1.21
Pawnshop in locality	2.39	4.01**	0.04	1.14	0.64	1.95**

Note: Odds ratios must be interpreted with respect to the option not asking. An odds ratio of 1.05 means that the variable makes it 5% more likely to ask for a credit at that source than not ask for a credit.

Table 6: Multinomial Logit

Dependent variable is use of each source

	Bank	Savings Bank	Government credit	Money Lender	Pawnshop	Family and Friend
Household controls						
Household size	0.122	0.0305	0.141	0.144**	0.311***	0.127***
	(0.138)	(0.0459)	(0.157)	(0.0706)	(0.119)	(0.0315)
Household head's sex	-0.585	0.962**	-0.0707	2.205***	-0.507	0.356
	(0.563)	(0.381)	(0.557)	(0.629)	(0.479)	(0.229)
Household head's age	-0.0737***	-0.0440***	0.0720*	0.0903**	0.00375	0.00455
	(0.0168)	(0.0135)	(0.0437)	(0.0393)	(0.0196)	(0.0126)
Household head's age squared	0.000918***	0.000327***	-0.000862***	-0.000916**	-0.000220	-0.000137
	(0.000188)	(0.000116)	(0.000287)	(0.000374)	(0.000325)	(0.000125)
Head of house formally employed	1.349*	0.437	-2.168**	-0.0302	-0.888	-0.157
	(0.787)	(0.428)	(0.926)	(0.604)	(0.632)	(0.272)
Head of house informally employed	0.793	-0.440	-1.197**	-0.0978	-0.822	-0.304
	(0.494)	(0.419)	(0.471)	(0.492)	(0.583)	(0.238)
Average schooling of head and spouse	-0.00474	-0.00859	0.0195	0.0739	-0.0700*	0.0417
	(0.0666)	(0.0447)	(0.0927)	(0.0632)	(0.0409)	(0.0295)
Anual income (log)	1.149***	0.359***	0.0487	-0.295**	0.0658	-0.0874
	(0.175)	(0.136)	(0.128)	(0.129)	(0.176)	(0.0608)
Negative shock	0.632	0.386	0.218	0.370	-0.226	0.547***
	(0.599)	(0.272)	(0.438)	(0.257)	(0.490)	(0.133)
Locality controls						
Urban	-0.196	0.299	1.393	0.830*	1.173	0.483*
	(0.676)	(0.698)	(1.147)	(0.491)	(0.722)	(0.258)
Average income in locality (log)	-1.509**	-0.872	-1.509**	-0.701*	-0.656	-0.794***
	(0.593)	(0.599)	(0.659)	(0.400)	(0.541)	(0.174)
Average schooling in locality	0.532***	-0.233	0.397*	0.0744	0.268	-0.0467
	(0.170)	(0.250)	(0.216)	(0.227)	(0.206)	(0.0955)
Bank in locality	0.0813	0.804*	0.722	-0.814*	0.306	0.203
	(0.540)	(0.465)	(0.968)	(0.442)	(0.561)	(0.227)
Savings bank in locality	-0.558	0.813*	0.720	0.386	0.279	-0.395
	(0.625)	(0.439)	(0.705)	(0.420)	(0.514)	(0.244)
Government credit in locality	0.392	-0.290	1.360*	0.0991	0.0907	0.203
	(0.613)	(0.446)	(0.725)	(0.385)	(0.496)	(0.177)
Pawnshop in locality	0.486	0.741	-1.842**	-0.559	-0.177	0.476*
	(0.644)	(0.586)	(0.863)	(0.468)	(0.642)	(0.270)
Constant	-6.100	3.273	3.920	-0.0252	-1.213	5.962***
	(5.699)	(4.615)	(7.920)	(4.358)	(4.699)	(1.562)
Observations	3,840	3,840	3,840	3,840	3,840	3,840

Note: *** significant at 0.1% level **significant at 1% level * significant at 5% level. Robust errors with clusters by locality in parenthesis, there are 129 localities in the sample. The number of observations is smaller from the number of households in the survey due to missing values in some variables. The results should be interpreted with reference to not using any type of credit. Analytical weights used.

Table 7: Panel A - Awareness

Probability that a source of credit is considered in a choice set using a normal distribution

Dependent variable is awareness of sources of credit

	Bank	Savings Bank	Government credit	Money Lender	Pawnshop	Family and Friend
Household controls						
Household size	0.0283	0.00787	0.0140	0.0442**	0.0437	0.0743***
	(0.0196)	(0.0166)	(0.0350)	(0.0176)	(0.0303)	(0.0161)
Household head's sex	0.0395	0.0828	0.0609	0.345**	0.223	0.213**
	(0.112)	(0.120)	(0.207)	(0.144)	(0.140)	(0.0935)
Household head's age	0.0116**	-0.00623	0.000910	0.00395	0.00392	0.00374
	(0.00555)	(0.00493)	(0.00843)	(0.00551)	(0.00522)	(0.00434)
Household head's age squared	6.63e-05	0.000182***	3.71e-05	2.37e-05	2.98e-05	-8.77e-06
	(5.40e-05)	(4.66e-05)	(9.85e-05)	(5.70e-05)	(5.73e-05)	(5.25e-05)
Head of house formally employed	0.152	0.567***	-0.216	0.136	0.114	-0.174
	(0.193)	(0.170)	(0.271)	(0.172)	(0.218)	(0.128)
Head of house informally employed	0.110	0.234*	-0.500***	0.270*	-0.0824	-0.0510
	(0.152)	(0.131)	(0.184)	(0.149)	(0.191)	(0.106)
Average schooling of head and spouse	0.0496***	0.0343**	-0.0242	0.0168	0.0173	0.0188
	(0.0130)	(0.0167)	(0.0228)	(0.0120)	(0.0143)	(0.0128)
Anual income (log)	0.181***	0.165***	0.103*	0.0369	0.0653	0.0760***
	(0.0612)	(0.0502)	(0.0527)	(0.0512)	(0.0512)	(0.0265)
Negative shock	0.0574	0.0882	0.195	0.0768	0.0382	0.137**
	(0.0804)	(0.0839)	(0.132)	(0.0748)	(0.0931)	(0.0617)
Locality controls						
Urban	0.0978	0.0966	0.0300	0.0517	0.265	0.0786
	(0.139)	(0.199)	(0.259)	(0.161)	(0.178)	(0.111)
Average income in locality (log)	0.162	-0.00341	-0.202	-0.0113	0.232	-0.146
	(0.134)	(0.170)	(0.187)	(0.170)	(0.186)	(0.0963)
Average schooling in locality	-0.0295	-0.132	0.0643	-0.0106	0.0237	-0.0604
	(0.0540)	(0.0804)	(0.0824)	(0.0719)	(0.0670)	(0.0372)
Bank in locality	0.234*	0.0834	0.465**	0.0284	0.313	0.127*
	(0.124)	(0.234)	(0.225)	(0.139)	(0.211)	(0.0748)
Savings bank in locality	0.207**	0.499***	0.157	0.349**	0.0374	-0.0322
	(0.0982)	(0.161)	(0.220)	(0.154)	(0.160)	(0.0988)
Government credit in locality	-0.151	-0.0232	0.203	-0.0143	-0.125	0.107
	(0.0954)	(0.139)	(0.153)	(0.134)	(0.124)	(0.0774)
Pawnshop in locality	-0.185	0.153	-0.391*	-0.188	0.00184	0.140
	(0.149)	(0.228)	(0.209)	(0.171)	(0.224)	(0.102)
Constant	-5.880***	-3.000*	-1.597	-2.607*	-5.681***	-0.0137
	(1.101)	(1.605)	(1.734)	(1.419)	(1.678)	(0.836)
Observations	3,840	3,840	3,840	3,840	3,840	3,840

Note: *** significant at 0.1% level **significant at 1% level * significant at 5% level. Robust errors with clusters by locality in parenthesis, there are 129 localities in the sample. The number of observations is smaller from the number of households in the survey due to missing values in some variables. Analytical weights used.

Table 7: Panel B - Use of credit conditional on awareness

Multinomial logit with consideration set

Dependent variable is use of sources of credit

	Bank	Savings Bank	Government credit	Money Lender	Pawnshop	Family and Friend
Household controls						
Household size	0.141	0.0585	0.406	0.165*	0.266**	0.0614
	(0.169)	(0.0613)	(0.264)	(0.0856)	(0.134)	(0.0451)
Household head's sex	-0.451	0.921*	1.039	1.193*	-0.801	0.137
	(0.611)	(0.471)	(0.812)	(0.666)	(0.562)	(0.241)
Household head's age	-0.125***	-0.0427**	0.220	0.0656**	-0.0118	-0.00842
	(0.0224)	(0.0182)	(0.160)	(0.0318)	(0.0210)	(0.0159)
Household head's age squared	0.00114***	3.38e-05	-0.00223	-0.000810***	-0.000198	-8.78e-05
	(0.000372)	(0.000181)	(0.00171)	(0.000280)	(0.000381)	(0.000170)
Head of house formally employed	1.527	-0.448	-2.260**	-0.313	-0.794	0.121
	(0.931)	(0.637)	(1.032)	(0.600)	(0.740)	(0.250)
Head of house informally employed	1.048	-0.710	0.925	-0.622	-0.542	-0.337
	(0.730)	(0.595)	(1.219)	(0.466)	(0.774)	(0.231)
Average schooling of head and spouse	0.00503	-0.104**	0.239	0.0929	-0.115**	0.0140
	(0.128)	(0.0511)	(0.200)	(0.0813)	(0.0555)	(0.0323)
Anual income (log)	0.824***	0.107	-0.601	-0.382**	0.00375	-0.243***
	(0.251)	(0.194)	(0.582)	(0.173)	(0.233)	(0.0796)
Negative shock	0.797	0.258	-0.599	0.173	0.00220	0.532***
	(0.614)	(0.249)	(0.903)	(0.311)	(0.540)	(0.134)
Locality controls						
Urban	-1.217*	-0.0328	2.133	0.878**	0.221	0.532**
	(0.698)	(0.599)	(2.544)	(0.414)	(0.744)	(0.240)
Average income in locality (log)	-2.254***	-1.213**	-2.353	-0.685**	-1.989**	-0.971***
	(0.640)	(0.529)	(3.095)	(0.345)	(0.980)	(0.193)
Average schooling in locality	0.689***	0.0622	1.764*	0.0769	0.358	0.0494
	(0.228)	(0.176)	(0.902)	(0.213)	(0.355)	(0.0877)
Bank in locality	0.192	0.685	-1.542	-1.085**	0.180	0.148
	(0.639)	(0.434)	(1.243)	(0.437)	(0.681)	(0.233)
Savings bank in locality	-0.674	-0.432	2.640*	-0.439	0.151	-0.559**
	(0.674)	(0.440)	(1.593)	(0.349)	(0.563)	(0.234)
Government credit in locality	0.657	-0.380	1.670	0.205	0.152	0.153
	(0.662)	(0.421)	(1.046)	(0.301)	(0.548)	(0.176)
Pawnshop in locality	0.909	0.807*	-3.088*	-0.103	-0.397	0.504*
	(0.662)	(0.474)	(1.691)	(0.585)	(0.590)	(0.265)
Constant	7.586	12.39**	4.225	5.376*	17.64**	11.07***
	(5.300)	(4.875)	(23.17)	(3.021)	(8.602)	(2.056)
Observations	3,840	3,840	3,840	3,840	3,840	3,840

Note: *** significant at 0.1% level **significant at 1% level * significant at 5% level. Robust errors with clusters by locality in parenthesis, there are 129 localities in the sample. The number of observations is smaller from the number of households in the survey due to missing values in some variables. Analytical weights used.

Table 8: Awareness and use conditional on awareness correcting for selection
Dependent variable are awareness and use of each source

	Formal		Informal	
	Awareness	Use	Awareness	Use
Household controls				
Household size	0.0287	0.0600	0.0750***	0.205
	(0.0191)	(0.0623)	(0.0154)	(1.009)
Household head's sex	0.0335	0.339	0.262***	-0.628
	(0.0988)	(0.289)	(0.0845)	(3.974)
Household head's age	4.39e-05	-0.0581***	0.00515	0.00239
	(0.00346)	(0.0138)	(0.00457)	(0.101)
Household head's age squared	0.000165***	0.000223	-2.06e-05	-0.000770
	(3.27e-05)	(0.000184)	(4.56e-05)	(0.00456)
Head of house formally employed	0.284*	-0.110	-0.0101	-0.454
	(0.171)	(0.500)	(0.144)	(3.015)
Head of house informally employed	0.0640	-0.422	0.0303	-1.890
	(0.125)	(0.413)	(0.117)	(10.03)
Average schooling of head and spouse	0.0415***	-0.0575	0.0175	0.0407
	(0.0138)	(0.0393)	(0.0129)	(0.255)
Anual income (log)	0.217***	0.122	0.0419	-1.090
	(0.0411)	(0.164)	(0.0284)	(5.874)
Negative shock	0.110**	0.265	0.110*	1.751
	(0.0559)	(0.263)	(0.0665)	(9.204)
Locality controls				
Urban	0.104	0.0214	0.0593	2.314
	(0.126)	(0.532)	(0.120)	(12.58)
Average income in locality (log)	0.0155	-1.273**	-0.104	-4.170
	(0.145)	(0.514)	(0.119)	(21.89)
Average schooling in locality	-0.0529	0.0999	-0.0538	0.221
	(0.0601)	(0.167)	(0.0483)	(1.254)
Bank in locality	0.249	0.365	0.141	-0.674
	(0.162)	(0.459)	(0.105)	(4.331)
Savings bank in locality	0.339***	0.0423	0.0460	-2.319
	(0.111)	(0.369)	(0.110)	(12.82)
Government credit in locality	-0.0563	0.258	0.00575	0.645
	(0.0928)	(0.360)	(0.0888)	(3.453)
Pawnshop in locality	-0.0573	0.569	0.0915	1.852
	(0.165)	(0.510)	(0.130)	(9.768)
Instruments				
Natural disaster in locality	-0.0237		-0.0916	
	(0.113)		(0.0909)	
Previous serious accident or health problem	0.0873		0.104	
	(0.0815)		(0.0792)	
Public transport in locality	0.0699		0.211	
	(0.129)		(0.130)	
Change in infrastructure in locality	-0.305***		0.0229	
	(0.102)		(0.0876)	
Constant	-3.771***	11.96***	-0.111	52.97
	(1.302)	(4.471)	(1.047)	(278.9)
Sigma		0.439*		8.532
		(0.244)		(48.19)
Rho		-0.397***		-0.608***
		(0.0677)		(0.122)
Observations	3,683	3,683	3,683	3,683

Note: *** significant at 0.1% level **significant at 1% level * significant at 5% level. Awareness is the probability that a source of credit is considered in a choice set using a normal distribution. Use is a multinomial logit with sample selection and consideration set. Robust errors with clusters by locality in parenthesis, there are 129 localities in the sample. The number of observations is smaller from the number of households in the survey due to missing values in some variables. Use of each source should be interpreted with reference to not using any type of credit. Analytical weights used.