Wageningen University - Department of Social Sciences

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The Impact of Remittances on Financial Inclusion in Veracruz, Mexico

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MID – International Development Studies **Filippo Cuccaro**

Economics ***Robert Lensink***
Marrit Van den Berg
Roselia Servin Juárez

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ABSTRACT

This thesis presents the results of a survey conducted among two hundred and sixty households spread in twelve municipalities of the state of Veracruz, Mexico. The objective of the study is to assess the impact of remittances on the use of formal financial services of remittances receivers households. Specifically, the indicators used in this analysis are the ownership of a saving account, the frequency of deposit and the obtainment of loans in a time frame of one year. The survey lasted about two months. The sample analysed is a stratified random sample among the three geographical areas of Veracruz, which offers an explanatory power valid for the whole state. The estimation methods used are OLS, Probit, Ordered Probit and afterwards, in order to address the endogeneity of remittances, 2SLS and IV Ordered Probit are applied. The results show a positive impact of remittances on the use of saving services, both on the ownership of saving account and on the frequency of deposit. No impact is found on the obtainment of loans. After the instrumentation the positive impact holds respect to the ownership of a saving account but vanishes respect to the frequency of deposit. The instrument variable used in this study (Acquaintance) is new to the literature and produces interesting findings. Since that receiving remittances appears to be beneficial in increasing the use of financial services; it would be ideal fostering this dynamic in order to support the remittance receivers in make a wise use of them. Especially, considering also the fact that, in the sample used for this analysis, almost the 60% of household that receive remittances are directly saving part of them.

Key words: *Remittances, Financial inclusion, Endogeneity, Instrumental variable, Acquaintance, Veracruz*

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1. INTRODUCTION

The money that migrants working abroad send home, usually to their families staying behind is called remittances. The behaviour of this flow of money has been studied by many researchers that tackled the argument from different perspectives. The overall idea is that, when market imperfections in the recipient context are relaxed or flexible, the remittances are beneficial for the improvement of living conditions (Pería et al. 2008; Gupta et al. 2009; Aggarwal et al. 2011; Ambrosius & Cuecuecha 2013). However, the impact of remittances on receiving countries is a thorny topic that has been debated in the last years among scientists and policy makers.

For Mexico the remittances money flow represents an important income source at the household level, the country ranks among the world's top ten receivers of remittances in absolute numbers. Precisely, according to World Bank Indicators (2013), it is the fourth country (receiving 22 US$ billion) after India (71), China (60) and Philippines (26). In contrast to a large number of works that have focused on the use of these flows, my interest is to analyse the use of formal financial services of remittances receivers. I want to analyse the relationship between remittances and financial inclusion in Veracruz, Mexico. The state of Veracruz is one of the biggest remittances receiver states of Mexico, stably placed at the fifth place over the period 2004-2006 at National level (Diaz, 2010). I am interested in detecting a positive impact of remittances in increasing the demand for saving services; and a negative impact on the demand for credit. Financial inclusion refers to the grade of participation into the credit/saving formal sector of the population. The household's financial inclusion increases when a new saving deposit is paid in or a new loan is granted within the formal sector. On the contrary, the resort to the informal sector is detrimental for the improvement of the financial inclusion. The custom to rely on informal manners to save and borrow money keeps the people excluded from the formal sector.

The research questions of this thesis are the following: Which is the impact of remittances on the use of financial services, in formal financial institutions in Veracruz, Mexico? To what degree do remittances enhance the use for receivers of financial formal services as saving account and loans?

My interest is on the correlation between the status of being a remittances receiver household and the use of formal financial services, specifically about the ownership of a saving account, the frequency of the deposit in the saving account and the obtainment of loans in a time frame of one year.

I applied quantitative methods to a small scale sample aiming to describe the impact of remittances on the use of financial services in the state of Veracruz, Mexico. Specifically, after implement of simple OLS, I run two Probit regressions and one Ordered Probit regression; and then two 2SLS

(Two stage least square) regressions and one IV (instrument variable) Ordered Probit trying to address the endogeneity that is likely to affect this study.

In his paper, "*Are Remittances a 'Catalyst' for Financial Access? Evidence from Mexico"*, Ambrosius C. (2011) makes use of panel data, that I do not have, and therefore looks at the change in remittances status and the relative change in use of financial services as saving account and loans. Specifically, he considers the ownership of savings accounts and the availability of borrowing options. Instead, I run cross-sectional analysis and I consider the real use of borrowing option not only their availability. My explanatory variable of interest is a binary variable that indicate whether the households receive remittances.

The next paragraph offers a brief summary about previous studies that addressed the impact of remittances on other dimensions. In next section I present a relevant literature review, from which I derived the hypotheses of this thesis. Then in section 3 I provide the identification strategy with the description of the empirical model. Section 4 describe the data gathering and provides the summary and descriptive statistic of my sample. Section 5 is where I present the methodology that I used and I also discuss the endogeneity problem that this study carries and about the instrument that I used to correct for it. In section 6 I report the result of the analysis and section 7 is dedicated to a short discussion. Finally, in section 8 I present my conclusion.

1.1 State of the Art

Given the increasing volume and stable nature of remittances to developing countries, the political discussion around them has led the academics to develop several studies that have analysed their impact along various dimensions. The focus is on themes such as poverty, inequality, growth, health, education, infant mortality, and entrepreneurship.

Research on the impact of remittances on poverty using household data suggests that these transfers help reduce the level of poverty (Lopez-Córdova, 2005, and Taylor, Mora, and Adams, 2005, on Mexico). Maimbo and Ratha (2005) pointed out that since the majority of the world's migrants from developing countries are drawn from rural areas, in terms of poverty reduction, the rural context tend to benefit the most. The finding that remittances help to reduce poverty is confirmed in cross-country studies; for instance Adams and Page (2003) find that remittances have a statistically significant impact on reducing poverty, based on a dataset of 74 low and middle-income developing countries.

Studies that analyse the impact of remittances on education such as Hanson and Woodruff (2003) and López-Córdova (2005), for Mexico, find that by helping to relax household constraints, remittances are associated with improved schooling outcomes for children. Remittances have also

been shown to promote entrepreneurship (Woodruff and Zenteno, 2001). Furthermore, studies on infant mortality and birth weight have documented that migration and remittances are beneficial to lower infant mortality and are associated with higher birth weight among children that belong to remittances receiver households, at least in the Mexican case (Hildebrandt and McKenzie, 2005; Duryea et al., 2005; and López-Córdova, 2005) .

Two studies by Giuliano and Ruiz-Arranz (2005) and Mundaca (2005) show that, the impact of remittances on growth depends on the level of financial development in a country. However, in the words of Orozco: "Whether and how remittances might affect financial development is a priori unclear. The notion that remittances can lead to financial development in developing countries is based on the concept that money transferred through financial institutions paves the way for recipients to demand and gain access to other financial products and services, which they might not have otherwise" (Orozco and Fedewa, 2005). At the same time, providing remittance transfer services allows banks and financial institutions in general to gather information about unbanked recipients and mitigate the adverse selection problem. "Besides capturing money flows, the remittance channel can be used to sell financial service packages geared towards low-income individuals" (Toxopeus & Lensink 2007).

Nevertheless, so far to the question of whether remittances promote financial development in recipient countries and what is their impact on the use of financial services have received not enough attention. I think that this issue is important because financial systems perform many key economic functions and their development has been shown to foster growth and reduce poverty (Demirgüç-Kunt, 2006).

The relationship between remittances and the use of financial services, credit and saving is not clear worldwide. Both, credit and savings services, have been proven to be effective, within the right circumstances, in enhancing people's life conditions. However, the effect of remittances on the demand for financial services is not evident. Are people that receive remittances more prone to demand for loans? Or the opposite is true? To what extent does receiving remittance inhibit the use of financial services? The dynamic between these two financial assets could lead to very different scenarios.

2. LITERATURE REVIEW and HYPOTHESIS

In developing countries, access to financial services is often a privilege of higher and middle income groups from urban areas. The share of households in developing countries that own bank accounts can be as low as 5% (Tanzania), typically lying between 20 and 30% for most Latin American countries and is estimated between 16 and 30 % in Mexico, compared to shares between 90 and 100% for Western European households (Demirguc-Kunt, Klapper 2012). Households with low and irregular income, mainly situated in rural areas, remain excluded from the formal financial sector (credit, insurance or saving services) due to high transaction costs and information asymmetries that rise serious adverse selection problems.

Demirguc-Kunt and Klapper found a strong correlation between inequality in the use of formal saving accounts and inequality in income. Moreover they found that adults saving at a formal financial institution and adults borrowing from a formal financial institution (FI from now on) are both less than 10 % in Mexico. In their survey they ask what are perceived as barriers to use of formal saving accounts and out of the possible answers (Not enough money, Religious reasons, Family member already has account, Too expensive, Too far away, Lack of necessary documentation and Lack of trust) the lack of money and the high costs are the most common reasons, with respectively 55 and 40 % of the respondents choosing these answers for Latin America subsample (Demirguc-Kunt and Klapper 2012).

Very few studies, investigates the impact of remittances on the use of financial services. Exceptions include Aggarwal et al. (2006), who find that remittances have contributed to deeper financial sectors measured in domestic savings and, albeit at a minor degree, to domestic credit relative to GDP in a cross-country panel of 99 developing countries. These results are also confirmed by Martínez Pería et al. (2008) for Latin America and by Gupta et al. (2009) for Sub-Saharan Africa. In a case study on Mexico, Demirgüç-Kunt et al. (2009) bring supplementary confirmation to the overall picture of a positive impact of remittances on deposits (and partly to credits) on a micro level and she also found a positive impact on the number of accounts per household. In her study the explanation for a positive impact of remittances on the financial sector on the wave of Orozco and Fedewa 2005, is that, through remittances, financial institutions function as transfer providers and previously unbanked remittances receivers approach the financial sector for the first time, crating room for an increase of the demand for other financial services (Christian Ambrosius, 2011). Ambrosius Christian with his doctoral thesis (“Essays on Migrants’ Remittances and the Financial Sector”, May 2012) at the school for business & economics, Freie Universität Berlin, has brought a valuable enrichment to the discussion over remittances and financial services. He estimated an

empirical model to measure a change in the ownership of savings accounts and on the availability of borrowing options as a function of a change in the remittances status. The results of this investigation offer interesting insight. For instance, the authors claim that due to a positive change in remittances status, rural households, when headed by a woman, have a higher probability of having a positive change in owning a savings account compared to households headed by men; but there was no gender difference with respect to the availability of borrowing options. On the other hand, urban households headed by women had a lower probability of improving access to borrowing options. Moreover, the results of his investigation showed that with a probability of improving their access status to savings accounts, seven percentage points higher than the control group, the treatment effect of remittances on financial access is high and statistically significant for rural households, but small and not statistically significant for urban households (Ambrosius 2011).

Specifically, in his paper, *"Are Remittances a 'Catalyst' for Financial Access? Evidence from Mexico"*, Ambrosius C. (2011) used the Mexican Family Life Survey panel for 2002 and 2005; and the results from the treatment-effect-model at household level show that a change in remittances status has an important impact on ownership of savings accounts and on the availability of borrowing options. This effect is significant for rural, but not for urban households and important for microfinance institutions, but not for traditional banks. The author claims that this is true all over the country. I will check the consistency of this statement for a smaller context, namely the state of Veracruz. He used a Logit regression model and estimate two different models; one is looking at the borrowing option and the other at the saving accounts.

In the first place, after have read his paper, I tough that would have been possible to go one step forward and also consider the extent on the financial inclusion considering the amount of saving and the size of the loan, so having continuous variable such outcome instead of binaries ones. Therefore my idea was about to apply a Tobit regression model in order to consider also the differences in magnitude of the outcome indicators that in case would have been *loan size* and *amount of saving* (continuous) instead of *obtainment of loan* and *ownership of saving account* (binary). This is the reason why during the data collection I asked also for the amount of saving held by the households and the loan size in case the household had obtained a loan. Nevertheless, I realize after the survey that constructing a model where the amount of saving or the loan size were directly dependent from the amount of remittances received is misleading. Within such a model, I cannot infer that an increase in the amount of saving due to the remittances is better than a decrease of the saving. The same is true also looking at the loan size such outcome of the regression. The reason is that I could not distinguish between household that directly save the remittances and therefore increase their amount of saving and those that decide to invest the remittances and perhaps

pool them with some previous saving in order to make a profitable investment and therefore end up having less saving than before the remittances arrived. In case of the loan size, would have no sense to say that the household that requests bigger loan are better off or more financially included respect to other household that do not ask for credit and claim that the remittances and only the remittances are the cause for that. Could be that the household in need of credit is effectively better off from the beginning and does not need the remittances to be a trustworthy borrower or the opposite can be true; therefore the remittance are a substitute for the credit that the household is not able to obtain from the formal sector. In order to be able to infer about these dynamics I should have collected much more precise data inclusive of every single money flow, either in-coming or out-going that interests the household. This would have been barely impossible and since the sensitive nature of this kind of questions I also would have serious doubts about the soundness of such survey.

Hence, I decide to follow the study that Ambrosius C. (2011) carried out for the whole Mexico and replicate it for a smaller sample indicative only for the state of Veracruz.

In Mexico the remittances are not always sent and received through FIs. Often the senders of remittances use other channels to send the money. For instance, they rely on Money Transfer Operators (Western Union, MoneyGram, Vigo, Wells Fargo, Maniflo, Delgado Travel, City, Bank of America, Intermex, SORIANA, Coopel, Walmart, Chedraui, Intermex, Sigue, SISA, TELECOMM TELEGRAFOS, Comercial Mexicana, among the others) or on commercial banks (BBVA Bancomer, BANSEFI, HSBC, Banco Azteca, Santander, BANORTE, Scotia Bank, Banamex). On the other hand, the remittances, although less frequently, can be brought to destination physically in cash. In this case the transfer takes place in the informal financial sector, which it is not addressed in this thesis. Whether the remittances are received by a FI or a commercial bank is not relevant for my analysis where I am interested on the use of financial services not on the kind of institution that provide them. Despite this, in the questionnaire, I also asked about from which kind of institution the remittances are received and where, in case they are, are saved. Depending from the answers it is possible to see if the institution where the household receive the remittances is also the same one where the household decide to save; of course given the fact that the institution is one where saving account service is available.

From this review, (**Hypothesis 1**), *I think that receiving remittances has a positive impact on the use of saving services in formal financial institutions for receiver households compared to no-receiver household*, since the remittances represent an extra income flow that reaches the household providing it with extra resources that can be directed to the formal financial sector. Moreover, (**Hypothesis 2**), *receiving remittances is likely to increase the frequency of the saving deposit that the household is able to make*. For low income household the room for saving is very limited and so

are the times that it needs to go deposit money in a saving account. Therefore is possible that the fact of receiving remittances leads the households to have a higher deposit frequency.

The impact depends on the context and household characteristics. For instance, households situated far away from the financial institutions may incur in high transaction costs and may also perceive the trip or, more extremely, the fact to entrust their money to a FI as a risky venture, possible scenario in a country such as Mexico that is among those with the highest crime rates worldwide. If that is the case, closeness to the branch and social trust of the FI will facilitate the flow of funds.

Interesting evidences regarding the link between remittances and financial services can be observed in the history. Countries with a long migration tradition, such as Portugal, Turkey and the Philippines, have developed financial institutions geared towards migrant populations, with banks capturing a large proportion of remittances (Toxopeus & Lensink 2007). Portuguese banks, for example, have developed full banking services in France, Germany and other emigrant destinations, thus encouraging emigrants to have a bank account and use banking services (Orozco 2010). Moreover, Orozco and Fedewa (2006) affirm that remittance recipients in selected Latin American countries are more likely to be banking individuals than non-recipients.

According to the World Development Indicators (2011), remittances are second to foreign direct investment as a capital flow into developing countries. The remittances flow seems to be stable but it is not completely safe from shocks. Remittances are also more reliable for recipients compared to any other flow, and proved to be more resilient with regards to international economic crises. "Contrary to other private-sector flows, remittances are counter-cyclical and therefore provide a stabilizing element during periods of financial instability" (Buch et al. 2002, Bugamelli/Paternò 2005). Nevertheless, in some cases, receiving remittances worsens the future development of certain households that tend to rely on them without make proper investments for the long run.

Because remittances are sent out of altruistic motives and respond to families' needs, remittances could also function as a substitute for credit and insurance from formal financial institutions. Woodruff & Zenteno (2007) and Giuliano & Ruiz-Arranz (2009) explicitly argued that remittances function as a substitute for a lack of access to credits and play an important role in financing investment by micro-entrepreneurs. "Remittances compete with formal financial services, possibly reducing demand for credits and other financial products like insurance" (Ambrosius & Cuecuecha 2013). This line of research has underlined that remittances function as a substitute for credit and insurance from formal financial institutions. Remittances receivers that need financial services, for instance due to an idiosyncratic shock, are able to rely on an additional and relatively stable source of income, which is not available to no-receivers. Therefore, I am still thinking that receiving remittances enhance the demand for saving services but it is possible that the remittances work as

substitute for credit, therefore triggering a dynamic that will make decrease the demand for credit and in some cases also the amount of saving at the household level (the amount of saving, not the demand for saving services). For instance, this is the case when a remittances receiver household decide to invest the remittance, perhaps because has no chance to obtain a credit, and at the same time also decide to invest part of its previous saving in order to be able to make a conspicuous investment. Hence (**Hypothesis 3**), *I expect a negative impact of remittances on the obtainment of loans*.

The access to financial services would improve the living conditions of the households by providing an alternative saving options to the most commons accumulation strategies such as cash saving kept at home or saving in fixed assets like land and cattle. Moreover, other financial services like credit and insurances would enhance their capabilities, in the understanding of Sen (1999), increasing their possibilities providing them with important tools for an endogenous development.

3. THE EMPIRICAL MODEL

The empirical model is a set of linear functions of the following form:

$$Y_{hi} = f_{hi}(X_h, R_h) + \varepsilon_{hi}$$

Where the subscripts *h* and *i* refer to household and indicator, respectively; Y_{hi} denotes financial inclusion respect to the indicator *i* by household *h*; X is a vector[1] of household characteristics prone to influence the financial inclusion of the household; R represents remittances, my explanatory variable of interest (binary); ϵ_{hi} is an error term that is assumed to be approximately normally distributed with mean zero and a variance of σ^2.

The dependent variable is the *financial inclusion* (*Y*) that will be assessed by considering separately, the credit and the saving demand. Specifically, I will consider one outcome indicators to assess the credit demand and two to evaluate the saving demand. For each outcome indicator I will estimate independent regressions taking into account the following indicators (Y) :

a) *Credit indicator*

- *Loans obtainment during the last year*

b) *Savings indicators*

- *Ownership of a savings account in the last year*
- *Frequency of deposits in the last year*

The first two indicators (*Loans obtainment* and *Ownership of a savings account*) are binary variable. Therefore they take value of one when at least a loan has been obtained or the household own a saving account in any formal financial institution and they take value of zero if the household never obtained a loan or does not own a saving account in any FI. The third indicator (*Frequency of deposits*) is registered in ordered categories that range between 1 and 7. The first category corresponds to the lower frequency of deposit and the last to the higher frequency of deposit. Specifically, 1 = Never ; 2 = yearly; 3 = every two months; 4 = monthly ; 5 = every three week; 6 = every two week ; 7 = weekly. The categories have been chosen to meet the Mexican context where frequency of deposit is either very high or relatively low. Households that do not own any saving

[1] For a schematic description of the vector X and the indicators Y see Appendix

account are grouped in the category number 1. For descriptive statistics, about the sample, skip to section 4.2. Now I describe the variable that compose the vector X of my model and provide explanation about why I think that they are likely to influence the financial inclusion of a household.

Usually, in the Mexican context the household head take the decisions concerning the household resources allocation. Therefore, data about the **characteristics of the household head**, such gender, age, marital status, education and religion, have to been considered. Often in the literature we observe behavioural discrepancy between household headed by women rather than men. Men and women are likely to take different decision about resources allocation and therefore about preference regarding the use of financial services. The age and marital status of the household head are also candidates to influence saving and credit behaviours. An older married head is probably less prone to ask for credit and may have more chance to own a saving account respect to a very young one that is just starting to build up a family. Education level and whether a person is literate are important factors that influence the chance of participating to the formal financial sector and after the entrance they play a role over the strategies that the household take. Religion and ethnicity could also affect this kind of decision. However, not only the household head characteristics drive the resources management. The process is also tied to the **composition of the household** and the characteristic of its members. Therefore I gathered information about all the members of the household, such as the number of children, adults and elderly with their exact age, gender and education level; about indigenous and business activities presence. The remittance's flow can partially be channelled into family businesses, therefore it is important to control also for this variable. In order to harmoniously take into consideration all these kind of information together I decide to construct some sort of indexes, such as the % of women, the % of people with at least secondary education and the total dependency ratio of the household. The rest of the information enters the regression as dummy variables (indigenous and business activities presence). I also included a dummy for the kind of location where the household is situated, whether is rural or urban context.

It is also necessary to take into consideration the income, expenditure, or wealth distribution of the household over time in order to bring into the analysis important characteristics that are likely to affect the household financial inclusion. An important concern is whether to investigate per capita pre-remittance income, non-durable consumption expenditure, or household wealth. Deaton (1997) mentions the advantages of using expenditure, as opposed to income, for measuring long-run well-being, in particular if households can smooth consumption and avoid the volatility of current economic conditions relying on home production. Indeed, in the absence of perfect capital markets,

as in rural developing areas, expenditure is easier to measure because certain market activities are replaced by home production. However, expenditure level is not the best tool for looking at selection into remittance recipients, as they are likely to be affected by remittances flows. An alternative is to observe ownership status of different household assets, whose acquisition is less likely to be affected by current remittance flows and more likely to reflect past savings (Acosta, 2006). The assets and housing characteristics that are considered include the following: phone, radio, television, refrigerator, console, bicycle, motorbike, car, stove and washing machines (durable assets); material of roof, walls and floor (housing). With these asset holdings, the idea is to construct a linear index using a particular set of weights. Equal weights are not appealing because equality of importance is an arbitrary assumption. In the absence of prices, dates of purchase, or current values for these assets, a reasonable assumption is to construct the index using a First Principal Component statistical procedure. The underlying assumption is that household long-run wealth explains the maximum variance in the asset variables. This index can provide reasonable estimates of wealth effects and long-run economic status. The asset index for household *j* is defined as:

$$A_J = \sum_{\mathrm{k}} f_{\mathrm{k}} \frac{(a_{jk} - a_k)}{\mathrm{S}_{\mathrm{k}}}$$

Where a_{jk} is the presence of asset *k* in household *j*, a_k is the sample mean and s_k is the sample standard deviation for asset *k* across households, and f_k is the weight assigned to asset *k*. The method assigns the weights so that the index provides the maximum discrimination possible between households, with the assets that vary most across households getting larger weights. For instance, an asset that all households own will be given zero weight because it explains none of the variation across households (Acosta, 2006). In my analysis I decided to use this kind of index instead of the income or expenditure level that although were part of the questions asked. In this respect, I also consider whether the household receive **governmental subsidies** and in the regression it enters as a dummy.

An important aspect of this analysis is the transaction costs that the household have to face during and in order to receive the remittances or save them. There are two side of the **transaction costs** involved in the money transfer. First of all, the costs that the migrant faces in sending the money; and second, the costs that the recipients have to pay in order to get the remittances and/or save them. The first's factors play a role in the sending decision of the migrant but are not considered in

this analysis. On the other hand, the transactions cost for the recipients may play a role on the impact of remittances on financial inclusion. If reach the agency's branch is relatively very costly, the household would minimize the visit to the FI. Hence, these costs have consequences about the borrowing and saving options. Therefore collecting information about the transaction costs that each household is facing is crucial for the analysis. Questions in the questionnaire included time, distance and ticket prices that clients have to deal with when they want to reach the agency's branches. After the data collection I decide to use only the time (minutes) and a dummy indicating whether the household have to pay for transport services. The information about the prices was too inconsistent. Unfortunately, getting the first results I realize that also the dummy that was supposed to indicate whether the household have to pay for transport services is unreliable. The sign of the coefficient for this dummy was counterintuitive and dwelling upon the dataset I detected a mistake in the data collection related to this dummy. Hence, I used only the time (measured in minutes) as a proxy for transaction cost.

If **shocks** occur in a household that receives remittances, it is likely that remittances will be used by family members to cope with idiosyncratic or covariate shocks. An unexpected idiosyncratic event, such a serious illness of a family member can strongly affect the resources allocation of the whole household. The same happens when the household's business gets in trouble or when a new member joins the family, increasing the consumption and the expenditure for specific needs (for instance schooling). For these reasons, I controlled for idiosyncratic shocks among the households, asking for the kind of shock and whether they used remittances to cope with it. In the vector X, the occurrence of economic shocks is represented by a dummy.

4. DATA

During the survey I have been supported by the local institution: "COLEGIO DE POST GRADUADOS, Campus Cordoba". They provide me with vehicles to reach the survey areas, five enumerators and other backup facilities.

The research has been carried out in 12 municipalities of the state of Veracruz, Mexico[2]. I personally conducted the survey making use of ad hoc questionnaire that I started developing in Wageningen and I finalised in Cordoba, Veracruz. With the help of local enumerators I translated the questionnaire and checked its consistency. The survey lasted about two months and we directly interviewed 260 household. The 12 municipality and the 260 households included in the survey are evenly spread all over the state of Veracruz, ensuring a good explanatory power valid for the whole state. I used a stratified random sample, standing over that the three geographical areas were evenly represented. At the end of the survey we interviewed 82 households from the north, 89 from the centre and 89 from the south. All the questions were referring to one year time frame that starts in July 2012 and ends in July 2013, when I did start the survey. Hence at the time of the interviews I asked the people to reply taking into account the last 12 months time frame.

4.1 Electing variables

Beside the description of the vector of covariate used in the models, given in the previous paragraph, I want to briefly justify the choices I did over the vector of covariate X and over the outcomes indicators.

Often due to the lack of access to the formal sector, people decide to borrow from moneylenders and if the borrower is also a remittances recipient, likely the remittances will be used to pay back the loan (informal credit flow)[3]. In this case, the remittance flow will be directed out of the formal sector but the remittances are still used in order to obtain credit. Hence, although in the informal sector, remittances are still beneficial in smoothing the credit and saving constraints of recipients households. This aspect represents a limitation of my analysis. I tried to gather information about the informal financial sector but people showed to be very reluctant in answering this kind of questions. Therefore I did not manage to obtain this part of the story and I decided to exclude the informal financial flow from the model and consider only the use of formal financial services.

[2] NORTH: Poza Rica, Coyutla, Tantoyuca
CENTRE: Amatlán De Los Reyes, Cuitlahuac, Cuichapa, Omealca, Tezonapa
SOUTH: Tatahuicapan De Juarez, Pajapan, Hidalgotitlan, Uxpanapa. (Map in the Appendix)

[3] The informal sector is detrimental for the attempt to enhance the financial inclusion of the population; any resources used to repay loans to the money lenders are resources that could have be allocated into the formal financial sector.

The length of the membership, with the FI, influences the financial inclusion of the household. The time from when a client is known by the FI plays an important role when the clients ask for a loan. If the client has showed for long time to be a remittances recipient, it is more likely to getting the loan respect to another client that joined the FI just since few months. The same does not matter so much if the household want to deposit money; give money is less problematic than receive them. However in the Mexican context people tend to have multiple membership or they drop out from one to enter another one very frequently. They change so often that in some cases, within a time frame of one year, the household has dropped out from more than one FI and became member of many others. For this reason I decided to consider the financial situation of a household only looking to whether it owns a saving account or has request a loan to any formal FI in the last year and leave out the past financial story of the households.

I also gathered specific information over the members that have migrated, such as when they left, where they went and the kind of relational link that they have with the household. Indeed, the time spent away, the destination, and the parental relationship of the migrants are likely to affect the amount of remittances sent. Afterwards, I did not use this information in running the regression because they were incomplete and likely to be endogenous.

Naturally, I asked about the amount of remittances received by the household and the frequency of these transfers; together with information about the loans obtainment, the ownership of saving account and the frequency of saving deposits in the time frame of interest. Then, the amount of remittances and their frequencies of transfers did not enter the regressions and my explanatory variable of interest (remittances) is represented by a dummy, indicating whether the household received remittances.

The survey collected many information that later have been excluded from the final regressions. Even before to run any regression, from table 2 and 3 (next paragraph) where the sample has been split according to the two binary outcomes, is possible to observe which among the explanatory variables differ in average. The variables that give p-values over the difference too high (above 0.1) are not likely to have a strong explanatory power. In the next paragraph I report the descriptive statistics.

4.2 Summary and Descriptive Statistics

Table 1 Summary Statistics of the sample (Observation are 260 for all the variables)

Variables	Mean	Sd	Min	Max	**Meaning**
Remittances	0.36	0.481	0	1	=1= The HH receives remittances
Credit *(Y)*	0.26	0.440	0	1	=1= The HH obtained at least one loan
Saving *(Y)*	0.47	0.500	0	1	=1= The HH owns a saving account
Frequency *(Y)*	4.96	2.061	1	7	Frequency of deposit in saving account
Acquaintance *(IV)*	0.15	0.358	0	1	=1= The HH knows an external migrant
Member abroad	0.44	0.497	0	1	=1= The HH has migrants
Distance	30.11	30.215	2	240	From the FI (minutes)
Welfare Index	0.47	0.204	0	1	First Principal Component Procedure (Sec.3)
Gov. Subsidies	0.65	0.479	0	1	=1= The HH receive Gov. subsidies
N° subsidies	0.73	0.626	0	4	N° of subsidies received by the HH
Total subsidies	4102.85	5055.205	0	25500	Total amount of subs. in Mexican pesos
Rural	0.56	0.497	0	1	=1= The HH is located in rural area
Indigenous	0.29	0.454	0	1	=1= in the HH there are indigenous
Age H-Head	55.48	14.944	19	95	Age of the HH Head
Literacy H-Head	0.50	0.501	0	1	=1= The HH Head is literate
Married H-Head	0.72	0.448	0	1	=1= The HH Head is married
Sex H-Head	0.65	0.479	0	1	=1= The HH Head is male
Business	0.95	0.226	0	1	=1= Business is present in the HH
Dependency Ratio	0.44	0.284	0	1	N° of no-labour aged people over the total
% of women	0.54	0.220	0	100	% of women in the HH
% with sec. Educ.	0.33	0.273	0	100	% of people with secondary Education
Shocks	0.37	0.482	0	1	=1= Shocks have occurred in the HH
N° of shocks	0.97	1.099	0	6	N° of economics shocks faced by the HH

Table 1 shows the summary statistics for the relevant variables of my sample. The first variable that appears in the table is the dummy for whether the household receive remittances. The following three rows are occupied by the three outcome indicators (two dummies for loans obtainment and ownership of saving account; and the categorical variable for the frequency of deposit in the saving account). Not all of them enter the regression; I listed them for clarity reason. For the dummies the meaning for when they assume value 1 (=1=) is given in the table. In the next paragraphs I discuss the differences that there are between the subsamples that are obtained dividing the whole sample according to the outcomes of the regressions.

Table 2 Descriptive Statistics _ Sample divided by Output: Ownership of Saving Account

SAVING	Do Not Own Saving Account N = 137		Do Own Saving Account N = 123		Difference Test	
N° of Obs. = 260	Mean	Sd	Mean	Sd	T_p-value	X^2_p-value
Remittances	0.182	0.388	0.561	0.498		0.000
Acquaintance _IV	0.109	0.313	0.195	0.398		0.054
Member abroad	0.277	0.449	0.618	0.488		0.000
Distance	33.066	25.678	26.813	34.386	0.096	
Welfare Index	0.441	0.194	0.512	0.210	0.005	
Gov. Subsidies	0.635	0.483	0.659	0.476		0.692
N° subsidies	0.723	0.615	0.732	0.641	0.907	
Total subsidies	3661.31	4412.01	4594.63	5664.79	0.138	
Rural	0.526	0.501	0.602	0.492		0.217
Indigenous	0.314	0.466	0.260	0.441		0.34
Age H-Head	54.50	15.14	56.57	14.70	0.265	
Literacy H-Head	0.504	0.502	0.496	0.502		0.901
Married H-Head	0.693	0.463	0.756	0.431		0.26
Sex H-Head	0.723	0.449	0.561	0.498		0.006
Business	0.949	0.221	0.943	0.233		0.836
Dependency Ratio	0.446	0.291	0.443	0.277	0.936	
% of women	0.521	0.225	0.551	0.213	0.273	
% with sec. Educ.	0.312	0.283	0.352	0.261	0.234	
Shocks	0.226	0.420	0.520	0.502		0.000
N° of shocks	0.854	1.128	1.106	1.054	0.065	

In table 2 the sample is divided by the ownership of a saving account in formal FIs. Out of 260 households, 137 do not own any saving account and 123 do own at least one. Then, for each variable, mean and standard deviation, for each subgroup are showed. In the last column I give the tests over the differences between the two mean for each variable. According to the nature of the variables the relative p-values correspond to a t-test or to a Chi^2-test for the difference between the mean been different from 0. For dummy variable I used a Chi^2-test, for continuous ones a t-test.

When the p-value related to one variable, is small enough (p-value < 0.1), I can expect to obtain significant regression coefficients as results of the estimation for those variable. Of course it is not certain because in the regression all the variable interact in the calculation of the coefficients and therefore is possible that, even if does exist a statistically significant difference of one variable between the two subgroups, the regression coefficient for the same variable is not statistically significant. Hence, also the opposite can be true.

Therefore Table 2 shows that, in my sample, the households that own a saving account are on average more likely to receive remittances; to know an acquaintance that lives abroad; to have a member of the household that lives abroad; to be situated closer to the FI office; to have female

head; to have experience an economic shock and on average they are wealthier. Table 3, below, describes the same but dividing the sample by the obtainment of loans.

Table 3 Descriptive Statistics _ Sample divided by Output: Obtainment of loans

CREDIT	Did not obtain a loan N = 192		Did obtain a loan N = 68		Difference Test	
N° of Obs. = 260	Mean	Sd	Mean	Sd	T_p-value	X^2_p-value
Remittances	0.344	0.476	0.412	0.496		0.316
Acquaintance _IV	0.130	0.337	0.206	0.407		0.133
Member abroad	0.417	0.494	0.500	0.504		0.234
Distance	29.818	26.624	30.926	38.828	0.795	
Welfare Index	0.456	0.205	0.527	0.194	0.013	
Gov. Subsidies	0.667	0.473	0.588	0.496		0.245
N° subsidies	0.755	0.603	0.647	0.686	0.222	
Total subsidies	4068.96	4684.37	4198.53	6018.32	0.856	
Rural	0.568	0.497	0.544	0.502		0.736
Indigenous	0.286	0.453	0.294	0.459		0.905
Age H-Head	55.979	15.518	54.059	13.192	0.364	
Literacy H-Head	0.453	0.499	0.632	0.486		0.011
Married H-Head	0.740	0.440	0.676	0.471		0.318
Sex H-Head	0.646	0.480	0.647	0.481		0.986
Business	0.938	0.243	0.971	0.170		0.299
Dependency Ratio	0.451	0.292	0.424	0.259	0.490	
% of women	0.544	0.228	0.512	0.192	0.301	
% with sec. Educ.	0.303	0.275	0.409	0.252	0.006	
Shocks	0.302	0.460	0.544	0.502		0.000
N° of shocks	0.833	1.030	1.368	1.196	0.001	

It seems that there is more difference, within my sample, between the subgroups related to the ownership of saving account than between the ones related to the obtainment of loans but as I said these are not the result of a regression; the regression coefficient can still be statistically significant. To be notice that the p-value of the Chi^2-test for the remittances dummy, my explanatory variable of interest, is very significant in table 2 but is not any more in table 3. Probably the remittances have an effect on the use of saving account but not on the obtainment of loans. Therefore from Table 3 I know that, in my sample, the households that did obtain a loan (68) are on average wealthier; more likely to have a higher percentage of people with at least secondary education; to have literate head and to have experienced an economic shock.

Table 4 Descriptive Statistics _ Remittances receiver status divided by Output: Frequency of deposit

	FREQUENCY of deposit in the saving account							
Remittances	*Never*	*Yearly*	*2months*	*Monthly*	*3week*	*2week*	*Weekly*	Total
No	95	1	10	15	33	4	8	166
Yes	21	6	7	18	28	5	9	94
Total	116	7	17	33	61	9	17	260

For the frequency of deposit I report only table 4 above, where the sample is divided by the status of been a remittances receiver household (the two rows) and is then grouped according to the seven categories in which the output indicator is measured. The majority of remittances receiver households have a frequency that ranges around the fourth and fifth categories (every three weeks and monthly), differently from the no-receiver household that most of which are gathered in the first category, so they never go to deposit money in formal FIs. From the table seems that receiving remittances increase the frequency of deposits but this statement has to be tested with a proper regression.

5. METHODOLOGY

After the application of easier statistical method, such as OLS, Probit and Ordered Probit model, I also applied less straightforward methods making use of my instrumental variable, namely the 2SLS and the IV Ordered Probit. Before describing the path of the analysis I want to recall the endogeneity bias likely to be present in my study. Indeed, an important complication in empirically studying the impact of remittances on the use of financial services is the potential for endogeneity biases as a result of measurement error, reverse causation, and omitted variables. However, in the World Bank Policy Research Working Paper 3957, July 2006 : ”Do Workers’ Remittances Promote Financial Development?” the authors provides support for a robust positive impact of remittances on financial sector development, even after controlling for other factors that affect financial development and after correcting the estimates for different potential sources of bias (Aggarwal, Demirgüç-Kunt, Martinez Peria, 2006). I tried to address the endogeneity bias by conducting the 2SLS regression and the IV Ordered Probit, where I use an instrument variable that I personally identified as suitable.

5.1 Endogeneity problem

This study is probably affected by a serious endogeneity problem. The issue lays on the fact that one of the explanatory variables, specifically the remittances, is influencing the outcome but it is also influenced by it. In fact, the remittances received status of a household is likely to be influenced by the amount of saving and the size of loan that the same household may has. Moreover the fact that a household is remittances receiver could be determined by some latent variables that are unobservable and that differ between the households, such as initial welfare, intergenerational inheritances, propensity to migrate, network size, entrepreneur skills and attitude. Therefore I have an explanatory variable that probably is endogenous to the model and I will need to instrument for it. In the next paragraph I discuss the instrument variable that I think can function to overcome the endogeneity bias and for which I collected data.

5.2 Instrument Variable

In order to try to find an instrument able to overcome the endogenous issue in the estimation arising from unobservable characteristics of clients of the FIs who receive remittances, I thought on few possible variables such as the income level and the destination of the migrants; and about migrant networks. Unfortunately since I am going to the recipient’s area to collect the data, it will be almost impossible to collect information about the income level and the destination of the migrants that I

think strongly affect the decision of the migrants in sending remittances. But instead, it is possible to gather information about the migrant network.

In the last years several studies, focused on remittances, have been conducted. The authors have had to deal with the endogenous issue related to remittances. Different attempts, using different methodology, are available in the literature (Dorantes and Pozo, 2006; Taylor and Mora, 2006; Acosta, 2006; Calero et al., 2008). The majority makes use of instrument variables and the instruments used have been the village and household migration network, per capita count of Western Union offices in the state, source countries of remittances and regional variation in the availability of bank offices, the number of people returned home in the last two years and the migration propensity of the village respect to the region. These studies were not focused on the impact of remittances on financial inclusion but instead on the impact of remittances on school attendance, employment rate or labour supply.

Since I am interested on the financial inclusion I need an instrument that is far enough from influencing the financial inclusion but that it is still linked to the probability of receive remittances, hence that is beneficial in increasing the chances for migration. Specifically, I will ask whether the household has been in contact with any migrant (*acquaintance*) that never send any remittances to the household. This with the attempt to detect a migrant not directly involved with the interested household (never sending remittances to it) but close enough to offer some help in achieve the migration of a member of the interested household. If an *acquaintance* exists, would be beneficial to encourage the migration of a member of the household that later on will start sending remittances but would not influences the financial inclusion, defined as the ownership of a saving account and the obtainment of loans, of the same household.

5.3 Analysis

I run three different regressions for each of my two binary outcome indicators (*Loans obtainment* and *Ownership of a savings account*). I start computing an OLS, followed by a Probit and then I run 2SLS in order to try to address the endogeneity bias. The third indicator (*Frequency of deposits*) is registered in ordered categories; therefore I use an Ordered Probit model and then an IV Ordered Probit. The results are given in three different tables, one for each outcome indicator, in the following section.

OLS, Ordinal least squares model, is known as a linear probability model and can be used as a way to describe conditional probabilities. However, when used with a discrete binary response outcome, the errors from the linear probability model violate the homoscedasticity and normality of errors assumptions of OLS regression, resulting in invalid standard errors and hypothesis tests (Long,

1997). The OLS model is not suitable when the outcome variable is discrete because is meant for estimate a linear function on a continuous outcome variable. The results of such regressions are reported in the first columns of table 5 and 6 but I will not comment on them because is misleading.
Since my outcomes variable are binary, OLS method is not appropriate and therefore I run Probit models with the ownership of saving account (column 2 in table 5) and the obtainment of loans (column 2 in table 6) as outcome variables.
In column 1 of table 7 is reported the outcome of an Ordered Probit regression with the frequency of deposit as outcome variable, since this outcome indicator is also not continuous but discrete, ranging from 1 to 7 and only assuming entire natural numbers.
Finally in column 3 of table 5 and 6 I report the results of the two 2SLS regressions. Column 2 of table 7 shows the result of the IV Ordered Probit.

5.4 Marginal Effects

The interpretation of regression coefficient after a Probit is not straightforward. Looking at the individual regression coefficients (the ones reported in columns 2 of table 5 and 6) the only thing that I can say is that a positive coefficient means that an increase in the predictor leads to an increase in the estimated probability of a positive outcome, that in my model means owning a saving account or have obtained a loan. On the other hand a negative coefficient means that an increase in the predictor leads to a decrease in the estimated probability of a positive outcome; of course, given the fact that they are statistically significant.
Hence, from table 5 I can infer that the fact of receiving remittances and the fact of having experienced economic shocks increase the estimated probability that a household does own a saving account. On the other hand, the fact to have a male household head decreases the estimated probability that a household does own a saving account.
When the outcome is the obtainment of loans (table 6), the conditions that increase the estimated probability of a household of having requested a loan are the fact of having experienced economic shocks and an increase of the percentage of people with at least secondary education. Unfortunately, the dummy for remittances is not significant in this regression.
These are very limited findings and therefore I have to compute also the marginal effects in order to assess how much each explanatory variable influence the estimated probability of a positive outcome. Indeed, if in linear models, the coefficients have a direct interpretation (they represent the estimated change in the value of the dependent variable associated with a unit increase in the corresponding independent variable) in nonlinear model, as Probit, the estimated probability of a positive outcome is a function of the relationship between the value of the independent variable and

the variable's coefficient. Therefore, its magnitude varies depending on the magnitude of the change in the independent variable of interest (Long et al., 2006). A tool for addressing these issues is to report the marginal effects of key independent variables. Marginal effects can be an informative means for summarizing how change in a response is related to change in a covariate (Stata 11 Reference Manual, p. 975). The marginal effects for binary variables, which is for instance the case when I look at my explanatory variable of interest, namely the remittances receiving status, show how the estimated probability of a positive outcome is predicted to change as the explanatory variable changes from 0 to 1 holding all other covariates equal. For continuous independent variables, the marginal effect measures the instantaneous rate of change. Marginal effects at the means are computed by setting the values of all the covariates at their means, and then seeing how a change in one of the explanatory variables changes the estimated probability of a positive outcome. In my case these kind of marginal effect are not very useful because they give me the effects for a change of each explanatory variable on the estimated probability of a positive outcome for an hypothetical household that has the means values on every others explanatory variable. Of course, in reality such household does not exist. Instead, with the average marginal effects a marginal effect is computed for each case (using the real values observed), and the effects are then averaged. In table 8 and 9 I report the average marginal effects of the Probit regressions that correspond to columns 2 of table 5 and 6.

Before discussing the marginal effects in the two Probit models I want to comment on column 1 of table 7. In this column are reported the Ordered Probit coefficients. Standard interpretation of these coefficients is that for a one unit increase in the predictor, the response variable level is expected to change by its respective regression coefficient in the ordered odds scale while the other variables in the model are held constant. For instance, looking at the ordered Probit coefficient corresponding to the remittances receiving status, I can infer that the ordered Probit odds of being in an higher outcome category of an household that receive remittances is 0.642 more than for an household that does not receive remittances. In other words, remittances receiver households are more likely to have high frequency of deposit then no-receiver (category 1 correspond to lowest frequency). As before, for the Probit model, the interpretation of these coefficients is not very informative. Again I need to compute the marginal effects for each explanatory variable on the estimated probability of be in a certain outcome category (in my case I have seven categories). I report the marginal effects for each category, of the explanatory variable of interest in table 10.

5.5 Mc Fadden's pseudo R2

Finally, before to comment the results, I want to spend few words about the R^2 and the pseudo R^2 that appear at the bottom of the result tables. First, the two R^2 of the two OLS on saving (R^2 = 0.285) and on credit (R^2 = 0.097). These indexes are easy to interpret but unfortunately I cannot use them as they are because they refer to a kind of analysis that is not suitable for my case, as explained before. Therefore I have to rely on the second kind of index, the Mc Fadden's pseudo R^2 that appear on the very last line of the tables. These indices are not computed for the OLS regressions of course; they are indeed an attempt to obtain the same as a R^2 for Probit models and other nonlinear models. Their interpretation is not exactly the same as for the R^2 of an OLS. There are several approaches to thinking about R^2 in OLS. These different approaches lead to various calculations of pseudo R^2 with regressions of categorical outcome variables.

Many kind of pseudo R^2 have been created and in this case I can use The Mc Fadden's pseudo R^2. This index ranges from 0 to 1, but will never reach or exceed 1 as a result of its calculation. From Long et. al., 1997, there are two approaches to interpret this index. The first one refers to the R^2 as explained variability. A second interpretation refers to R^2 as improvement from null model to fitted model. Nevertheless, the best use of Mc Fadden's pseudo R^2 is for comparing different specifications of the same model. In this case the specification that gives the higher Mc Fadden's pseudo R^2 is the better for the given dataset. There is a trade-off between use a specification that includes more explanatory variables, in order to try explaining more variability; but at the same time reduces the degrees of freedom of the whole model and use a specification with less explanatory variables but that does not reduce the degrees of freedom. As mentioned before I tried different specification for my models and comparing the Mc Fadden's pseudo R^2, I finally have chosen the one that does not have too many explanatory variables and gives me the higher Mc Fadden's pseudo R^2. My results give me three Mc Fadden's pseudo R^2, respectively 0.223 when the outcome is the ownership of a saving account, 0.086 when the outcome is obtainment of loans and 0.061 when the outcome is the frequency of deposit.

Apparently a rule of thumb for the interpretation of this kind of index is that a McFadden's pseudo R^2 ranging from 0.2 to 0.4 indicates very good model fit (Matt Reichenbach, 2014). According to this empirical rule my model has a good fit when the output is the ownership of a saving account. But when the output is the obtainment of loans or the frequency of deposit a Mc Fadden's pseudo R^2 of, respectively 0.086 and 0.061 indicates that my model does not increase so much the degree to which the model parameters improve upon the prediction of the null model.

6. RESULTS

Table 5 - OUTCOME : Ownership of saving account

	(1) OLS - Saving	(2) Probit - Saving	(3) 2SLS - Saving
Remittances	0.356*** (0.0586)	1.080*** (0.191)	0.287* (0.147)
Distance	-0.0014 (0.00095)	-0.00452 (0.00291)	-0.00142 (0.00093)
Indigenous	0.0398 (0.0652)	0.136 (0.206)	0.04 (0.0637)
Sex H-Head	-0.132** (0.0652)	-0.434** (0.213)	-0.143** (0.067)
Age H-Head	-0.00011 (0.00206)	-0.00165 (0.00662)	0.000224 (0.00212)
Gov. Subsidies	0.0759 (0.0632)	0.249 (0.205)	0.0815 (0.0627)
Dependency Ratio	0.0184 (0.116)	0.0318 (0.367)	0.0069 (0.115)
% of women	0.0235 (0.142)	0.15 (0.46)	0.0135 (0.14)
% with sec. Educ.	0.122 (0.113)	0.43 (0.363)	0.111 (0.113)
Shocks	0.263*** (0.0578)	0.826*** (0.184)	0.269*** (0.0576)
Welfare Index	0.296* (0.151)	0.903* (0.485)	0.320** (0.155)
rural	0.0704 (0.0582)	0.277 (0.187)	0.0679 (0.0571)
N	260	260	260
R2	0.285		0.269
pseudo R2		0.223	

Standard errors in parentheses ; * p<0.10, ** p<0.05, *** p<0.01

Table 6 - OUTCOME : Obtainment of loans

	(1) OLS - Credit	(2) Probit - Credit	(3) 2SLS - Credit
Remittances	0.0412	0.126	0.156
	(0.0575)	(0.187	(0.145)
Distance	0.000655	0.0016	0.000677
	(0.00093)	(0.00297	(0.00092)
Indigenous	0.0582	0.172	0.0578
	(0.064)	(0.213	(0.0628)
Sex H-Head	-0.0299	-0.0688	-0.0125
	(0.064)	(0.208	(0.0661)
Age H-Head	-0.00092	-0.00287	-0.00146
	(0.00202)	(0.00678	(0.00209)
Gov. Subsidies	-0.0164	-0.059	-0.0256
	(0.062)	(0.199	(0.0619)
Dependency Ratio	0.104	0.313	0.123
	(0.114)	(0.379	(0.114)
% of women	-0.134	-0.474	-0.117
	(0.14)	(0.468	(0.138)
% with sec. Educ.	0.231**	0.761**	0.249**
	(0.111)	(0.363	(0.111)
Shocks	0.184***	0.574***	0.175***
	(0.0567)	(0.182	(0.0568)
Welfare Index	0.270*	0.873*	0.23
	(0.148)	(0.495	(0.153)
rural	-0.0333	-0.0999	-0.0292
	(0.0571)	(0.186	(0.0563)
N	260	260	260
R2	0.097		0.083
pseudo R2		0.086	

Standard errors in parentheses ; * p<0.10, ** p<0.05, *** p<0.01

Table 7 - OUTCOME : Frequency of deposit

	(1) Ord. Probit - Frequency	(2) IV Ordered Probit - Frequency
Remittances	0.642***	0.00865
	(0.149)	(0.379)
Distance	-0.0004	7.75E-05
	(0.00234)	(0.00224)
Indigenous	0.208	0.213
	(0.169)	(0.161)
Sex H-Head	-0.0515	-0.0339
	(0.165)	(0.157)
Age H-Head	0.000227	-0.00021
	(0.00536)	(0.00513)
Gov. Subsidies	0.0957	0.0797
	(0.163)	(0.155)
Dependency Ratio	-0.0345	-0.0263
	(0.296)	(0.282)
% of women	0.332	0.307
	(0.366)	(0.35)
% with sec. Educ.	0.636**	0.619**
	(0.292)	(0.28)
Shocks	0.559***	0.555***
	(0.147)	(0.141)
Welfare Index	0.437	0.41
	(0.39)	(0.373)
rural	0.0871	0.068
	(0.151)	(0.144)
N	260	260
R2		
pseudo R2	0.061	

Standard errors in parentheses ; * p<0.10, ** p<0.05, *** p<0.01

The likelihood ratios chi^2 of the two Probit estimations and of the Ordered Probit have all a p-value smaller than 0.001 and therefore the models are statistically significant. The hypothesis that all coefficients are equal to zero can be rejected.

Also respect to the goodness of fit test I can show good results. This test compares the predictions of the model with the real observation; where the null hypothesis is that there are approximately equal numbers of cases in each group. Therefore I do not want to reject the null hypothesis and this is the case when the p-value of the goodness of fit test is bigger than 0.1. The p-value of the goodness of fit test for the model that looks at the ownership of saving account is 0.327, the one of the model that looks at the obtainment of loans is 0.284 and when the outcome is the frequency of deposit is 0.452. Hence the two Probit estimations and the Ordered Probit have a good fit.

Now I discuss the marginal effects of the two Probit estimations and of the Ordered Probit.

Table 8 Average marginal effects after Probit on Ownership of saving account

	dy/dx	Std. Err.	z	P>z
Remittances	0.328022	0.0466096	7.04	0.000
Sex H-Head	-0.131733	0.0630753	-2.09	0.037
Shocks	0.2509628	0.0495913	5.06	0.000
Welfare Index	0.2741435	0.1447377	1.89	0.058

Table 8 reports the average marginal effects of the significant explanatory variables when the outcome is the ownership of a saving account. The explanatory variables that have a highly significant different from zero effect are the dummies for remittances and the occurrence of shocks. Specifically, I can infer that if a household receive remittances is 33% more likely to own a saving account respect to a household that does not receive remittances. This finding confirms my hypothesis that the remittances increase the use of saving accounts for the households that receive them. Apparently also the occurrence of shocks increases the probability to own a saving account of 25%. Slightly less statistically significant are the marginal effects of the welfare index and of the dummy for the gender of the household head. The latter is negative and suggests that when the household head is male, the household is 13% less likely to own a saving account respect to household headed by women. On the other hand, when the welfare index, of the household, increases of one unit the household is 27% more likely to own a saving account. The average marginal effects of the other variable are not statistically significant and therefore do not bring evidences of a causal relationship.

Table 9 Average marginal effects after Probit on Obtainment of loans

	dy/dx	Std. Err.	z	P>z
Remittances	0.0374771	0.0551508	0.68	0.497
% with sec. Educ.	0.2254505	0.104931	2.15	0.032
Shocks	0.1700758	0.0510621	3.33	0.001
Welfare Index	0.2588407	0.1444897	1.79	0.073

Table 9 reports the average marginal effects of the significant explanatory variables when the outcome is the obtainment of loans. In this case only three variable have a significant different from zero effect and remittances are not one of them. Apparently, remittances do not have a strong effect on the use of credit services and beside to give a not significant parameter its magnitude is also very low. With this result I cannot assess whether my hypothesis that the remittances have a negative impact on the obtainment of loans, for the households that receive them, is true. The welfare index again gives a significant parameter, again positive but this time of slightly smaller magnitude (0.25). Also the occurrence of shocks has a positive significant effect but this time its magnitude is slightly lower only reaching the 0.17, where in the case of the ownership of saving, been the outcome, was 0.25. Interestingly the percentage of people with at least secondary education has a quite strong effect on the obtainment of loans. The parameter is significant and its magnitude is 0.22. This result suggests that when more members of the household achieve a higher level of education the whole household has more chances to obtain a loan; and for an increase of one per cent unit of the percentage of people with at least secondary education level, the household is 22% more likely to obtain a loan.

Table 10 Marginal effects after Ordered Probit on Frequency of deposit

Variable	dy/dx	Std. Err.	z	P>z
Marginal Effects for Frequency = Never				
Remittances*	-0.2461873	0.05437	-4.53	0.000
Marginal Effects for Frequency = Yearly				
Remittances*	-0.0034101	0.00227	-1.5	0.133
Marginal Effects for Frequency = Every two months				
Remittances*	-0.0018535	0.00378	-0.49	0.624
Marginal Effects for Frequency = Monthly				
Remittances*	0.0194695	0.00762	2.56	0.011
Marginal Effects for Frequency = Every three week				
Remittances*	0.1237875	0.03016	4.1	0.000
Marginal Effects for Frequency = Every two week				
Remittances*	0.0315863	0.01236	2.56	0.011
Marginal Effects for Frequency = Weekly				
Remittances*	0.0766077	0.0242	3.17	0.002

Table 10 reports the marginal effects after Ordered Probit on Frequency of deposit of the explanatory variables of interest, the remittances. The table is constructed pooling together seven rows, where each of them reports the marginal effects for one category of the outcome variable, frequency of deposit, which has seven categories. The marginal effects (dy/dx) are computed for a discrete change of the dummy, for remittances, from 0 to 1. The parameter is significant for the last four categories and for the first one. It is always positive for the last four and negative for the first one. When is positive its magnitude is rather small, with its maximum being 0.12 (the marginal effect on the fifth category) but it is quite large and negative (-0.24) when the marginal effect is computed for the first category, the one that means that the household never deposit any saving. These results confirm the feeling given by table 4 and my hypothesis that remittances increase the

frequency of deposit of the household that receive them. Indeed, the fact of receiving remittances has a positive effect on the probability of a household of be in one of the high frequency categories (the last four) and a negative effect on the probability of being in the first one. The strongest positive effect of my explanatory variable of interest is for category 5 that correspond to a frequency of every three weeks.

Bringing together all the results, I can infer that remittances have a positive impact on the use of saving services, both in increasing the usage of saving account and in enhancing the frequency of the deposits. However the remittances, at least in my sample, do not have statistically significant impact on the use of credit services.

I did not observe any causal relationship between the distance from the FI and the usage of financial services. The gender of the household head has an impact only on the probability of owning a saving account and its effect is negative, indicating that when the household head is male is less probable that the household own a saving account in formal institutions. An interesting result comes from the variable indicating the percentage of people with at least secondary education in the household. Here the idea is about to see whether household with a higher average education level are more prone to make use of financial services. Indeed, this variable has a positive and rather strong effect on the probability of having obtained a loan.

6.1 - 2SLS and IV-Ordered Probit

Table 11 - 2SLS and IV Ordered Probit

	(1) 2SLS - Saving	(2) 2SLS - Credit	(3) IV Ordered Probit - Frequency
Remittances	0.287*	0.156	0.00865
	(0.147)	(0.145)	(0.379)
N	260	260	260
R2	0.269	0.083	

Standard errors in parentheses ; * p<0.10

Here, in table 11, I reported the results, for the explanatory variable of interest, of the two 2SLS regressions and of the IV Ordered Probit. Significance and magnitude of the other covariates do not change so much, respect to the results of the corresponding two OLS and the Ordered Probit (see tables 5, 6 and 7). The instrument used, has been always the acquaintance, which I discussed in the methodology section (results of the first stage regression in the Appendix). I used these methods in order to try overcoming the endogeneity issue embedded in this study.

The unique case where remittances are still statistically significant is when the outcome is the ownership of a saving account. The coefficient is positive and again suggests that the fact of receiving remittances increase the probability, of receiver households, to own a saving account. Specifically, remittances receiver household are 29% more likely to owning a saving account, compared to no-receiver households.

When the outcome is the obtainment of a loan, the parameter is still not statistically significant as in the corresponding OLS regression and again I do not detect any causality of remittances respect to this outcome.

Finally, also looking at the Ordered Probit regressions first without instrumentation and then instrumented; I notice that the output does not change so much. The variable that are statistically significant are the same as before the instrumentation with slightly lower coefficients. However, the only but very relevant exception is related to remittances. Indeed, after the instrumentation the coefficient for the remittances is not significant anymore and also its magnitude is lower.

In appendix I report the test of week instrument and the result of such test tell me that the instrument is robust with an $F > 10$ ($F = 47.9$) and significant.

6.2 Bringing together all the estimation methods

Table 12 All the models

SAVING	(1) *OLS*	(2) *Marginal Effect - Probit*	(3) *2SLS*
Remittances	0.356*** (0.0586)	0.328022*** (0.0466096)	0.287* (0.147)
CREDIT	*OLS*	*Marginal Effect - Probit*	*2SLS*
Remittances	0.0412 (0.0575)	0.0374771 (0.0551)	0.0551508 (0.145)
FREQUENCY	-------	*Ordered Probit*	*IV Ordered Probit*
Remittances		0.642*** (0.149)	0.00865 (0.379)

Before starting the discussion, I comment Table 12 that brings together all the estimation methods used in this thesis, providing a valuable prospective of my study. The relevant outcomes are reported on the left side (bolded) and the coefficients are always referring to remittances. In the first column are reported the two OLS, the second column shows the marginal effects when the outcomes are binary and the coefficient of the Ordered Probit when the outcome is the frequency of deposit in the saving account. The third column reports the result of the instrumentation.

From the table we can appreciate that the model is not very sensitive to the estimation method used. It gives almost the same result, especially when the outcomes are the two binary ones.

I tried to correct for the endogeneity of remittances using an instruments that has never been used before (acquaintance). My findings hold after the instrumentation respect to the relationship between receiving remittances and the ownership of a saving account. The parameters for the relationship between remittances and the obtainment of loans are never significant, in any estimation, but the significance disappears after the instrumentation of the Ordered Probit.

7. DISCUSSION

The literature has shown that poverty and low income are the main determinants for a lack of access to finance in developing countries (Beck/Demirgüç-Kunt 2008) and thus I thought that to receive an extra income flow originated by the remittances is beneficial in enhancing the access and use of financial services.

My model has some limitations but it is still valid to assess the impact of receiving remittances on the use of formal financial services by remittances receiver households.

I cannot control for income, since the level of income is influenced by the remittances flow, but I include a welfare index (its construction is explained in section 3), the total dependency ratio, the percentage of people with secondary education and a dummy for the occurrence of shock as proxies for income and poverty level. I do not distinguish the impact of remittances between commercial bank and Microfinance sector. I cannot comment whether having access to financial services enables for better accumulation strategies and increases the wellbeing of the households.

I am only able to show what the probability is for remittances receiver households of using formal financial services compared to no-receiver households. I can infer how much each explanatory variable influence this probability but I cannot discuss the indirect effect of using financial services on the lives of receivers.

Before reaching the final specification, I tried different kinds of specifications experimenting different sets of covariates. I tried different kind of welfare indices, other measurements for housing quality and education level and in general different proxies for socioeconomic status.

My findings are in compliance with the ones of previous studies, at least about the use of saving services; I did not find any casual relationship between remittances and credit services. To this respect I added the analysis about the frequency of deposit in the saving account that, in Veracruz, seems to be boosted by the remittances.

Further, a very interesting contribution to the academic research field comes from the results of the instrumentation. My instrument seems to be appropriate for the study and provides me good results. In the framework of the 2SLS, produces good results in terms of significance in the first stage regression (reported in the Appendix) and respect to the coefficient related to remittances in the second stage. Unfortunately, it is useful only when the output is the ownership of a saving account but the model that looks at the obtainment of loans does not give any significant coefficient even in the OLS or in the Probit model.

Finally, besides having shown that remittances have an impact in increasing the probability of the usage of saving services, taking a closer look to my sample; I want to signal that the correlation between the remittances receivers and the households that save at least part of the remittances is large, namely 0.59. Table 13, below, gives the distribution of the relationship. A correlation of about 0.6 is very high and indicate that a big percentage of the remittances receiver household directly save part of the remittances. This is an important aspect for further discussion. I will come back to it in the conclusion.

Table 13

	Save remittances		
Receive remittances	*No*	*Yes*	*Total*
No	166	0	166
Yes	38	56	94
Total	204	56	260

8. CONCLUSION

My explanatory variable of interest is whether the household receive remittances, and it has been revealed that the receiver households are more prone to make use of saving services. This is shown respect to the ownership of a saving account in formal financial institutions (receiver households are about 30% more likely to own one) and it is also been proven that receiver households are more likely to have a higher frequency of deposit in the saving account. Unfortunately, I did not find any causal relationship between the fact of receiving remittances and the obtainment of loans. Nevertheless, I observed other interesting relationships among the rest of the explanatory variables.
For instance, when the household head is female, it is more likely that the household own a saving account. Households with a higher average education level are more likely to have requested a loan. Households with higher welfare index are more likely to make use of both saving and credit services. The occurrence of economic shock in the household is associated with higher usage of financial services in general, both for saving or credit.

Given the fact that receiving remittances appears to be beneficial in increasing the use of financial services of remittances receiver household, at least for the saving facilities, It would be ideal fostering this dynamic in order to support the remittance receivers in make a wise use of this extra flow of income, originated from outside the household. Especially, considering also the fact that, in the sample used for this analysis, almost the 60% of household that receive remittances are directly saving part of them.
If more of the remittances are saved instead of spent in smoothing the consumption constrains, they would represent a rather reliable source for investments in the long run. Ideally, not only the recipients would benefit from such investments but also the whole community where the investments are made. Hence, more recipients are also clients of financial institutions (FI), more improvement is possible to obtain, in the receivers context. The gap between the recipients of remittances and the clients of FIs can be detrimental for an endogenous development path. This is the case when the households that receive the remittances rely on them to sustain its consumption only, without make any investment for the long run.
Different FIs vary on the financial services policies that they apply. They differ on the requirements to meet in order to become member and on the interest rate they charge to credits and that they offer for savings. Comparing different kind of policies and the effect they have on the use and allocation of remittances is relevant in order to assess whether a change in the policy of the FI would enhance the profitability of the institutions and the benefits for the recipients. A mapping of the actual

situation for any specific context is critical in order to assess the potential of a change in policies. It is necessary to know if those receiving remittances are already members of any FI and if not; it is important to investigate the possibility that they will join to any of them. All the actors involved; the recipients of remittances, the FIs and the money transfer operators would benefit from a different arrangement. The recipients would benefit from better access to credit and saving services and from lower transfer fees. The money transfer operators, on the other hand, could rely on a stable inflow of money. Furthermore, FIs could benefit from an increasing money flow caused by the entrance of new people attracted by the new arrangement. The success of this "win-win" dynamic depends on the willingness of the actual clients to let their remittances to be managed by the FIs.

Unfortunately, the empirical test whether and to what degree access to financial services among remittance receivers improves well-being and asset accumulation strategies lies beyond the scope of this thesis. This aspect is left for future research.

However, by the fact that I have been conducting the survey personally, I can add a reflection among the remittances. The impression I had is that the remittance money flow behaves as the income that is missing due to the migration of the member of the household. In other words, it is a substitute for the income that the migrant was not able to obtain in his context of origin. When the household receive the remittances they are already net of the expenses that the migrant has to face in living abroad but it is not surprising that only a small amount is saved. The household does not have to sustain the needs of the migrant but it still has to cover the consumption expenditure of the household itself, where the income of a working-age member would be missing without the remittance. Therefore the remittances that reach the household are a part of the total income that the household is able to produce and that the household needs to cover the total expenditure. The difference consists in the fact that the amount of money earned by the migrant, net of the expenses of living abroad, is still higher than the amount of money that the migrant could have earned without migrate. This is clear when the migrant would be unemployed staying home; but it is always true because of the difference in salaries between the context of origin and destination of the migrant. Where is reasonable to assume that in the destination context the average salary is always higher. It is this surplus that represents the "room" for saving that the household was missing before that the remittances started to arrive.

Moreover, if the adverse selection problem is mitigated by the remittance inflows such that it can work as marketable collateral to reduce the bank risk as predicted by Toxopeus & Lensink (2007), clients can use both current and future inflows as 'collateral' to have access to credit and to accumulate savings.

A critique to the Probit and Ordered Probit regressions used in this thesis could point to the possibility of reverse causation between receiving remittances status and financial inclusion of the household. I tried to correct for this endogeneity problem making use of 2SLS and IV Ordered Probit methodology using an instruments that has never been used before (acquaintance). My findings hold after the instrumentation at least respect to the relationship between receiving remittances and the ownership of a saving account.

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APPENDIX

Description of the Vector X and Outcomes Y of the models

Vector X:

- Gender of the household head (1 if the head is male, 0 if female)
- Number and characteristics of household's members (children, adults and elderly) :
  - % of people with at least secondary education
  - % of women
  - Total dependency ratio (Number of no-labour aged people over the total)
- Assets of the household (welfare *INDEX)*
  - Durable assets
  - Housing
- Transaction costs
  - Minutes to reach the FI
- Receiving of Governmental subsidies (dummy)
- Information about idiosyncratic and covariate shocks experienced by the household over the last years (health-related, business strikes, schooling-related, etc.) (dummy)
- Rural or urban

Outcomes Y:

- Information about credit and savings held by the household in the last years

- Loans obtainment during the time frame 07/2012 – 07/2013 **(Binary variable)**

  0 = The household did not request any loan from formal FIs in the year 2012
  1 = The household did request at least one loan from formal FIs in the year 2012

- Ownership of a savings account during the time frame 07/2012 – 07/2013 **(Binary variable)**

  0 = The household did not own any saving account in formal FIs in the year 2012
  1 = The household did own at least one saving account in formal FIs in the year 2012

- Frequency of deposits during the time frame 07/2012 – 07/2013 **(Ordered categories)**

  1 = Never
  2 = Yearly
  3 = Every two months
  4 = Monthly
  5 = Every three week
  6 = Every two week
  7 = Weekly

First stage 2SLS regression

Number of observation	=	260
F(12, 247)	=	5.62
Prob > F	=	0.0000
R-squared	=	0.2145
Adj R-squared	=	0.1763
Root MSE	=	0.4369

Remittances	**Coefficients**	**Std. Err.**	**t**	**P>t**	**[95% Conf. Interval]**	
Distance	-.0008726	.0009582	-0.91	0.363	-.00276	.0010148
Indigenous	-.0143856	.065288	-0.22	0.826	-.1429778	.1142066
Sex H-Head	-.1533032	.0646845	-2.37	0.019	-.2807067	-.0258997
Age H-Head	.0044428	.0020462	2.17	0.031	.0004126	.008473
Gov. Subsidies	.0793266	.0630754	1.26	0.210	-.0449076	.2035608
Dependency Ratio	-.1460274	.1155514	-1.26	0.208	-.3736192	.0815643
% of women	-.1295282	.1420449	-0.91	0.363	-.4093019	.1502454
% with sec. Educ.	-.1528954	.11301	-1.35	0.177	-.3754816	.0696907
Shocks	.0478829	.0578563	0.83	0.409	-.0660717	.1618376
Welfare Index	.3073916	.1495235	2.06	0.041	.0128879	.6018954
Rural	-.0198199	.0582723	-0.34	0.734	-.1345939	.094954
Acquaintance - IV	**.5091016**	.0768256	6.63	**0.000**	.3577847	.6604184
_cons	.1495593	.1730257	0.86	0.388	-.1912347	.4903533

Weak instrument test

Correlation between the instrument variable and
the endogenous explanatory variable (Remittances) = 0.3789

Correlation between the instrument variable and
the outcome (ownership of saving account) = 0.1197

First-stage regression summary statistics

Variable	R-sq.	Adjusted R-sq.	Partial R-sq.	Robust F(1,246)	Prob > F
Remittances	0.2162	0.1748	0.1514	47.9643	0.0000

Minimum eigenvalue statistic = 43.8988

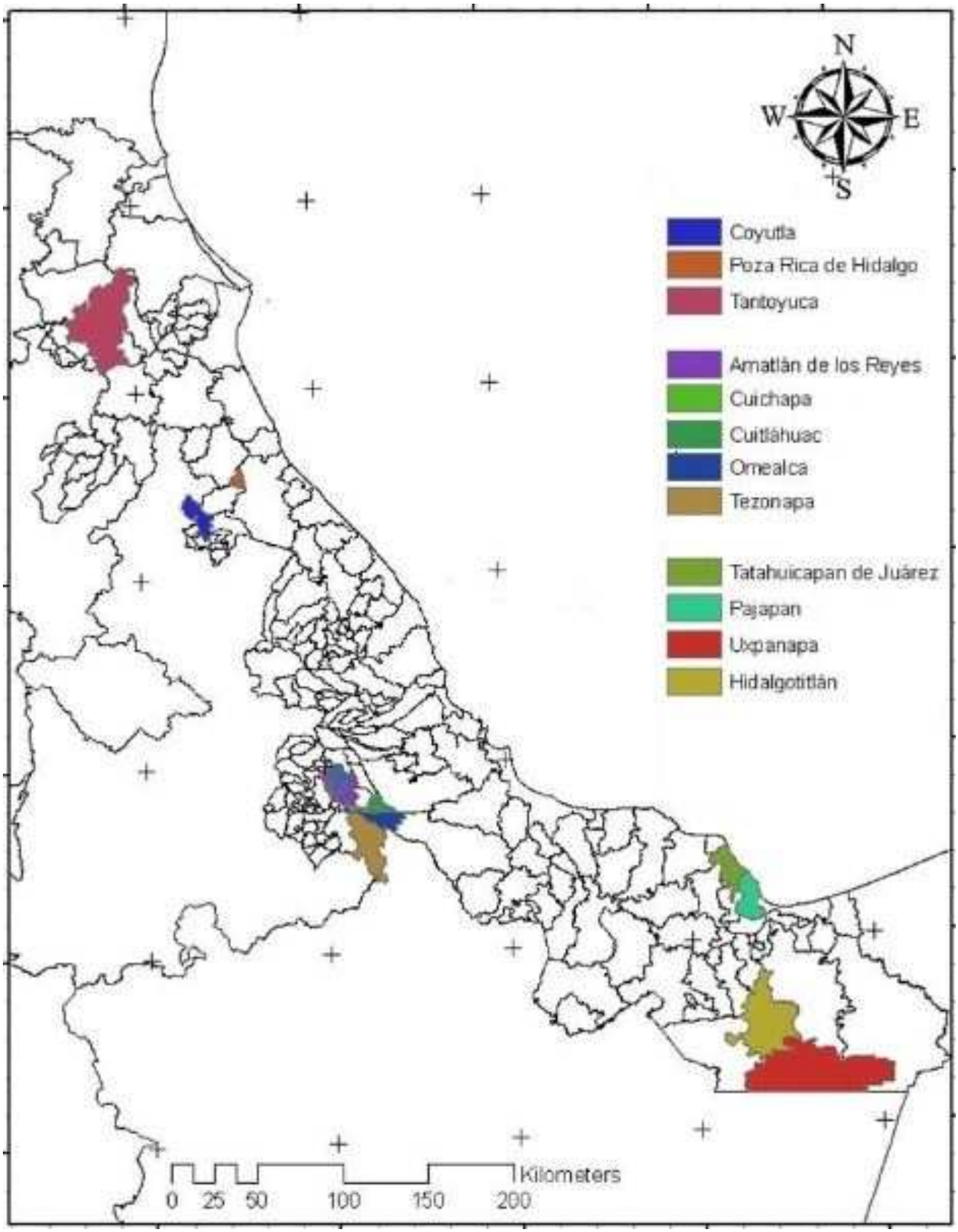
Critical Values # of endogenous regressors: 1
Ho: Instruments are weak # of excluded instruments: 1

	5%	10%	20%	30%
2SLS relative bias	(not available)			

	10%	15%	20%	25%
2SLS Size of nominal 5% Wald test	16.38	8.96	6.66	5.53
LIML Size of nominal 5% Wald test	16.38	8.96	6.66	5.53

Map of the survey area

12 Municipalities of the state of Veracruz, Mexico



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