



## Who borrows among the poor? MC use determinants in Guatemala, with particular reference to social ties

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E-mail address: m-hasegawa@osipp.osaka-u.ac.jp I thank Professor Naoto Yamauchi, Osaka school of International Public Policy (OSIPP), Dr. Tsunehiro Ootsuki, associate professor of OSIPP, and Professor Akira Kousaka, OSIPP, for their help and encouragement during the preparation of this paper. I also thank Prof. Naoto Yamauchi for permitting me to publish this paper.

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## **Abstract**

Who borrows Micro Credit (MC) is the information needed to improve not only MC programs but also policies of poverty alleviation. This paper analyzes the MC use determinants taking social ties into account using data in Guatemalan Living Standard Measurement Study. It shows that the determinants are relatively different between the poor and the non-poor. It also shows that social ties could raise the possibility of MC utilization especially among the poor, which would verify the function of social ties as collateral of creditworthiness. Those excluded from MC may not be the poorest but the socially weakest.

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## **Introduction**

Access to credit is an essential measure for poverty alleviation in developing countries when the credit is used effectively for income generation activities or risk coping strategies. Nevertheless, risky borrowers basically are refused unless adverse selection is introduced under extremely high interest rates. Therefore, the poorest so far have been recognized as those excluded from credit because of their economic riskiness (Hulme and Mosley, 1996; Van Bastelaer, 2000)<sup>1</sup>. Then to what extent does credit for poverty alleviation such as Micro Credit (MC) actually reach the poor as a whole? Is the widespread notion that MC favors the wealthy poor really true? In this paper, who can access MC, namely the determinants of MC use, is investigated empirically, with MC defined as a small credit by financial institutions mainly for the poor<sup>2</sup>. Understanding attributes of MC borrowers could lead not only to better designs of financial programs but also more efficient public policies enabling them.

In rural credit markets, there are two types of mechanisms to screen the trustworthy: direct mechanisms and indirect mechanisms (Hoff and Stiglitz, 1990). The direct mechanisms obviously rely on social ties between borrowers and lenders to overcome the information asymmetry among them. Moreover, in rural communities that often are segmented socially and geographically, information is circulated all the time and tends to be shared among almost all villagers. Under such circumstances, borrowers' information easily reaches lenders' ears, besides the direct information from the close relationships between borrowers and lenders. Furthermore, if contracts are repeated in such close-knit societies, the problem of information asymmetry is expected to be reduced greatly. In the indirect mechanisms, group-lending also depends theoretically on social ties (Ghatak, 1999, 2000). According to Ghatak (1999), in the process of group formation of group-lending, information provided by social ties is utilized to select group members under the pressure of joint liability.

Thus, in both direct and indirect mechanisms in rural credit markets, social ties are the

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<sup>1</sup> Hulme and Mosley (1996) organize their ideas from several case studies which are principally on income generating credits using group lending method. Van Bastelaer (2000) refers to this idea in the case of joint-liability groups as well.

<sup>2</sup> Following the definition of Christen et al. (2004), MC is provided by such institutions as state-owned or agricultural banks, cooperatives, specialized microfinance institutions and non-governmental organizations, and can be distinguished from other credits provided by individuals.

basis for guaranteeing credit through abundant local information (Van Bastelaer, 2000). For the poor without collateral, social ties should function just as the substitution of collateral to guarantee their trustworthiness. Consequently, possessing abundant social ties should be an important attribute for the poor MC borrowers. However, the social ties have not necessarily been valued as MC determinants up to now.

At first, credit determinants were treated as control variables to analyze the impact of MC because the borrowers' attributes affect both selection of borrowers and impact on borrowers' welfare (Pitt and Khandker, 1998; Coleman, 1999). In both Pitt and Khandker (1998) and Coleman (1999), variables related to social ties were not considered as factors of program participation at all. As Coleman (1999) suggests, the differences in MC access determinants on different classes logically should affect its impact. Therefore, if only the poor clients make most of the social ties as their credit guarantees, variables related to social ties should be included in program participation analysis, which could change the impact analysis as a result.

Many researchers have studied the relationships between social ties and repayment rate in group lending (Besley and Coate, 1995; Ghatak, 2000; Ahlin and Townsend, 2007). Most of them divide the function of social ties into two or three parts, which are ex-ante (selection) and ex-post (monitoring and enforcement), then analyze which function could have the greatest effect on the repayment rate. Wydick (1999) claims the effect of peer monitoring on high repayment rate from his empirical analysis of group lending data in Guatemala. Although he examines fully the role of social ties in MC<sup>3</sup>, the selection bias is not considered in his repayment analysis. Meanwhile, Karlan (2005) succeeds in excluding this bias and verifies that social ties affect higher repayment rates by analyzing group lending data in Peru<sup>4</sup>. He explains this effect by the social ties' function that is gathering information and increasing clients' trustworthiness. He also indicates that cultural similarity and geographic concentration improve group lending outcomes for the same reason. In his analysis, however,

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<sup>3</sup> Wydick (1999) uses the term "social cohesion" instead of social ties and defines "social ties" as closeness or homogeneity among each group in the social cohesion.

<sup>4</sup> Karlan (2007) uses the term "social connections", which is defined as "the links and commonalities that bind a group of people together and determine their social interactions." He regards this "social connections" as a broader form of "social capital."

economic variables such as income or assets of households are not included in the estimation model. Supposing that social ties could be necessary, especially for poor MC borrowers, it may be important to take economic factors into account even as control variables.

Recently there have been a few papers suggesting that ethnic ties affect access to credit. Biggs et al. (2002) have found that ethnicity facilitates access to informal trade credit by analyzing data in Kenya. They explain its mechanisms by channeling abundant information and reputation functioning as enforcement among ethnic networks. Fisman (2003) also shows an effect of ethnic ties on the provisions of trade credit in four African countries. He suggests that discrimination against trade partners with different ethnic background is a reason for preferential credit provision, besides more general rationalization that ethnic ties may channel the information about members' creditworthiness.

Credit provision in the case of MC, namely "MC outreach" depends basically on targeting policies of each MC institution (Ledgerwood, 1999). While many MC institutions have attempted to target the poor as their clients, some groups of poor people with particular attributes tend to be excluded. Navajas et al. (2000) argue that MC borrowers are not the poorest but rather those near the poverty line. Relying on Basic Human Needs<sup>5</sup> as the basis for poverty measurement, they proved that not the economically poor but the severely socially deprived people were excluded in the MC programs in Bolivia. On the other hand, Evans et al. (1999) show in their study of an MC program of Bangladesh Rural Advancement Committee (BRAC) that the poorer the households are, the more likely they are to have participated in the program. They also suggest that lack of female education, small household size, and landlessness might reduce the possibility of MC access. While those three factors surely related to borrowers' creditworthiness, other important factors are omitted in their analysis if social ties are the key to guarantees for borrowers' creditworthiness, especially among the poor. Zeller (1994) has found that social ties did affect application for informal credit in Madagascar, even though they were not too significant so far as rationing of formal and informal credit was concerned<sup>6</sup>. Recently, Amin

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<sup>5</sup> Navajas et al. (1999) used the Index of Fulfillment of Basic Needs (IFBN) computed by the indicators of housing, access to public services, education, and access to health services.

<sup>6</sup> In Zeller (1994), having ancestor's burial places in the region is recognized as the variable of social ties.

et al. (2003) have brought up the idea of vulnerability in analysis of MC access, and demonstrated that MC was successful in reaching the poor, but unsuccessful in reaching the vulnerable poor by using a panel data in Bangladesh. Thus, as Honohan (2005) says, “there is less agreement on a framework for analyzing the determinants of access for low income households.”

The aim of this paper is to analyze of the MC use determinants, taking social ties into account using data from the Living Standard Measurement Study (LSMS) in Guatemala<sup>7</sup>. Analysis of the MC use determinants could explain access barriers from the borrowers’ side and contribute to the improvement of MC programs, as well. In addition, suggesting the important determinants in deferent classes could influence the impact analysis as the control variables that affect both credit access and the impact.

The rest of the paper is organized as follows. Section two describes the data used mainly in this paper. Section three explains the econometric framework and its variables in particular social ties. Section four presents and interprets the results in light of the guarantee of creditworthiness among the poor. Section five concludes and adds policy implications.

## **Data**

The principal data source for this study is the 2000 Guatemalan Living Standards Measurement Survey (Encuesta Nacional Sobre Condiciones de Vida, hereafter ENCOVI 2000) which was carried out by the National Statistical Institute (INE) in Guatemala as an LSMS of the World Bank. The ENCOVI 2000 features a module of social capital questionnaires besides usual questionnaires, such as those about loan and deposit, which makes it possible to study the relationship between MC and social ties, including social capital. In ENCOVI 2000, 7,276 households were sampled as representative of eight regions and urban/rural areas in Guatemala based on the 1999 census. In addition, each household was labeled as “extremely poor,” “poor,” or “non-poor,” according to its income in the data released on the World Bank’s website<sup>8</sup>. This labeling suggests that 45.9 percent of

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<sup>7</sup> It can be obtained from the World Bank’s web site:  
<http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/EXTLSMS/0,,contentMDK:21387262~pagePK:64168445~piPK:64168309~theSitePK:3358997,00.html>.

<sup>8</sup> Extremely poor: their annual income is below the annual cost of the food basket, which

households are poor or extremely poor in Guatemala and about 75 percent of all those poor live in rural areas (referring to Table 1). The north and the northwest regions seem to have severe poverty problems from the regional point of view.

[Insert Table 1]

In Guatemala which is famous for its Mayan ruins, more than half of the population is indigenous people coming mainly from the Mayan line. However, a small number of Spanish whites have been dominant both politically and economically, and so-called Latinos who are a mixture of the white and the indigenous comprise a middle ruling class. The poor north and northwest regions are the resident places for indigenous people; therefore, the regional distribution of the poor may reflect the social class structure in Guatemala.

As for credits, the penetration rate of MC in Guatemala takes fourth place in the world from my calculation, using cross-country data compiled by Christen et al. (2004)<sup>9</sup>. In ENCOVI 2000, the ratio of credit borrowers, including informal credit, is 13.7 percent of the population (referring to Table 2). Interestingly, the borrowers' ratio among the extremely poor is roughly the same as that in the poor. Geographically, there is not a big gap between urban and rural areas; if anything, regional gaps from Metropolitan or Central districts to Northeast are relatively apparent. Since households and communities in Guatemala have various kinds of risk factors, such as natural disasters and fluctuating terms of trade for commercial agricultural products (Tesliuc and Lindert, 2002), it may be necessary to use credits in order to smooth consumption, regardless of poverty, areas, and geographical regions.

[Insert Table 2]

Although credit outreach is similar among households in different economic situations, their borrowing institutions are quite different (referring to Table 3). From Table 3, such informal lenders as friends, families, and individuals can be recognized as major credit resources for

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satisfies the minimum daily intake of calories per capita (Quetzal 1912 ÷ \$ 251.9). Poor: their annual income is below the annual cost necessary for the daily lives including the food expenses at the extremely poor level (Quetzal 4319 ÷ \$ 569). Non-poor: their income is above the annual living cost at the poor level.

<sup>9</sup> The penetration rate here is the proportion of the number of all MC accounts in a country to the population of the country. The first place is taken by Sri Lanka (17.84%), followed by Indonesia (13.74%), and Bangladesh (13.22%). Guatemala's penetration rate is 8.55 percent.

the poor and the extremely poor, which accounts for more than half of their total credits. As MC institutions, cooperatives can be said to penetrate the poor and the extremely poor. In addition, a mission-oriented private bank named Banrural<sup>10</sup> opens its door for the poor, which is reflected in this table.

[Insert Table 3]

Among the financial institutions shown in Table 3, MC institutions are defined as private banks, state banks, cooperatives, associations of producers, financiers, and NGOs. Informal lenders, such as individuals and friends/family, should not be regarded as MC institutions.

In the early years, MC was recognized as credits for small businesses. The poor in Guatemala use MC mainly for small businesses especially for agricultural activities as shown in ENCOVI 2000, although there are some occasions in which MC is used for consumption smoothing purposes such as emergencies or medical expenses (referring to Table 4). On the other hand, the non-poor tend to use formal credits for household purposes especially for loans for construction and reconstruction of houses.

[Insert Table 4]

With regard to guarantees, while 60 percent of the non-poor can borrow formal credit with no guarantees or only signatures on contracting, almost half of the poor are required to put their lands as guarantees. From this data, owning land is thought to be one of MC determinants for the poor.

According to a cross-tabulation between borrowers' jobs and lending organizations in ENCOVI 2000, both self-employed workers or farmers and private companies' employees seem to use various organizations, including informal lenders (referring to Table 5-1).

Meanwhile, government employees and employers rely on banks and cooperatives. Most day

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<sup>10</sup> According to Alfaro-Gramajo (2003), Banrural was established in 1998 as the reorganized institution of Banco Nacional de Desarrollo Agrícola (BANDESA), which was the state agricultural development bank. Banrural has held the mission that it tries to develop Guatemalan rural areas through the universal financial services. 70 percent of capital was private and the rest was derived from public sector. Its sales performance has been good. For example, its profits doubled from 1997 to 2001 and it took third place in terms of profitability (ROE) among all Guatemalan banks in 2001. Moreover, as for outreach, the number of branches in rural areas has increased three times and the number of accounts has enlarged more than thirty-five times in the years between 1997 and 2001. While most state-owned development banks have diminished in importance since the 1980s, the key to success of Banrural, according to Alfaro-Gramajo (2003), was that private citizens and citizens' groups participate in the capital formation and the management.

workers or unskilled workers have to borrow from informal lenders. Then, narrowing the objects down to the poor borrowers only (referring to Table 5-2), it becomes clear that private companies' employees also depend chiefly on the informal lenders. On the other hand, the poor self-employed workers or farmers use both formal and informal institutions. They may have assets or social ties guaranteeing their creditworthiness to borrow from formal MC institutions.

[Insert Table 5-1 and 5-2]

Paying attention to the relationship between credits' purposes and borrowers' jobs, it is obvious that the majority of credits for agricultural purposes are used by self-employed workers or farmers (referring to Table 6-1). Narrowing the objects down to only the poor, this trend is almost the same (referring to Table 6-2). The day workers or unskilled workers and the employers also use credits for small business purposes (referring to Table 6-1). This tendency is relatively stronger among the poor borrowers (referring to Table 6-2). In Table 6-1, the employees of both private companies and government are likely to use loans for household purposes, such as emergencies or medical expenses, and purchasing other household items. From both Table 5-2 and Table 6-2, MC is used chiefly by the self employed for small business purposes especially for the agriculture.

[Insert Table 6-1 and 6-2]

### Model and variables

To explore the determinants of MC use in Guatemala, I analyze data in ENCOVI 2000 according to an econometric model below.

$$y_i = \alpha + X_i \beta_1 + G_i \beta_2 + SC_i \beta_3 + u_i \quad ^{11}$$

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<sup>11</sup> Maximum likelihood function and logarithmic maximum likelihood function of this model are as follows:

$$\begin{aligned} & (\beta_1, \beta_2, \beta_3 | X_i, G_i, SC_i, y_i) = \\ & \prod_{i=1}^n (1 - \Phi(X_i \beta_1))^{1-y_i} \Phi(X_i \beta_1)^{y_i} \cdot \prod_{i=1}^n (1 - \Phi(G_i \beta_2))^{1-y_i} \Phi(G_i \beta_2)^{y_i} \cdot \prod_{i=1}^n (1 - \Phi(SC_i \beta_3))^{1-y_i} \Phi(SC_i \beta_3)^{y_i} \\ & \ln L(\beta_1, \beta_2, \beta_3 | X_i, G_i, SC_i, y_i) = \\ & \sum_{i=1}^n \{(1 - y_i) \ln(1 - \Phi(X_i \beta_1)) + y_i \ln \Phi(X_i \beta_1)\} + \sum_{i=1}^n \{(1 - y_i) \ln(1 - \Phi(G_i \beta_2)) + y_i \ln \Phi(G_i \beta_2)\} + \\ & \sum_{i=1}^n \{(1 - y_i) \ln(1 - \Phi(SC_i \beta_3)) + y_i \ln \Phi(SC_i \beta_3)\} \end{aligned}$$

The dependent variable ( $y_i$ ) would be one if at least one family member of a household ( $i$ ) borrows from MC institutions in the last twelve months. If no one uses MC in the household, ( $y_i$ ) would be zero. On this binary response variable, I estimate the households' properties which raise the possibilities of MC use applying probit model. Poor borrowers and non-poor borrowers are estimated separately because their security mechanisms could be different, as mentioned above. The explanatory variable  $X_i$  means a set of characteristics of household  $i$ ,  $G_i$  means a set of geographical factors, and  $SC_i$  means a set of household social capital properties. The  $u_i$  means error term.

Considering households without access to MC institutions, the probit model with selection mechanisms which is called Heckman probit model also was tried to be estimated<sup>12</sup>. But the

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<sup>12</sup> The econometric model and the maximum likelihood function of Heckman probit model are as follows:

$$y_i = \begin{cases} x_i^* \beta + u_i & \text{if } z_i = 1 \\ \text{unobserved} & \text{if } z_i = 0 \end{cases}$$

$$z_i = \begin{cases} 1, & \text{if } z_i = \gamma x_i^{**} + \varepsilon_i > 0 \\ 0, & \text{if } z_i = \gamma x_i^{**} + \varepsilon_i < 0 \end{cases}$$

$$\begin{pmatrix} \varepsilon_i \\ u_i \end{pmatrix} \sim N \left( \begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{pmatrix} 1 & \rho \sigma u \\ \rho \sigma u & \sigma^2 u \end{pmatrix} \right)$$

$y_i$ : use MC or not in a household( $i$ ) (use: 1/no: 0)

$x_i$ : set of household( $i$ )'s properties including geographical factors, household's head characteristics, and household social capital properties

$z_i$ : access to MC institutions for a household( $i$ ) (access: 1/no: 0)

The set of variables in  $x_i^*$  is not the same as set in  $x_i^{**}$ .

Maximum likelihood function

$$\begin{aligned} L(\beta, \gamma, \sigma, \rho \mid x_i, z_i, y_i) &= \Pi \{z_i = 0\} P(z_i) \cdot \Pi \{z_i = 1\} P(y_i, z_i = 1) \\ &= \Pi \{z_i = 0\} P(z_i) \cdot \Pi \{z_i = 1\} P(y_i) P(z_i = 1 \mid y_i) \end{aligned}$$

Logarithmic maximum likelihood function

$$\ln L(\beta, \gamma, \sigma, \rho \mid x_i, z_i, y_i) = \sum_{z_i=0} \ln P(z_i) + \sum_{z_i=1} \ln P(z_i = 1 \mid y_i) + \sum_{z_i=1} \ln P(y_i)$$

assumption that the coefficient of correlation between error term of probit model and that of the selection equation is zero could not be rejected (referring to Table 11 and Table 12 in appendix). Therefore, it is judged that the sample selection probit model would not be appropriate in this case.

Social capital is thought to be a crucial concept to understand people and societies in developing countries. It is thought to be the basis of acceptance for development aids. While the social capital recently has attracted a lot of attention from both researchers and practitioners, the concept itself has been recognized for a long time and may be suggested through such terms as social ties, capacity building, network, and so on. In this paper, social capital is defined as “the institutions, relationships, and norms that shape the quality and quantity of a society's social interactions”<sup>13</sup> based on the World Bank's definition in ENCOVI 2000. Variables of social capital in ENCOVI 2000 consist mainly of membership of organizations and participation of collective actions. Those social capital variables could be interpreted as the index of social ties that guarantees the poor against the risk of default. Nowadays, membership of an organization generally is used for measuring social capital. On the contrary, measuring social capital by participation of collective action might be particularly relevant to developing countries because organizations themselves are not widespread in those countries, especially in rural areas (Ibanez et al., 2002). In more detail, participating collective actions are divided into two groups according to their main functions: bridging and linking collective actions. Bridging collective actions include construction of community infrastructure, donations, and labor agreement, which could be defined as putting importance on close connection inside groups or communities. In contrast, linking collective actions include contacting government officials, appealing to judicial authorities, and volunteering in election campaigns, which could be characterized by the tendency of linking outside groups or communities. Which types of social capital are recognized as guarantees of trustworthiness may depict the situation of social ties in Guatemala. With regard to membership of organizations, in ENCOVI 2000 all the members in a household over 12 years are asked to provide up to three names of organizations in

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<sup>13</sup> Web site of the World Bank:  
<http://www1.worldbank.org/prem/poverty/scapital/whatsc.htm>

which they participate and to report the degree of their eagerness for organizations' activities. Then, based on the questions a dummy variable of the membership is made, which shows whether at least one family member belongs to at least one group or not. In addition, the variables of both the total number of memberships in a household and degree of eagerness for membership organizations are made up. Although these variables do not consider family size, they are expected to suggest the abundance of social capital in a household. Descriptive statistics of poor and non-poor households' variables are referred to Table 9 and Table 10 in appendix.

### **Results and Interpretations**

Table 7 shows the result of the estimation that calculates fixed effects of a household's properties, raising the possibility of using MC among the poor.

[Insert Table 7]

In model 1, which includes frequency of participation in social activities and a membership dummy of social group as social capital variables, both the variables are positively significant. It is demonstrated empirically that the richness of a household's social capital could raise the possibility of MC use among the poor. Therefore, the social ties can be said to function as one of the guarantees of trustworthiness or a factor that overcomes information asymmetries. Moreover, the significance of an ethnic dummy could endorse the importance of the social ties for the poor MC use in Guatemala. According to Ibanez et al. (2002), Guatemalan indigenous communities have enjoyed traditional social norms and a strong sense of solidarity. In those close-knit societies, credit unions or mutual credit groups have flourished and MCs have been used frequently under the circumstances in which information asymmetries have been overcome and mutual guarantees of creditworthiness established. On the contrary, a household's consumption level is not significant, which suggests that the household's economic situation measured by consumption does not affect the MC use possibility among the poor. Since the consumption level in the non-poor estimation shows positive significance for MC use possibilities (referring to Table 8), it could be a distinctive trait for the poor that the degree of the poor by consumption is not a determinant of MC use empirically. Thus, the widespread notion that the poorest are

excluded from MC use clearly can be negated here.

[Insert Table 8]

Comparing the results of the poor and the non-poor, the determinants of MC use are considerably different. Although the influence of holding land assets and savings are suggested in both consumption classes, social capital properties are more important among the poor than among the non-poor. Ethnicity, marital status, and mother tongue are the determinants of MC use only for the poor, whereas gender, education level, and trust for community are only for the non-poor. Those factors may function to raise the creditworthiness in each consumption class, respectively. Family size, as Evans et al. (1999) pointed out, performs as a factor of the creditworthiness in both classes because having more family members possibly leads to earning more money when being at risk under their repayment. Conversely, small households or single households could face some disadvantage in their need of borrowing. Therefore, it can be said that the socially weakest people are excluded from MC in Guatemala, considering the advantage of abundant social ties and disadvantage of single households for MC use.

Model 2 includes more detailed variables of social capital properties than those in Model 1. Among the poor in Model 2 (referring to Table 7), bridging collective activities is significant for raising possibilities of MC use, but linking collective activities is not significant in contrast. This may suggest that intra-community social ties are more important than social ties connected to particular authorities outside the community to get trustworthiness and information in their communities. In the non-poor, only the eagerness for their membership groups is significant, which might suggest the high social status of the non-poor borrowers. Because there are heteroscedasticities in both probit estimations, White's robust variance estimator is used for the statistical judgment. The model specification is admitted by the Wald test in both poor and non-poor estimations. McFadden's adjusted R2 index is 0.108 in the poor estimation and 0.091 in the non-poor.

## **Conclusion**

Who uses MC is analyzed using Guatemalan LSMS data in this paper. As a result, the determinants are considerably different between the poor and the non-poor. In the poor,

social ties are an important factor to raise the possibility of MC use rather than economic situation measured by consumption, which verifies the theory that the social ties should function as collateral for MC borrowing. Thus, the widespread notion that the poorest are excluded from MC use should be replaced by this finding that the socially weakest are excluded from MC. In addition, the finding that the MC use determinants might differ in different classes could improve the impact analysis of MC because MC use determinants are necessary as control variables in impact analysis of MC.

This empirical analysis could lead to some policy implications. First, it should be recognized that social ties are an important factor for MC programs. Therefore, it may be effective to choose program sites from this social-tie-oriented view. To generate social ties combined with MC programs should be no less effective. When social ties are an important concept for making policy, however, it should be taken into account that social ties possibly could belong to communities as well as households. Narayan and Pritchett (1999) suggest that villages' social capital influences households' income through credit, public services, and so on. Although this paper treats only social ties belonging to household under the constraint of the data, the impact of the community's social ties should be considered even in the analysis of the household's social ties, which should be explored hereafter.

Second, it should be recognized that those excluded from MC are not the poorest but the socially weakest. Thus, MC programs should be designed to target the weakest or to provide other poverty alleviation programs. Ibanez et al. (2002) suggested that higher education levels could improve social capital in Guatemala. Thus, the possibilities of MC use may be raised through the channel of social ties by education programs for the socially weakest.

In this paper, MC institutions are treated generally, regardless of their programs' design or management forms. As Karlen (2007) suggests, what kind of programs or institutions reach what kind of clients should be investigated in order to improve programs in this field. The extent to which those common determinants for all MC institutions and all MC programs in Guatemala can be generalized has to be studied from now on.

## Tables

Table 1

**Table 1 : Poverty Profile of Households in ENCOVI 2000**

	Total Households	Extremely poor	Poor	Non-poor
<b>Total Households</b>	7276 (100.0)	768 (10.56)	2571 (35.34)	3937 (54.11)
<b>Rural/Urban</b>				
Rural	3852 (52.94)	671 (17.42)	1844 (47.87)	1337 (34.71)
Urban	3424 (47.06)	97 (2.83)	727 (21.23)	2600 (75.93)
<b>Regions</b>				
Metropolitan	926 (12.73)	4 (0.43)	82 (8.86)	840 (90.71)
North	798 (10.97)	161 (20.18)	318 (39.85)	319 (39.97)
North East	599 (8.23)	19 (3.17)	153 (25.54)	427 (71.29)
South East	805 (11.06)	86 (10.68)	309 (38.39)	410 (50.93)
Central	1251 (17.19)	78 (6.24)	469 (37.49)	704 (56.27)
North West	1197 (16.45)	254 (21.22)	558 (46.62)	385 (32.16)
South West	1115 (15.32)	125 (11.21)	431 (38.65)	559 (50.13)
Peten	585 (8.04)	41 (7.01)	251 (42.91)	293 (50.09)

Source : ENCOVI 2000. Instituto Nacional de Estadística (INE) Guatemala

frequency (row percentage)

Table 2

**Table 2 : Loan Penetration by Poverty, Area, and Regions**

whether you have borrowed or repayed in the last 12 months			
	using credit	no credit	Total Households
<b>Total Households</b>	995 (13.68)	6281 (86.32)	7276 (100.00)
<b>Poverty</b>			
Extremely poor	92 (11.98)	676 (88.02)	768 (100.00)
Poor	288 (11.20)	2283 (88.80)	2571 (100.00)
Non-poor	615 (15.62)	3322 (84.38)	3937 (100.00)
<b>Rural/Urban</b>			
Rural	490 (12.72)	3362 (87.28)	3852 (100.00)
Urban	505 (14.75)	2919 (85.25)	3424 (100.00)
<b>Regions</b>			
Metropolitan	163 (17.60)	763 (82.40)	926 (100.00)
North	96 (12.03)	702 (87.97)	798 (100.00)
North East	62 (10.35)	537 (89.65)	599 (100.00)
South East	89 (11.06)	716 (88.94)	805 (100.00)
Central	192 (15.35)	1059 (84.65)	1251 (100.00)
North West	171 (14.29)	1026 (85.71)	1197 (100.00)
South West	153 (13.72)	962 (86.28)	1115 (100.00)
Peten	69 (11.79)	516 (88.21)	585 (100.00)

frequency (row percentage)

Made by the authour based on ENCOVI 2000



Table 5-1

	government employees	private companies' employees	day workers or unskilled workers	domestic employees	employers	self employed workers or farmers	helper or worker without pay in other location
private banks	52(44.07)	52(20.00)	5(5.21)	0(0.00)	28(29.79)	62(19.38)	3(21.43)
State banks	19(16.10)	17(6.54)	3(3.13)	0(0.00)	10(10.64)	30(9.38)	1(7.14)
cooperatives	24(20.34)	25(9.62)	10(10.42)	1(14.29)	24(25.53)	54(16.88)	2(14.29)
association of producers	0(0.00)	1(0.38)	0(0.00)	0(0.00)	0(0.00)	6(1.88)	0(0.00)
financiers	1(0.85)	4(1.54)	1(1.04)	1(14.29)	4(4.26)	3(0.94)	0(0.00)
NGOs	2(1.69)	8(3.08)	4(4.17)	1(14.29)	8(8.51)	26(8.13)	0(0.00)
individuals	5(4.24)	41(15.77)	22(22.92)	0(0.00)	5(5.32)	42(13.13)	3(21.43)
credit card	0(0.00)	0(0.00)	0(0.00)	0(0.00)	1(1.06)	0(0.00)	0(0.00)
friends,families,etc.	11(9.32)	71(27.31)	39(40.63)	4(57.14)	13(13.83)	79(24.69)	4(28.57)
other what	4(3.39)	41(15.77)	12(12.50)	0(0.00)	1(1.06)	18(5.63)	1(7.14)
<b>total</b>	<b>118(100.00)</b>	<b>260(100.00)</b>	<b>96(100.00)</b>	<b>7(100.00)</b>	<b>94(100.00)</b>	<b>320(100.00)</b>	<b>14(100.00)</b>
	<b>obs:995</b>					<b>frequency (column percentage)</b>	

made by the author based on ENGOVI 2000

Table 5-2

	government employees	private companies' employees	day workers or unskilled workers	domestic employees	employers	self employed workers or farmers	helper or worker without pay in other location
private banks	1(25.00)	2(3.51)	4(4.94)	0	3(12.00)	30(16.48)	0
State banks	0	2(3.51)	2(2.47)	0	6(24.00)	16(8.79)	1(14.29)
cooperatives	0	3(5.26)	9(11.11)	1(50.00)	6(24.00)	27(14.84)	1(14.29)
association of producers	0	0	0	0	0	5(2.75)	0
financiers	0	2(3.51)	1(1.23)	0	1(4.00)	3(1.65)	0
NGOs	1(25.00)	1(1.75)	4(4.94)	0	3(12.00)	19(10.44)	0
individuals	0	18(31.58)	18(22.22)	0	1(4.00)	26(14.29)	3(42.86)
friends,families,etc.	2(50.00)	23(40.35)	36(44.44)	1(50.00)	5(20.00)	45(24.73)	2(28.57)
other what	0	6(10.53)	7(8.64)	0	0	11(6.04)	0
<b>total</b>	<b>4(100.00)</b>	<b>57(100.00)</b>	<b>81(100.00)</b>	<b>2(100.00)</b>	<b>25(100.00)</b>	<b>182(100.00)</b>	<b>7(100.00)</b>
	<b>obs:380</b>					<b>frequency (column percentage)</b>	

made by the author based on ENGOVI 2000

Table 6-1

Table 6-1: Purposes of Credits by Borrowers' Job (main purposes in each sections)

	total	government employees	private companies' employee	day workers or unskilled workers	domestic employees	employers	self employed workers or farmers	helpers or workers without pay in other locations
<b>small business purposes</b>								
agri purposes	273(27.44)	10(8.47)	17(6.54)	37(38.54)	1(14.29)	31(32.98)	171(53.44)	6(42.86)
raw materials or inputs	155(15.58)	5(4.24)	7(2.69)	16(16.67)	0(0.00)	16(17.02)	101(31.56)	5(35.71)
other agri activities	66(6.83)	1(0.85)	3(1.15)	11(11.46)	1(14.29)	6(6.38)	41(12.81)	1(7.14)
animals	22(2.21)	2(1.69)	2(0.77)	2(2.08)	0(0.00)	4(4.26)	11(3.44)	0(0.00)
business purposes	142(14.27)	13(11.02)	24(9.23)	6(6.25)	1(14.19)	35(37.23)	61(19.06)	2(14.29)
articles for business	52(5.23)	4(3.39)	8(3.08)	2(2.08)	0(0.00)	14(14.89)	19(5.94)	1(7.14)
raw materials or inputs	36(3.62)	4(3.39)	3(1.15)	2(2.08)	18(14.29)	8(8.51)	15(4.69)	1(7.14)
other business activities	22(2.21)	2(1.69)	8(3.08)	0(0.00)	0(0.00)	4(4.26)	7(2.19)	0(0.00)
<b>consumption smoothing purposes</b>								
household purposes	495(49.75)	96(81.36)	219(84.23)	53(55.21)	5(71.43)	29(30.85)	87(27.19)	6(42.86)
construct house	82(8.24)	20(16.95)	27(10.38)	5(5.21)	0(0.00)	8(8.51)	10(3.13)	1(7.14)
other household items	129(12.96)	14(11.86)	57(21.92)	18(18.75)	2(28.57)	2(2.13)	16(5.00)	2(14.29)
payment of debt	70(7.04)	14(11.86)	25(9.62)	6(6.25)	0(0.00)	3(3.19)	10(3.13)	0(0.00)
emergency or illness	151(15.18)	17(14.41)	54(20.77)	22(22.92)	3(42.86)	6(6.38)	33(10.31)	1(7.14)
remodel house	47(4.72)	12(10.17)	19(7.31)	0(0.00)	0(0.00)	3(3.19)	8(2.50)	2(14.29)
total		118(100.00)	260(100.00)	96(100.00)	7(100.00)	94(100.00)	320(100.00)	14(100.00)
obs:995(NA:85)								
							frequency (column percentage)	

made by the author based on ENCOVI 2000

Table 6-2

Table 6-2: Purposes of loans of the poor by loaners' job (main purposes in each sections)

	total	government employees	private companies' employees	day workers or unskilled workers	domestic employees	employers	self employed workers or farmers	helpers or workers without pay in other locations
<b>small business purposes</b>								
agri purposes	190(50.00)	1(25.00)	9(15.79)	34(41.98)	0	18(72.00)	124(68.13)	4(57.14)
raw materials or inputs	114(30.00)	1(25.00)	5(8.77)	15(18.52)	0	12(48.00)	75(41.21)	3(42.86)
other agri activities	51(13.42)	0	3(5.26)	10(12.35)	0	5(20.00)	30(16.48)	1(14.29)
payment of debt	12(3.16)	0	0	3(3.70)	0	01(4.00)	7(3.85)	0
business purposes	31(8.16)	1(25.00)	6(10.53)	5(6.17)	1(50.00)	5(25.00)	13(7.14)	0
articles for business	16(4.21)	0	3(5.26)	2(2.47)	0	4(16.00)	4(2.20)	0
raw materials or inputs	8(2.11)	1(25.00)	0	1(1.23)	1(50.00)	0	4(2.20)	0
other business activities	6(1.58)	0	2(3.51)	0	0	1(4.00)	3(1.65)	0
<b>consumption smoothing purposes</b>								
Household purposes	137(36.05)	2(50.00)	42(73.68)	42(51.85)	1(50.00)	2(8.00)	45(24.73)	3(42.86)
construct house	15(3.95)	1(25.00)	5(8.77)	5(6.17)	0	0	2(1.10)	1(14.29)
other household items	33(8.68)	0	9(15.79)	14(17.28)	1(50.00)	0	9(4.95)	0
payment of debt	20(5.26)	1(25.00)	6(10.53)	4(4.94)	0	0	6(3.30)	0
emergency or illness	58(15.26)	0	14(24.56)	17(20.99)	0	1(4.00)	19(10.44)	1(14.29)
remodel house	11(2.89)	0	4(7.02)	0	0	1(4.00)	4(2.20)	1(14.29)
total		4(100.00)	57(100.00)	81(100.00)	2(100.00)	25(100.00)	182(100.00)	7(100.00)
obs:380 (NA:22)								
							frequency (column percentage)	

made by the author based on ENCOVI 2000

Table 7

**Table 7: Properties of Poor Households Borrowing from MF  
Fixed Effects in Probit Model**

dependent variable : MC use	model 1			model 2		
	fixed effects	z-value (robust)	LR statistics (heteroscedasticity)	fixed effects	z-value(robust)	LR statistics (heteroscedasticity)
<b>geographical properties</b>						
area dummy (urban:1/rural:0)	-0.0207	-3.73***	5.08**	-0.0229	-4.08***	5.48**
<b>region dummy</b>						
metropolitan dummy						
north dummy	0.0004	0.02	0.06	0.0043	-0.21	0.01
northeast dummy	-0.0267	-4.39***	0.15	-0.0268	-3.81***	0.01
south east dummy	-0.0106	-0.77	0.49	-0.0102	-0.7	0.13
central dummy	-0.0135	-1.04	2.78*	-0.0115	-0.81	2.22
northwest dummy	-0.013	-0.9	0.7	-0.0099	-0.63	0.19
southwest dummy	-0.021	-1.95*	1.41	-0.0204	-1.75*	1.55
peten dummy	-0.0042	-0.25	3.84*	-0.0035	-0.2	1.59
<b>household properties</b>						
number of family members	0.0032	3.18***	0.49	0.0033	2.93***	1.26
level of consumption (dicimal)	0.0016	0.86	0.38	0.0018	0.91	0.56
land assets dummy (own:1/no:0)	0.0155	2.57***	0.18	0.0165	2.69***	0.19
savings dummy (own:1/no:0)	0.1495	3.97***	0.72	0.1519	4.04***	0.2
access time to market	-0.0278	-1.33	8.91***	-0.0294	-1.34	8.53***
<b>household head's properties</b>						
age	-0.0002	-0.83	0.19	-0.0002	-1.14	0
ethnic dummy (indigenous:1/no:0)	0.0271	2.97***	0.6	0.0283	2.97***	0.33
gender dummy (man:1/woman:0)	0.0046	0.42	2.95*	0.0073	0.67	1.67
marital status (married:1/not married:0)	0.0186	2.33**	2.53*	0.0189	2.2**	2.4
education level	0.0042	1.06	1.14	0.0046	1.16	0.57
mother Language dummy (Spanish:1/no:0)	0.0187	1.9*	0.69	0.0199	1.92*	0.95
trust for community members (majority:2/some:1/no)	0.0063	1.5	1.03	0.0078	1.79*	0.94
<b>Social capital properties</b>						
number of participation in social activities	0.0035	2.72***	0.01			
bridging collective activities among social activities				0.0057	2.16**	0.54
linking activities among social activities				0.0042	1.27	0.06
membership of social group dummy	0.0242	3.93***	0.08			
total number of household's membership (degree of eagerness for membership group)				0.0032	2.9***	0.01
				0.0022	2.92**	0.05
Number of obs : 3339	Log pseudo likelihood = -549.74485			Log pseudo likelihood = -554.69685		
	Wald test(f=22): 179.69***			Wald test(f=23): 174.48***		
	Pseudo R2 : 0.1440			Pseudo R2: 0.1363		
	McFadden's Adj R2: 0.108			McFadden's Adj R2: 0.099		
	Count R2: 0.951			Count R2: 0.952		

\*significant at the 10% level, \*\* 5% level, \*\*\* 1%level

Source : ENCOVI 2000. Instituto Nacional de Estadística (INE.) Guatemala

Table 8

**Table 8 : Properties of Non-Poor Households Borrowing from MF  
Fixed Effects in Probit Model**

	model 1			model 2			
	fixed effects	z-value (robust)	LR statistics (heteroscedasticity)	fixed effects	z-value(robust)	LR statistics (heteroscedasticity)	
dependent variable : MC use							
<b>geographical properties</b>							
area dummy (urban:1/rural:0)	0.0121		1.26	0.32	0.0115	1.19	0.36
<b>region dummy</b>							
metropolitan dummy	-0.0367	-2.78***	0.28	-0.0359	-2.68***	0.06	
north dummy	0.0208	0.9	1.3	0.0228	0.96	1.75	
northeast dummy	0.0011	0.06	2.09	0.0025	0.13	1.72	
south east dummy	-0.005	-0.28	0.01	-0.0039	-0.21	0.03	
central dummy	-0.0173	-1.1	0.22	-0.0158	-0.99	0.26	
northwest dummy	0.0341	1.44	0	0.0371	1.52	0.01	
southwest dummy	-0.0196	-1.27	0.11	-0.0177	-1.11	0.12	
peten dummy							
<b>household properties</b>							
number of family members	0.0108	5.07***	11.15***	0.0108	4.9***	12.54***	
level of consumption (dicimal)	0.0167	3.8***	2.41	0.017	3.86***	1.48	
land assets dummy (own:1/no:0)	0.0183	2.03**	0.01	0.0196	2.17**	0	
savings dummy (own:1/no:0)	0.0387	3.59***	3.28*	0.0395	3.65***	2	
access time to market	-0.0011	-0.09	0.19	-0.0015	-0.11	1.84	
<b>household head's properties</b>							
age	-0.0001	-0.42	0.1	-0.0001	-0.33	0.1	
ethnic dummy (indigenous:1/no:0)	-0.0122	-0.84	2.24	-0.0109	-0.73	1.3	
gender dummy (man:1/woman:0)	0.0253	2.2**	0.11	0.0262	2.27**	0.24	
marital status (married:1/not married:0)	0.019	1.54	0.88	0.0191	1.54	1.24	
education level	0.0237	5***	5.34***	0.0242	5.01***	6.07**	
mother Language dummy (Spanish:1/no:0)	-0.0209	-1.06	0.19	0.0209	-1.06	0.03	
trust for community members (majority:2/some:1/no)	0.0158	2.63***	3.15*	0.0166	2.77***	4.01**	
<b>Social capital properties</b>							
number of participation in social activities	0.0029	1.51	0.84				
bridging collective activities among social activities				0.0013	0.35	0.32	
linking activities among social activities				0.0058	1.22	0.43	
membership of social group dummy	0.0241	2.8***	1.68				
total number of household's membership (degree of eagerness for membership group)				0.0039	1.63	2.31	
				0.0034	2.98***	1.95	
Number of obs : 3937	Log pseudo likelihood = -1684.1693			Log pseudo likelihood = -1087.1919			
	Wald test(f=22):266.77***			Wald test(f=23):261.53***			
	Pseudo R2 : 0.1098			Pseudo R2 : 0.1073			
	McFadden's Adj R2: 0.091			McFadden's Adj R2: 0.088			
	Count R2: 0.907			Count R2: 0.907			

\*significant at the 10% level, \*\* 5% level, \*\*\* 1%level

Source : ENCOVI 2000. Instituto Nacional de Estadística (INE.) Guatemala

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## Appendix

**Table 9: Descriptive Statistics of Poor Households' Variables**

Variables	No. of Obs	Mean	Std. Dev.	Min	Max
<b>borrowing MC or not (dependent variable)</b>	3339	0.0479	0.2136	0	1
<b>geographical properties</b>					
area dummy (urban:1/rural:0)	3339	0.2468	0.4312	0	1
<b>regeion dummy</b>					
metropolitan dummy	3339	0.0258	0.1584	0	1
north dummy	3339	0.1435	0.3506	0	1
northeast dummy	3339	0.0515	0.2211	0	1
south east dummy	3339	0.1183	0.3230	0	1
central dummy	3339	0.1638	0.3702	0	1
northwest dummy	3339	0.2432	0.4291	0	1
southwest dummy	3339	0.1665	0.3726	0	1
peten dumy	3339	0.0875	0.2825	0	1
<b>household properties</b>					
number of family members	3339	6.4055	2.5526	1	18
level of cousumption (dicimal)	3339	3.5112	1.5856	1	6
land assets dummy (own:1/no:0)	3339	0.8002	0.3999	0	1
savings dummy (own:1/no:0)	3339	0.0341	0.1816	0	1
market access dummy (accessible:1/ no:0)	3339	0.9036	0.2952	0	1
access time to market	3339	0.1025	0.3356	0	2
<b>household head's properties</b>					
age	3339	43.8302	14.8839	17	99
ethnic dummy (indigenous:1/no:0)	3339	0.5696	0.4952	0	1
gender dummy (man:1/woman:0)	3339	0.8616	0.3453	0	1
marital status (married:1/not married:0)	3339	0.8679	0.3386	0	1
education level	3339	0.5556	0.6342	0	9
Mother Language dummy (Spanish:1/no:0)	3339	0.49	0.5	0	1
trust for community members (majority:2/some:1/no:0)	3339	0.702	0.6189	0	2
<b>Social capital properties</b>					
number of participation in social activities	3339	2.2959	1.9928	0	12
bridging collective activities among social activities	3339	0.7592	1.0782	0	6
linking activities among social activities	3339	0.3456	0.7781	0	5
membership dummy of social group	3339	0.4705	0.4992	0	1
total numer of houshold's membership	3339	1.3187	2.051	0	15
degree of eagerness for membership group	3339	2.5125	3.9338	0	30
<b>MC institution access dummy (accessible:1/no:0)</b>	3339	0.8847	0.3194	0	1

made by authour based on ENCOVI 2000

Table 10: Descriptive Statistics of non-Poor Households' Variables

Variables	No. of Obs	Mean	Std. Dev.	Min	Max
<b>borrowing MC or not (dependent variable)</b>	3937	0.0930	0.2904	0	1
<b>geographical properties</b>					
area dummy (urban:1/rural:0)	3937	0.6604	0.4736	0	1
<b>regeion dummy</b>					
metropolitan dummy	3937	0.2134	0.4097	0	1
north dummy	3937	0.0810	0.2729	0	1
northeast dummy	3937	0.1085	0.3110	0	1
south east dummy	3937	0.1041	0.3055	0	1
central dummy	3937	0.1788	0.3832	0	1
northwest dummy	3937	0.0978	0.2971	0	1
southwest dummy	3937	0.1420	0.3491	0	1
peten dummy	3937	0.0744	0.2625	0	1
<b>household properties</b>					
number of family members	3937	4.2007	2.0003	1	15
level of cousumption (dicimal)	3937	8.4600	1.2605	6	10
land assets dummy (own:1/no:0)	3937	0.7018	0.4575	0	1
savings dummy (own:1/no:0)	3937	0.3061	0.4609	0	1
market access dummy (accessible:1/ no:0)	3937	0.9329	0.2502	0	1
access time to market	3937	0.1389	0.3078	0	2
<b>household head's properties</b>					
age	3937	45.0767	15.7319	16	93
ethnic dummy (indigenous:1/no:0)	3937	0.2398	0.4270	0	1
gender dummy (man:1/woman:0)	3937	0.7811	0.4136	0	1
marital status (married:1/not married:0)	3937	0.7579	0.4284	0	1
education level	3937	1.2543	0.9609	0	9
Mother Language dummy (Spanish:1/no:0)	3937	0.8278	0.3776	0	1
trust for community members (majority:2/some:1/no:0)	3937	0.6109	0.6656	0	9
<b>Social capital properties</b>					
number of participation in social activities	3937	2.4295	2.0220	0	13
bridging collective activities among social activities	3937	0.9822	1.1681	0	6
linking activities among social activities	3937	0.4249	0.8377	0	5
membership dummy of social group	3937	0.5072	0.5000	0	1
total numer of houshold's membership	3937	1.2065	1.6723	0	13
degree of eagerness for membership group	3937	2.4011	3.4194	0	28
<b>MC institution access dummy (accessible:1/no:0)</b>	3937	0.9428	0.2322	0	1

made by authour based on ENCOVI 2000

**Table 11: Properties of Poor Households Borrowing from MF  
Fixed Effects in Heckman Probit Model (second stage)**

dependent variable : MC use	model 1		model 2	
	fixed effects	z-value	fixed effects	z-value
<b>geographical properties</b>				
area dummy (urban:1/rural:0)	-0.018	-3.14***	-0.02	-3.4***
<b>regeion dummy</b>				
metropolitan dummy	0.1126	1.28		
north dummy	0.0566	1.26	-0.0094	-0.61
northeast dummy			-0.0258	-3.87***
south east dummy	0.053	1.25	-0.0132	-0.98
central dummy	0.0485	1.26	-0.0129	-0.94
north west dummy	0.051	1.44	-0.0099	-0.64
south west dummy	0.0295	0.92	-0.021	-1.88*
peten dumy	0.0595	1.23	-0.0115	-0.83
<b>household properties</b>				
number of family members	0.0032	2.88***	0.0032	2.63***
level of cousumption (dicimal)	0.0011	0.57	0.0012	0.6
land assets dummy (own:1/no:0)	0.0169	2.72***	0.0179	2.8***
savings dummy (own:1/no:0)	0.1544	4.01***	0.1585	4.05***
access time to market	-0.0224	-1.66*	-0.0239	-1.67*
<b>household head's properties</b>				
age	-0.0003	-1.22	-0.0003	-1.45
ethnic dummy (indigenous:1/no:0)	0.0248	2.47**	0.0252	2.42**
gender dummy (man:1/woman:0)	0.0028	0.21	0.0053	0.43
marital status (married:1/not married:0)	0.0151	1.54	0.0153	1.48
education level	0.0017	0.36	0.0021	0.46
mother Language dummy (Spanish:1/no:0)	0.0232	2.1**	0.0238	2.08**
trust for community members (majority:2/some:1/no)	0.0051	1.17	0.0068	1.49
<b>Social capital properties</b>				
number of participation in social activities	0.0038	2.87***		
bridging collective activities among social activities			0.0052	2.08**
linking activities among social activities			0.0048	1.48
membership of social group dummy	0.0239	3.62***		
total number of houshold's membership (degree of eagerness for membership group)			0.0035	2.84***
			0.0023	3.56***
Number of obs : 3339	Log likelihood = -1217.551		Log likelihood = -1221.673	
Censored obs : 385	Wald test(f=22) : 142.65***		Wald test(f=23) : 140.08***	
uncensored obs : 2954	Wald test( $\rho=0$ ) : 0.00		Wald test( $\rho=0$ ) : 0.03	

**Properties of Poor Households Accessing MC Institutions  
Fixed Effects in Probit model (First stage)**

dependent variable : MC access	fixed effects	z-value	LR statistics
area dummy	0.0049	0.49	9.25***
north dummy	-0.0229	-0.78	3.32*
north east dummy	0.0708	12.44***	7.89***
south east dummy	0.0756	8.93***	0.06
central dummy	0.0215	1.1	0.23
northwest dummy	0.0164	0.77	38.45***
southwest dummy	0.0181	0.92	10.61***
peten dumy	0.0449	3.77***	17.61***
market access dummy (accessible:1/no:0)	0.6448	21.09***	0.34
Number of obs: 3339	Log likelihood = -753.22317		
Wald test(f=9) : 646.50***	Pseudo R2 : 0.3689		
McFadden's Adj R2: 0.361	Cragg-Uhler(Nagelkerke) R2 : 0.232		
Mckelvey & Zavoina's R2 : 0.446	Efron's R2: 0.403		
Count R2 : 0.931	AIC: 0.457		

\*significant at the 10% level, \*\* 5% level, \*\*\* 1%level

Source : ENCOVI 2000. Instituto Nacional de Estadística (INE.) Guatemala

**Table 12: Properties of Non-Poor Households Borrowing from MF  
Fixed Effects in Heckman Probit Model (second stage)**

	model 1		model 2	
dependent variable : MC use	fixed effects	z-value	fixed effects	z-value
<b>geographical properties</b>				
area dummy (urban:1/rurat0)	0.0159	1.5	0.0153	1.43
<b>regeion dummy</b>				
metropolitan dummy	-0.0365	-2.51**	-0.0358	-2.41**
north dummy	0.0073	0.32	0.0088	0.37
northeast dummy	-0.0067	-0.36	-0.0048	-0.25
south east dummy	-0.0069	-0.36	-0.0057	-0.3
central dummy	-0.0162	-0.95	-0.0145	-0.84
northwest dummy	0.0296	1.23	0.0327	1.32
southwest dummy	-0.0197	-1.19	-0.0172	-1.01
peten dumy				
<b>household properties</b>				
number of family members	0.0107	4.55***	0.0107	4.43***
level of cousumption (dicimal)	0.0145	3.12***	0.015	3.21***
land assets dummy (own:1/no:0)	0.0158	1.68*	0.0172	1.83*
savings dummy (own:1/no:0)	0.0372	3.4***	0.038	3.45***
access time to market	0.0005	0.04	0.0003	0.02
<b>household head's properties</b>				
age	-0.0001	-0.44	-0.0001	-0.34
ethnic dummy (indigenous:1/no:0)	-0.0126	-0.8	-0.0109	-0.68
gender dummy (man:1/woman:0)	0.0238	1.77*	0.0247	1.84*
marital status (married:1/not married:0)	0.0161	1.15	0.0163	1.17
education level	0.0265	5.15***	0.027	5.21***
mother Language dummy (Spanish:1/no:0)	-0.0191	-0.9	-0.0189	-0.89
trust for community members (majority:2/some:1/no	0.015	2.31**	0.0159	2.45**
<b>Social capital properties</b>				
number of participation in social activities	0.0035	1.71*		
bridging collective activities among social activities			0.0025	0.64
linking activities among social activities			0.006	1.17
membership of social group dummy	0.0273	3***		
total number of houshold's membership (degree of eagerness for membership group)			0.0044	1.76*
			0.0037	3.03***
Number of obs : 3937	Log likelihood = -1641.52		Log likelihood = -1645.057	
Censored obs : 225	Wald test(f=22) : 212.31***		Wald test(f=23) : 208.78***	
uncensored obs : 3712	Wald test( $\rho=0$ ) : 0.65		Wald test( $\rho=0$ ) : 0.58	

**Properties of Non-Poor Households Accessing MC Institutions  
Fixed Effects in Probit model (First stage)**

dependent variable : MC access	fixed effects	z-value	LR statistics
area dummy	0.0346	5.2***	53.72***
metropolitan dummy	-0.0462	-2.41**	64.72***
north dummy	-0.0993	-3.04***	8.12***
northeast dummy	0.0099	0.98	0.29
southeast dummy	0.0203	2.83***	7.77***
central dummy	-0.0251	-1.6	1.09
northwest dummy	0.0068	0.54	0
southwest dummy	-0.0343	-1.91*	11.74***
peten dumy			
market access dummy (accessible:1/no:0)	0.3911	12.16***	10.05***
Number of obs : 3937	Log likelihood = -613.54957		
LR test(f=9) : 510.41***	Pseudo R2 : 0.2886		
McFadden's Adj R2 : 0.277	Cragg-Uhler(Nagelkerke) R2 : 0.119		
Mckelvey & Zavoina's R2 : 0.280	Efron's R2 : 0.259		
Count R2 : 0.957	AIC : 0.317		

\*significant at the 10% level, \*\* 5% level, \*\*\* 1% level

Source : ENCOVI 2000. Instituto Nacional de Estadística (INE.) Guatemala