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Migration and remittances

An analysis of the determinants of remittances in Mexico

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Acknowledgment

Executive summary

The objective of this thesis is to investigate the determinants of international remittances at a household and community level. It analyses both the determinants of which households that receives remittances and the amount of remittances received. The dataset used for the analysis is provided by the Food and Agriculture Organization of the United Nations (FAO) in Mexico and contains more than 25 000 observations. OLS regression analyses with heteroscedasticity-robust standard errors have been used to analyze the data.

Evidence from the analysis suggests that the poorest households are more likely to receive remittances from abroad, while the richest households on average receive a higher amount of remittances. The same relationship is found between agricultural land property and remittances; households with less land have a higher probability of receiving remittances, but they receive on average less than the richer households. No evidence of a migration hump is found. The fact that migrants from wealthier households are inclined to remit more money suggests that Mexican migrants primarily are motivated to remit based on their own self-interest. However, there is not enough evidence to know this for certain.

Additionally, the investigation finds several other significant relationships between household and community variables, and the probability of receiving remittances. Meanwhile factors affecting the amount of remittances received by the households are few; apart from total income and agricultural land property, the age of the head of households is the only variable with a significant impact.

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1. Introduction

Migration is not a new phenomenon; people have been moving and crossing borders for ages. Today around 3% of the world's population lives outside their country of origin and the migrant flows are increasing. This has potentially large effects for the migrants' families and their home communities, as well as for both the countries of origin and the destination countries. The impacts may be both positive and negative. The main gain of migration is remittances; the money migrants send back to their families. In 2009 total remittance flow in the world equaled US$307 billion (World Bank, 2011a), which was a significantly higher amount of money than for example the total flows of official development assistance (ODA). Remittances are an important source of income for many countries, as well as for the families living there. The overall impact of migration and remittances is though difficult to determine and it may vary substantially from country to country, and from community to community. However, either governments want to control or promote migration, it is useful to have knowledge about who migrates and who stays behind in order to develop efficient policies. Knowledge about who receives remittances and what determines the amount received, is equally important. This may give an indication of whether it is the poorer households in the society that benefit the most from remittances or if it is mainly the richer population that benefits.

1.1 Purpose

The purpose of this thesis is to investigate the determinants of remittances. This refers to both determinants of a household's probability of receiving remittances, as well as the factors affecting the amount they receive. Factors affecting the migration decision are likely to also affect a household's probability of receiving remittances. The determinants of migration will therefore have a central part in the analysis. There are many factors influencing the decision to migrate and the decision to remit money. This thesis will mainly take the focus of the household, investigating the characteristics of remittance-receiving households and the communities in which they reside.

1.2 Methodology

The Food and Agriculture Organization of the United Nations (FAO) in Mexico has provided the data used for the investigation. The dataset was collected in 2009 and

contains data on more than 25 000 rural Mexican households. Additionally, some variables characterizing the communities in which the households are residing have been added. These are public data published by Consejo Nacional de la Población[1] (CONAPO) and Consejo Nacional de Evaluación de la Política de Desarrollo Social[2] (CONEVAL). Multiple regressions with OLS estimates have been used to analyze the data.

1.3 Scope and limitations of analysis

The determinants analyzed are at a household and community level. There are likely to be several other factors, such as the characteristics of the migrant and income differentials between countries, affecting remittances. These however are not taken into consideration. The thesis takes the perspective of the sending country and the analysis is restricted to Mexico. Mexico has long migration traditions and is among the top emigration countries in the world. It is thereby a suitable country for investigating migration and remittances. However, the results may not apply universally to all countries because of regional differences. The large number of observations in the dataset gives substance to the analysis. Households from all the 31 states of Mexico have been interviewed and the results of the analysis should thereby be representative for the whole country. The fact that the data are cross sectional implies that it is impossible to analyze the effects over time or measure the specific impact of remittances for each household. Nevertheless, it is still suitable for analyzing the determinants of remittances.

1.4 Outline

Chapter 2 starts out by explaining the concepts of migration and remittances, in addition to the recent trends in the world. Then the phenomenon and the tendencies in Mexico are outlined. Chapter 4 continues with presenting related theories and literature on the topic. The structure of the analysis and the methodology used is explained in depth in chapter 5 before the results are discussed in chapter 6. In chapter 7 final conclusions are presented.

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[1] "The National Population Council"
[2] "National council for Evaluation of Social Development Policies"

2. Migration and Remittances

The term *migration* refers to both emigration and immigration. Migration may be *permanent* and *temporary*; people might emigrate with the intentions to settle down for good or they may emigrate with the intention of returning to their home country after a period. A migrant's original home country is referred to as *origin (or sending) country*, while a *destination* or *receiving country* refers to the country to which the migrant settles down either temporary or permanently. Countries may be spoken about as either an *emigrant country* or an *immigrant country*, depending on whether they are mainly receiving or sending migrants.

Remittances refer to the money that migrants send back to their home country. Normally the money is sent home to benefit their families. It also includes the money the migrants save up abroad and physically bring with them when moving back home for good (Keely, 2009).

The migrants constitute a diverse group of people and the reasons for migrating are many. Many migrants freely make the migration decision, often motivated by better economic prospects. Others are forced to leave their homes either as refugees and asylum seekers or because they have to flee famines and natural disasters. It is also common with family reunions in the cases where a family member, for example the father, has moved abroad and the family is joining him after some time. It is often difficult to obtain a visa in the destination country and many people choose to migrate illegally, making their stay abroad more difficult.

People do not necessarily migrate to another country, many move from rural to urban areas within their own home country as well. This is referred to as *internal migration*.

This thesis will primarily focus on migrants that, for different reasons, freely choose to migrate internationally. It will focus on emigrants and it takes the perspective of the country of origin. Internal migration will not be considered.

2.1 Migration in the 21st century

Migration is a universal phenomenon that is highly present in all parts of the world and the number of people migrating is constantly increasing. From 1990 to 2010 the stock of international migrants increased from 155.5 million to 213.9 million people (UN, webpage). However, the number of migrants as a share of total population is relatively constant; in 1990 the percentage share was 2.9% while in 2010 it was 3.1%.
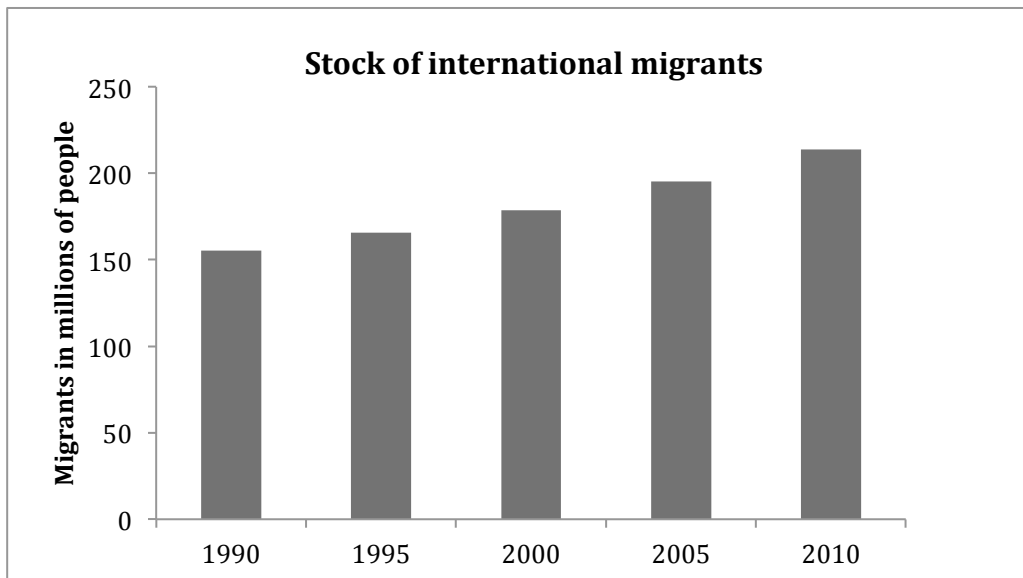
Figure 1 - Estimated total stock of international migrants in the World from 1990 to 2010 (United Nations, 2009)

Migrants are often perceived to be people moving from poor developing countries to richer developed countries. However, this only constitutes a part of the migration phenomenon. There is a large migrant flow between developed countries (also referred to as "the North") and between developing countries (often referred to as "the South"). An increasing number of people are moving between developing countries or internally, and today South-South migration is nearly as large as South-North migration (Vargas-Lundius et al, 2008). Today 43.1 percent of migrants from developing countries live in other developing countries (World Bank, 2011a, p. 12). This suggests that there are other factors, other than better economic prospects, that motivate migration.

The world's immigrants are to a large extent restricted to a limited number of countries. In 2005, 75 percent of all immigrants were residing in 28 countries. United

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States is by far the main receiver of migrants; in 2010 they received 42.8 million immigrants. The second largest immigrant country was the Russian Federation, receiving 12.3 million immigrants, followed by Germany with 10.8 million.
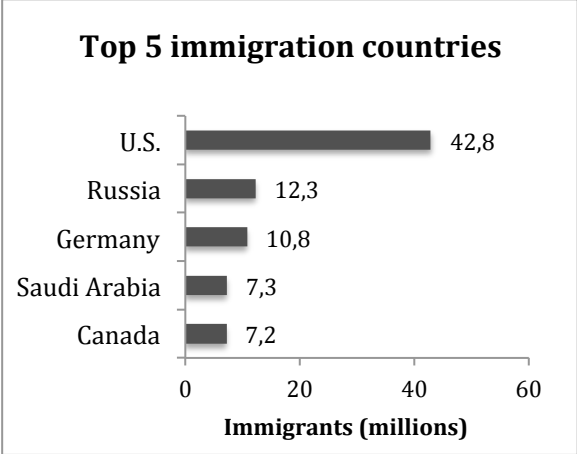
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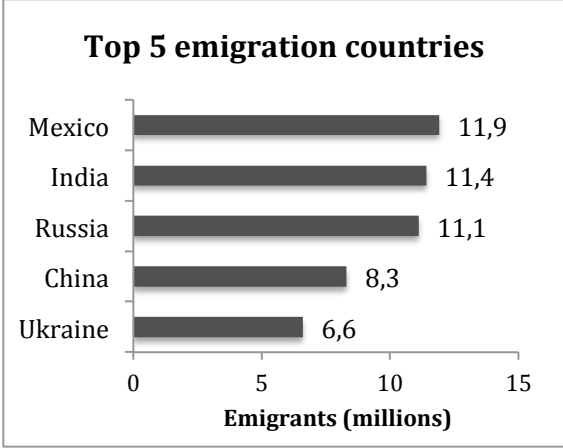
Figure 3 – Top 5 emigration countries in 2010. (World Bank, 2011a)

Mexico was the world's top emigration country in 2010, measured in absolute terms, right in front of India and Russia. 11.9 million Mexicans migrated to another country and the majority went to the United States. Mexico-United States was the top migration corridor last year and 11.6 million people crossed the border between these two countries (World Bank, 2011a).

These numbers, however, do not include illegal migration and total migration is likely to be underestimated. It is difficult to estimate the total number of illegal migrants, but a rough estimate suggest that 15 to 20 per cent of the world's immigrant stock is constituted of unauthorized immigrants. Only in the United States, the number of undocumented immigrants is estimated to be 10-11 million; about 30 percent of the total foreign-born population (Papademetriou, 2005).

International migrants are a heterogeneous group of people; they come from different parts of the world, they differ in age, gender and have different socio-economic profiles. Nevertheless, the United Nations Population Fund (UNFPA) estimates that a typical profile of a migrant is a young man or woman from 15 to 35 years of age. They normally belong to low and medium socioeconomic groups, although the poorest in a

society often are not the ones migrating (Hatton and Williamson 2004). Traditionally men have been the ones migrating, leaving their wives back home with the children. This pattern is often perceived to be persistent. However, in 2010 women constituted 48.2 per cent of the world's immigrants (World Bank, 2011a), although this varies between countries. Today women are also more likely to migrate independently and as a main income-earner, instead of just following their male relatives (United Nations, 2006).

The educational level of the migrants varies. Both high-skilled people and low-skilled people are leaving their homes and move abroad. The number of high-skilled emigrants as a percentage of a countries population varies enormously across countries. In 2010 Guyana topped the list of highest emigration rate of tertiary-educated people with 89 percent (World Bank, 2011a, p. 18). Emigration of physicians as a percentage of total physicians trained in a country, also differ between countries. According to data from the World Bank (2011) 8.3% of all physicians trained in low-income countries migrates to another country. This percentage drops significantly for both middle- and high-income countries, indicating that the loss of high-skilled labor is higher in the poorest countries.
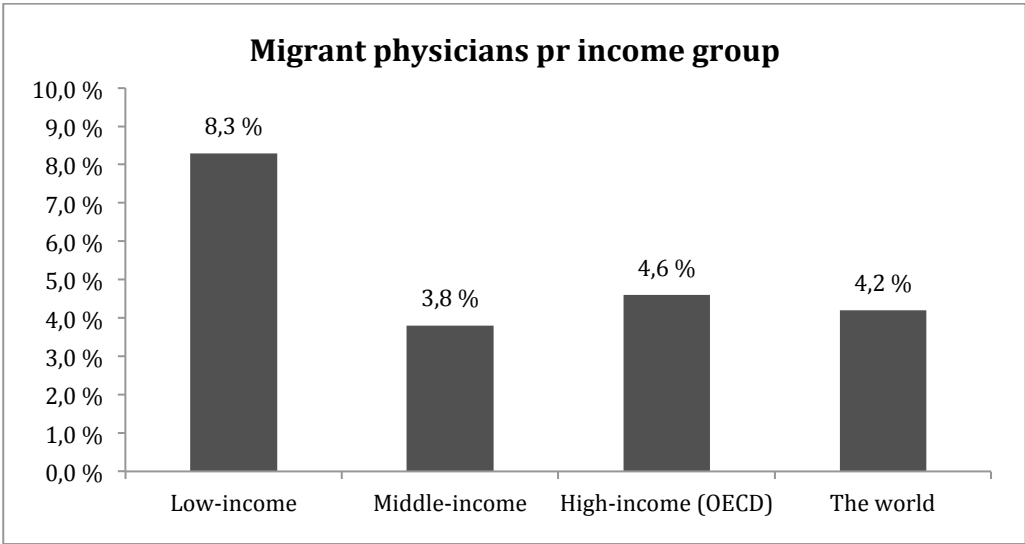
Figure 4 -: *Number of physicians as a percentage of total physicians trained in each income-group. All countries are classified in one of the groups according to criteria established by the World Bank (World Bank, 2011a)*

2.2 Remittances in the 21st century

The remittance flows to developing countries have grown significantly over the last decade, and have almost tripled since year 2000. The World Bank (2011) estimated remittances to be US$ 324 billion in 2010 and has become the world's second largest capital inflow to developing countries after foreign direct investment (FDI) (Vargas-Lundius et al, 2008) and it is more than double the size of official development assistance (ODA). These numbers only take into account remittances transferred through formal channels, and the actual numbers are likely to be significantly higher.
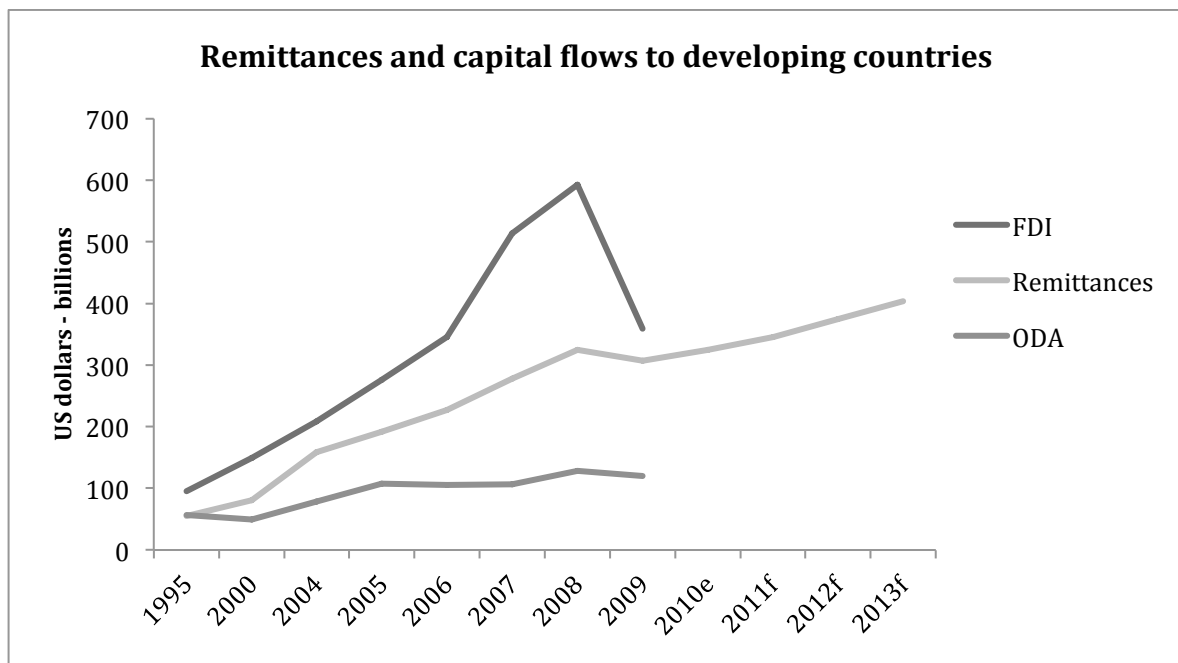
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Note: e = estimate, f = forecast

The increase in remittances is partly due to the increased migration, but it can also be explained by increased competition in the remittances market, lower transfer costs, more remittances diverted into formal channels, and an improvement in the reporting of data in many developing countries (Vargas-Lundius et al, 2008). Forecasts estimated by the World Bank indicate that remittance flows will continue to increase the next couple of years and reach US$ 404 billons in 2013 (World Bank, 2011a).
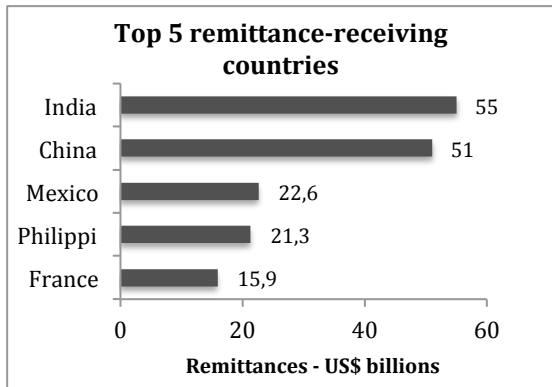
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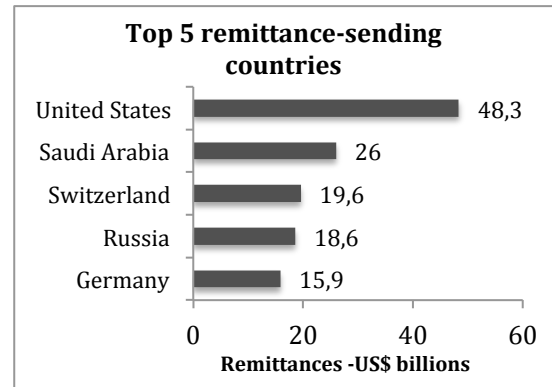
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In 2010 India was the country estimated to receive most remittances in absolute terms (World Bank, 2011a). They were estimated to receive US$ 55 billions, closely followed by China receiving US$ 51 billions. Mexico appears at third place, probably highly driven by their high number of emigrants. The United States are not only the country receiving most migrants, but also the country with highest outflows of remittances. Their outflow of US$ 48.3 billions is significantly higher than remittances outflows from Saudi Arabia, being the country with the second largest outflows.

Remittances are an important source of external financing for many poor countries and in many cases it constitutes a significant percentage of a country's GDP. In 2009, for the five countries topping the list of remittance-receiving countries as a share of GDP, remittances equaled more than 23 percent. Remittances were most important for the economy of Tajikistan with a share of GDP of 35 per cent (World Bank, 2011a, p. 14).

The flow of remittances to developing countries does not appear to have been very affected by the financial crisis in 2008. It slightly decreased in 2009 compared to 2008, but is estimated to have increased to US$ 325 billions again in 2010. Remittances thereby seem to be less sensitive to external shocks than FDI, which dropped significantly from 2008 to 2009. Remittance flows are persistent as both present migrants and new migrants send money back home. As long as migration flows increase, remittance flows are expected to increase as well. If new migration stops for a period, remittances will stop growing, but there will still be a significant flow. Migrants are also expected to continue to send remittances, even if affected by income shocks, as remittances constitutes a small part of the migrants income (World Bank, 2011a).

2.3 Remittance behavior

According to Sander and Maimbo (2003) most international migrants send between $100 and $1000 per transaction. Estimates done by the World Bank (2004, cited in Vargas-Lundius et al, 2008) indicates that the global average transaction value is $200. However, the amount of remittances a migrant sends is expected to be dependent on several factors. It will normally take some time from the moment a person migrates to the moment he starts sending money back home. It takes some time to find a place to live, get a job and to get established in a new society. Remittance flows from new migrants are therefore likely to be lower. The amount is also dependent on a migrant's family situation and tends to be higher when ties are closer. Bonds to the sending country are expected to weaken over time, and remittances are likely to decline the longer the migrant stays abroad (Gosh, 2006). Remittance flows often come to an end when the family gets reunited in the receiving country. According to Hugo (1998, cited in Vargas-Lundius et al, 2008) migrants tend to remit the most if they are of working age, have children or parents in the country of origin and have stayed in the country for some time. The time a migrant intends to stay abroad also affect the amount of money remitted; permanent migrants remit about 15 percent of their salary, while per temporary migrants remit up to 50 per cent of their total income (USAID 2002, cited in Sander 2003). Remittances' percentage share of income is also likely to be higher for migrants with low income compared to those who are richer.

2.4 Transfer costs

Remittances may be sent to the country of origin through formal and informal transfer channels. The choice of channel depends on what transfer means that are available to the migrants and the quality, the transfer time and the costs of making the transaction. Formal transfer channels include major money transfer companies (like Western Union and MoneyGram, etc.), banks, credit unions, regular mail service, etc. Informal channels comprise couriers and sophisticated channels such as the "Hawala" transfer systems, as well as friends and relatives travelling between the countries. The costs of making a transaction include a fee charged by the sending agent and a currency-conversion fee (World Bank, 2006). The size of the fee differs between geographical regions, and depends on the amount of money transferred and the channel chosen; informal channels are normally cheaper than formal channels. In some cases the fee may be as

high as 20 per cent of the principal. In 2004 the average price was reported to be 12 percent of the principal (Taylor 2004, cited in World Bank, 2006). The average remittance fee declines rapidly when the size of the transaction increases. The cost of transferring $100 from the United States to Mexico through one of the major money transfer companies is more than 10%, while if transferring $500 the costs drop to less than 3% (World Bank, 2006). The high transaction costs reduces the amount of remittances received by family and relatives in the country of origin significantly.

2.5 Remittance spending

Remittances tend to go on typical day-to-day expenditures like food and clothing. This is especially the case in poorer families that initially don't have a lot of money. Remittances are also typically used to pay off debt, to cover health expenses, to invest in children's education, for buying land and to build houses (Keely, 2009). A study conducted in Mexico suggests that children in households with migrants completed significantly more schooling than non-migrant households (Hanson and Woodruff, 2003). In general there is a widespread belief that remittances are mainly spent on consumption and non-productive investments. However, this is based on a weak empirical foundation. The studies intending to investigate remittance spending often have a deficient methodological design (de Haas, 2007). It is difficult to "earmark" migrant remittances to specific expenditures and determining the marginal impact of remittances on investments is challenging. Although there is an established belief that remittances rarely are used to establish new business enterprises, there are some studies suggesting otherwise. Massey and Parrado (1998) find a greater likelihood of households receiving large amounts of remittances to make productive investments in Mexico. Another study from the same country shows that 20 percent of total capital in urban micro-enterprises is financed by remittances (Woodruff and Zenteno, 2001, cited in World Bank, 2006). The empirical evidence regarding the impact of remittances on productive investments is inconclusive. However, it is at least likely to assume that a great share of the world's total remittances is spent on consumption and non-productive investments such as building houses and education.

2.6 Impacts

The impacts of migration and remittances on the country of origin may be many, and they are just as complex as the migration-phenomenon itself. It is not evident whether

the net impacts are negative or positive. The view on migration has changed throughout the last decades. In the 1950s and 1960s there was a generally optimistic view on migration and its impact on development. Worker's remittances were seen as an important and stable source of external development finance. In the 1970s and 1980s this view largely changed and a large-scale pessimism took over, focusing on the loss of human capital and the unproductive use of remittances in the developing countries. During the 1990s remittances were "rediscovered" and a more nuanced view on migration appeared (de Haas, 2007). Optimism has resurged, but the focus has changed to concentrate on why migration has contributed to development in some communities and not in others. The net impact is likely to be related to the characteristics of the countries and communities of origin. This section will give a brief overview over potential impacts of migration and remittances.

2.6.1 Low-skilled migration is usually beneficial

Low-skilled migration from developing countries is likely to have a positive impact on a country's poverty level, caused by the remittances the migrants sends back. Migrants with less education tend to send a higher percentage of their income back to their families compared to professionals (Keely, 2009). Low-skilled migrants often come from poorer families, and the remittances sent back from these migrants would thereby benefit those that need the money the most. The migration of uneducated people may also improve the labor market for other poor workers left behind in the sending-community (World Bank, 2006). If the unemployment rate is low, the departure of low-skilled migrants may give the companies a difficult time finding replacements, which is likely to pressure the salaries up in order to attract new people. On the other hand, unemployment rates are often high in developing countries and a worker migrating could possibly give another person a job opportunity.

2.6.2 High-skilled migration may cause a brain drain

The out-migration of educated people from a country may cause a "brain drain". Brain drain is maybe the most used argument against migration and refers to the loss of highly skilled and professional workers (Keely, 2009). Educated people are expected to be innovators and to provide new ideas to its country. When they emigrate it deprives the country in question from valuable human resources that could have stimulated to economic growth. The developing country also "loses" the money they have invested in

educating people. A brain drain may in particular have negative and severe impacts on the health sector, giving countries a shortage on qualified doctors and nurses (World Bank, 2006). The differences in high-skilled migration between countries are large, and it only represents a sever problem in a minority of countries (de Haas, 2007). Additionally, the negative effects of a brain drain may be outweighed by the fact that labor tends to be more productive in wealthy countries and thereby provides the migrant-families with a better opportunity of improving their livelihood. High-skilled migration may also result in a counter flow of remittances, investments, trade relations, skills, knowledge, innovations, attitudes and information in the long run (Ibid.). Several migrants may also return home, being able to use their newly acquired skills in the country of origin. This could result in a significant "brain gain" for the developing country. However, reality is that people from wealthier countries are more likely to return home than people from poorer countries. It may also be that the new skills of the migrants are not really of any use in their country of origin (Keely, 2009).

2.6.3 Remittances are likely to reduce poverty

Remittances often constitute a significant part of the total income of poor households and poor communities in the sending-country. The remittance flow goes directly to people that need it the most and the potential effect of the money is not being reduced by costly bureaucracies or corruption (Kapur, 2003), and has thereby an advantaged compared to ODA. However, the overall effect of remittances on poverty should not be overestimated. The total number of migrant's only equals 3 percent of the world's population, implying that the majority doesn't receive money from abroad. Additionally, it is not necessarily the world's poorest that receives remittances, as they often can not afford the initial migration costs. Lower middle-income countries[3] are the main beneficiaries, receiving nearly half of all remittances worldwide (Kapur and MacHale, 2003). Nevertheless, most studies seem to conclude that poverty has been reduced because of international remittances (de Haas, 2007). Adams and Page (2005) find, in a study from 71 countries, evidence indicating that a 10 percent increase in per capita official international remittances decreases the share of people living in poverty by 3.5 percent. Remittances thereby seem to give a good contribution in the combat against poverty.

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[3] Lower middle-income countries are those with a gross national income per capita between $736 and $2,935 (in 2003).

2.6.4 Evidence on the impact of remittances on inequality is inconclusive

Remittances are often thought to have a negative impact on income inequalities within a community, between regions or between nations. If the flow of money from abroad goes disproportionately to households that are better off, income inequalities increase. On the other hand if the poorer households receive a larger share of the remittances, inequality will decrease. Several studies have been done on the matter, but they suggest different remittance-effects, and no strong conclusion is found. For example, Mishra (2006) find inequality in Mexico to be increased by remittances at a national level, while De and Ratha (2005, cited in World Bank, 2006) don't find any impacts of remittances on inequality in Sri Lanka. The large differences in findings can be explained by variation in geographic areas and historic circumstances (World Bank, 2006). Factors like distance from high-income destination countries and the prevalence of social networks abroad are likely to influence the impact. Being close to high-income country reduces the migration costs and increases the poorest households ability to migrate. Social networks make it easier for poorer households to migrate and thereby increase the probability of the poorest households receiving a larger share of total remittances. It is therefore difficult to make a general conclusion about the relationship between remittances and inequality.

2.6.5 Remittances may have several indirect impacts

When a migrant takes of to live abroad the supply of labor of the household is reduced, however many migrant-households receive remittances, which compensates for the initial labor loss. This change in source of income represents an income effect. However, this effect should not be of any major concern. The substitution effect caused by the sending of remittances may be of greater concern. This effect may happen if the sending of remittances is conditioned on the level of total household income. If remittances only are sent if household income is low, the household members have a disincentive to work and the welfare gain from remittances will be reduced (World Bank, 2006). Analysts have argued that remittances create a dependency culture by making people reliant on handouts and making them more unwilling to work (Keely, 2009).

Another indirect effect of remittances is their ability to provide the household with working capital. Many poor households lack access to credit markets. Remittances may provide them with the necessary capital for productive investments that they were unable to get from credit institutions. A continuously flow of money from international migrants may also enable the household to obtain a loan, and thereby loosen credit constraints. Remittance receipts proven to be both stable and even increasing in the case of adverse shocks may be even more important in order to obtain credit from financial institutions, as it increase the lender's confidence that the money will be repaid.

Finally, remittances may have multiplier effects in the sense that total impact is a multiple of total remittances. The spending of remittances in the home community is likely to give positive indirect effects on non-migrant households. This is especially the case if local output is constrained by insufficient demand. A migrant-household spending remittances on consumption or on non-productive activities like home improvements will increase economic activity within the community and provide others with work. Adelman and Taylor (1992) estimated that each dollar in remittances from the United States to Mexico boosted Mexican GDP by $2.90. Remittances, if invested in the expansion of one sector in the home country, may increase the optimal size of other sectors as well (World Bank, 2006). This also represents a multiplier effect, as it is likely to result in increased incomes for other people working within these sectors as well.

2.6.6 Large inflows of remittances may result in the "Dutch disease"

Remittances is considered to be a relatively stable source of finance, even in times of financial crisis when is shows less variation than for example FDI (see figure 5). Total amount of remittances is also significantly higher than ODA. The inflow of foreign currency is a positive contribution to the balance of payments and many countries have become dependent on remittances to cover trade deficits and to maintain domestic stability (de Haas, 2007). However, large inflows of foreign currency may have negative consequences such as the "Dutch disease". Large foreign currency inflows may possibly cause an appreciation of the national currency, making exports more expensive and less competitive abroad. The economy may shift focus from

manufacturing and export to concentrate on local needs (such as building houses) instead (Keely, 2009). There is, however, little evidence for remittances causing such an effect. As for the impacts of remittances on national economic growth, the evidence is rather unclear (World Bank, 2006). According to Kapur (2003) the long-term remittance effect on economic development is poorly understood and there seems to be no conclusive evidence.

3. Migration and remittances in Mexico

3.1 Migration in Mexico

Every year a significant number of Mexicans choose to leave their country. In a country with 110 million inhabitants, almost 12 million were living in another country in 2010. To be exact, Mexico's total stock of emigrants in 2010 equaled 10.7% of its population (World Bank, 2011). It is not for no reason that Mexico was the world's top emigration country in 2010 measured in absolute number of migrants.

According to the World Bank (2011) the top five destinations for Mexican emigrants are the United States, Canada, Spain, Bolivia and Germany. However, there are significantly more Mexicans going to the US compared to any other country in the world. Based on data from the Mexican 2010 census, there has been estimated that the United States receives 89.4 per cent of all international migrants (INEGI, 2011b). The economic situation in the US, American migration policies and the relationship in general between the two countries is likely to have a considerable effect on migration outflows from Mexico.
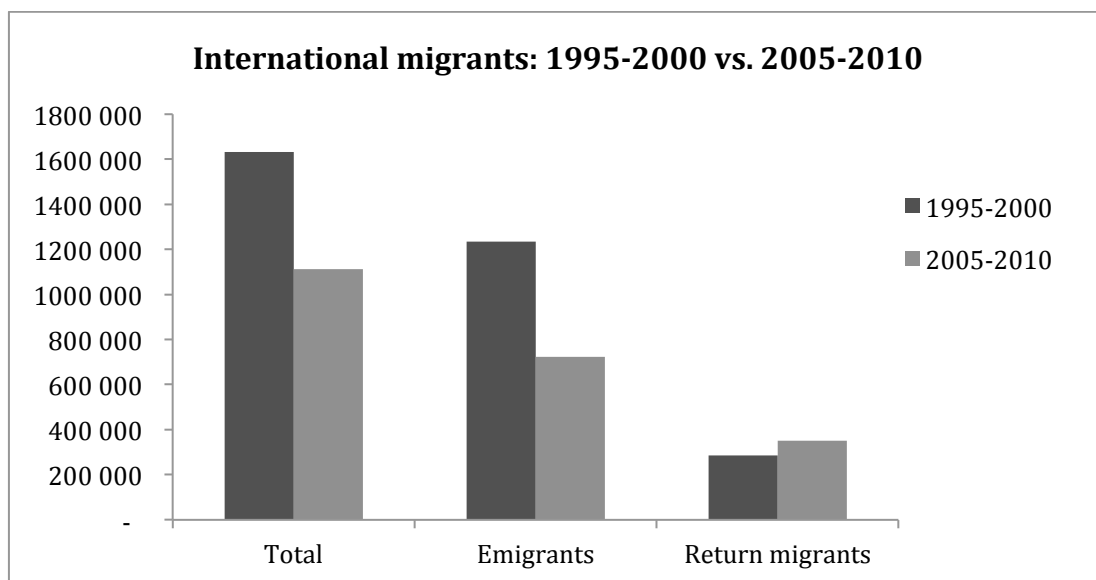
Figure 8 - *Number of international emigrants leaving Mexico from 1995-2000 compared to 2005-2010 (INEGI, 2011a).*

Comparing the data collected in the census from the year 2000 to the census in 2010, we observe a reduction in Mexican emigrants and an increase in migrants returning to

their home country. In the period 1995-2000, 1 633 052 Mexicans moved out of the country. Comparing this number to the five years previous to 2010, we observe a significant reduction of 31.9% (INEGI, 2010). The flow of return migrants on the other hand increased from 284 834 thousand to 350 719 thousands people. The decrease in emigration flows and the increase in return migration can probably be explained by greater difficulties in entering the US and the economic situation of the country, especially during the financial crisis (INEGI, 2010).

There are great regional differences in migration between the different states in Mexico. Figure 9 shows the number of international migrants in the period from 2005 to 2010 for each of Mexico's 31 states and the Federal District. The five top migration states in absolute terms are all situated in the central parts of the country. Guanajuato on top stacks out from the rest of the states with almost 120 000 inhabitants migrating internationally during the five-year period. Also in relative terms, Guanajuato is the state with most international emigrants; 2.1% of the total population moved abroad from 2005 to 2010. Zacatecas (2.05%), Michoacan (1.92%), Oaxaca (1.53%) and Hidalgo (1.50%) follow closely.
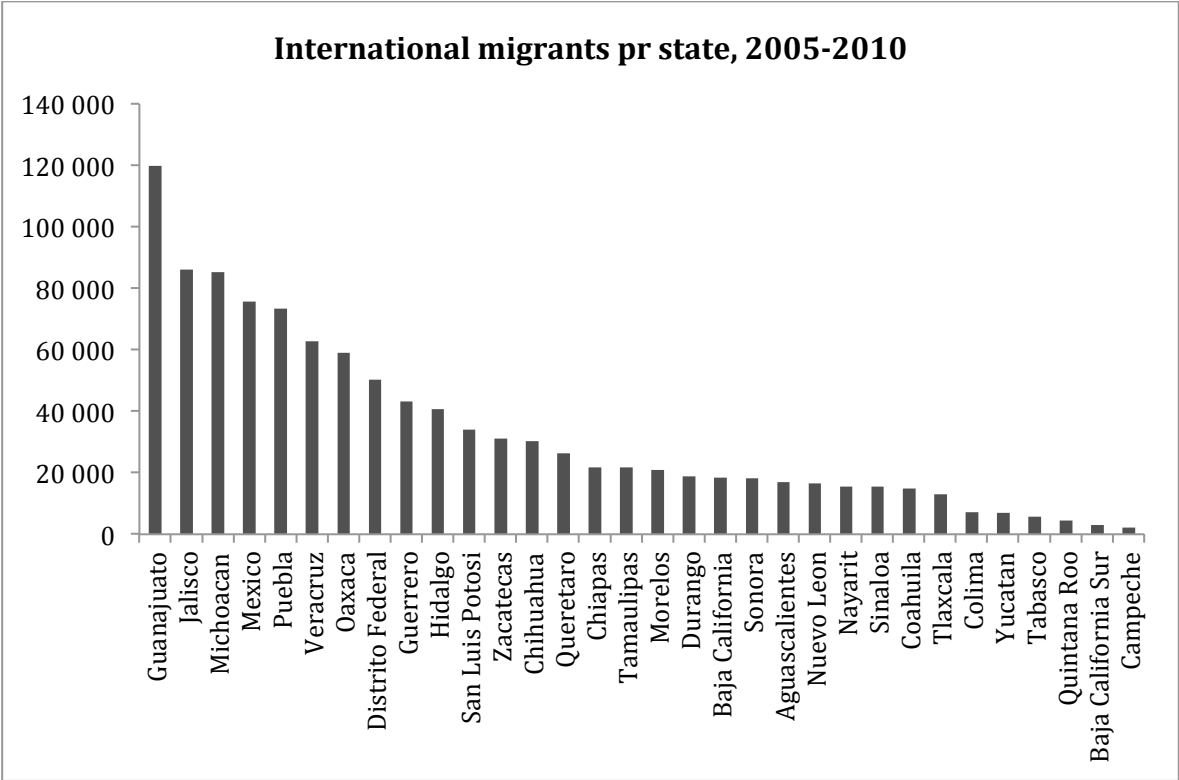
Figure 9 - *Number of emigrants from each state in the period 2005 to 2010 (INEGI, 2011b)*

The time that a Mexican migrant stays abroad varies. The majority (41%) stays in the destination country for one to three years before returning to Mexico. 34 percent stays less than one year, where the majority of these actually spends less than six months abroad. 15 percent stays three to five years. These numbers are based on the total return migrants from 2005 to 2010 and are estimated based on data from the census 2010 (INEGI, 2011b). The estimates suggest that temporary migrants don't spend a lot of time in the destination country and that 75 percent returns before 3 years have passed. It should be noted that permanent migrants are not taken into consideration in these estimates and there is probably a significant share of total migrants that remains in the receiving country.
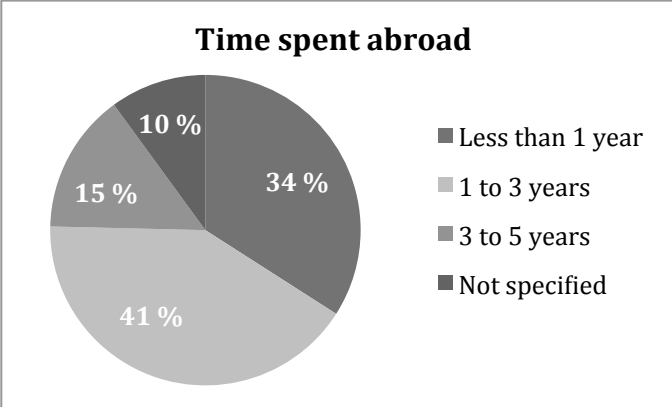
Figure 10 – Amount of time temporary migrants from Mexico spent in the destination country

3.2 Migration and Mexican women

Migration has, as mentioned previously, traditionally been considered a male activity; the men have left the country to work while the women have stayed behind caring for the family. Today women are almost as likely to migrate if considering all countries in the world. However, the situation in Mexico is different.

Estimates based on data from INEGI (see figure 11) clearly indicate that there is a much higher share of men that migrate internationally than women. From 2006 to 2008 on average of 77.5% of all emigrants were men (INGEGI, 2010). There is also a distinct difference in the two genders motives from migrating. The results from "Encuesta de Migración internacional de la Frontera Norte" in 2003-2004 (Inmujeres, 2007), show

that 72.3 percent of all Mexican male emigrants to the United States went primarily to search for work, while only 31.3 percent of the women stated this as their main reason for leaving Mexico. The majority of the women (36.9%) said that family reunification was their main motivation for going to the United States. Only 6% of the men emigrated to reunite with family members. These data suggest that the heads of households left behind in Mexico will tend to be female, as men constitute the largest share of emigration and a significant share of the women emigrate to reunite with their family members.
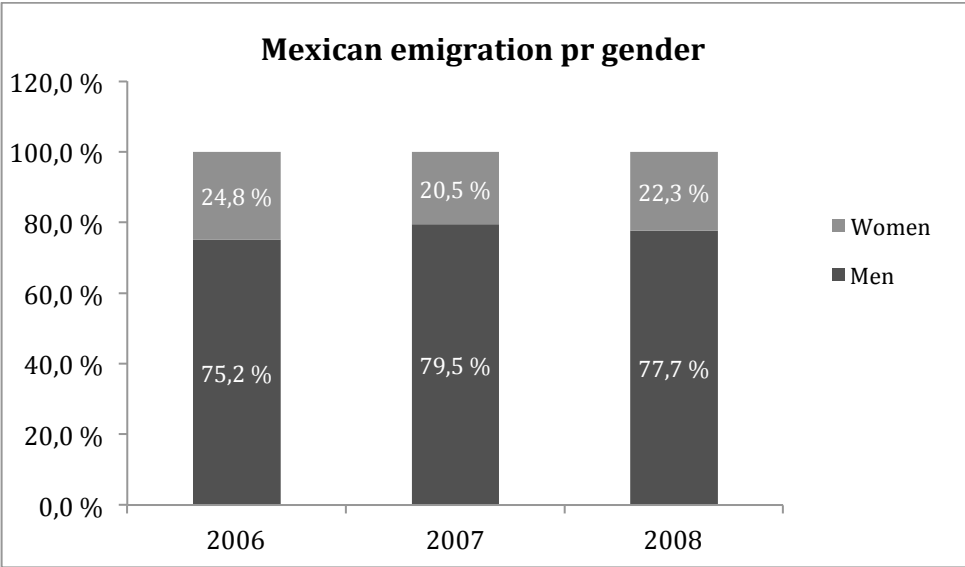
Figure 11 - The gender distribution of Mexican emigrants, 2006 to 2008 (INEGI, 2010)

3.3 Remittances in Mexico

Remittances are an important source of income for Mexico. In the years before the financial crisis, total inflows increased continuously up to US$27.2 billions in 2007. It decreased from 2008 to 2009 down to US$22.2 billion, most likely because of the economic situation, but was estimated by the World Bank (2011) to slightly increase again in 2010.

In absolute terms, remittances make up a considerable amount of money, however in terms of Mexico's total GDP remittances only equaled 2.26 percent[4] in 2010. That being said, remittances were higher than the inflow of both FDI and ODA in 2008. In 2008

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[4] Remittances as a share of GDP (2010): US$22.b billion/US$995.9 billion. GDP for 2010 is estimated by the IMF (2011) and is given in nominal terms. Note that remittances for 2010 are also an estimate.

Mexico received US$22.5 billion of FDI and US$0.1 billion of ODA, while remittances constituted a total of US$26.3 billion the same year. That makes remittances one of Mexico's most important sources of capital inflows.

Remittance inflows to Mexico, 2003 to 2010
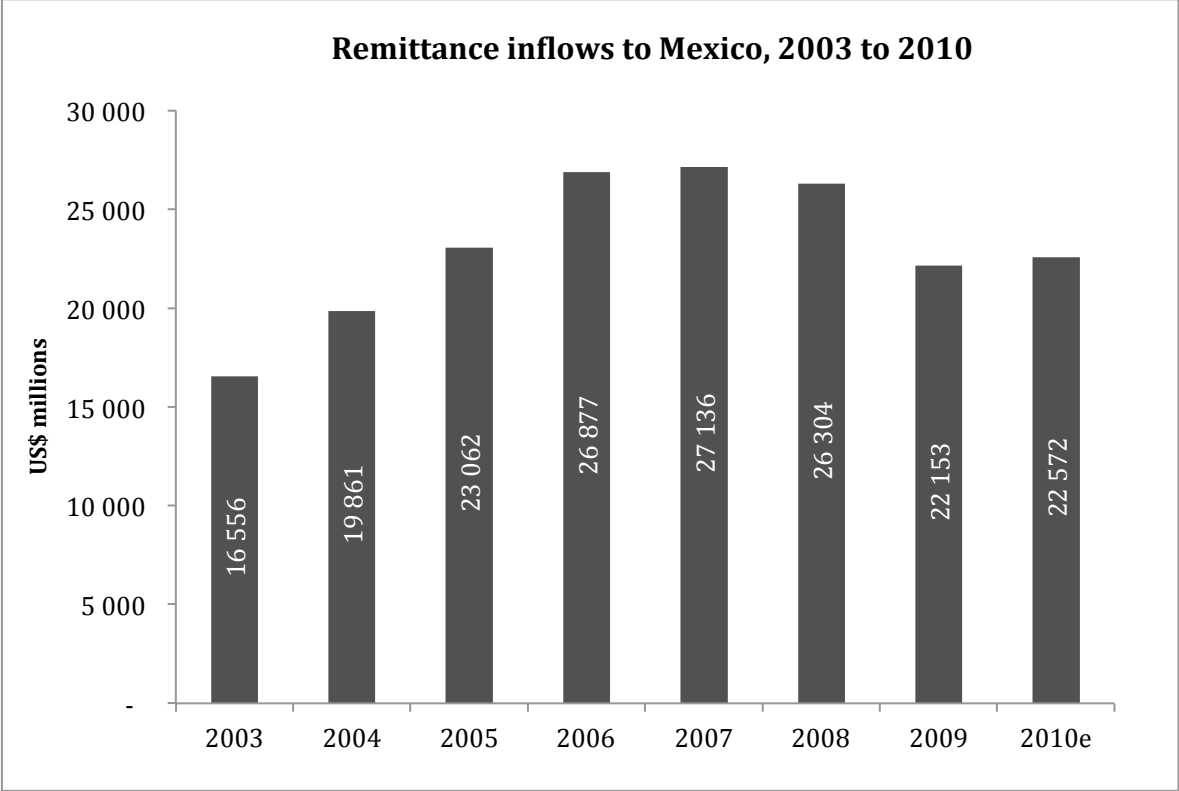
Figure 12 - Yearly inflow of remittances to Mexico from 2003 to 2010, in US$ million (World Bank, 2011a)

Just as with migration, the amount of remittances varies highly between the different states. In 2010 Michoacán received US$2,141 and was thereby ranked as the top remittance-receiving Mexican state, followed by Guerrero (US$1,978) and Mexico (US$1,753) (Banco de Mexico, 2011).

The amount of remittance received is positively related to the number of migrants send abroad in each state. However, Guerrero sending less than half the number of people abroad compared to Guanajuato from 2005 to 2010 received significantly more remittances in 2010. Jalisco on the other hand, sending the second largest number of migrants abroad in the period 2005-2010, received less remittances in 2010 than 9 other states. This suggests that there may be large differences in the amount of money that migrants send back to their relatives.
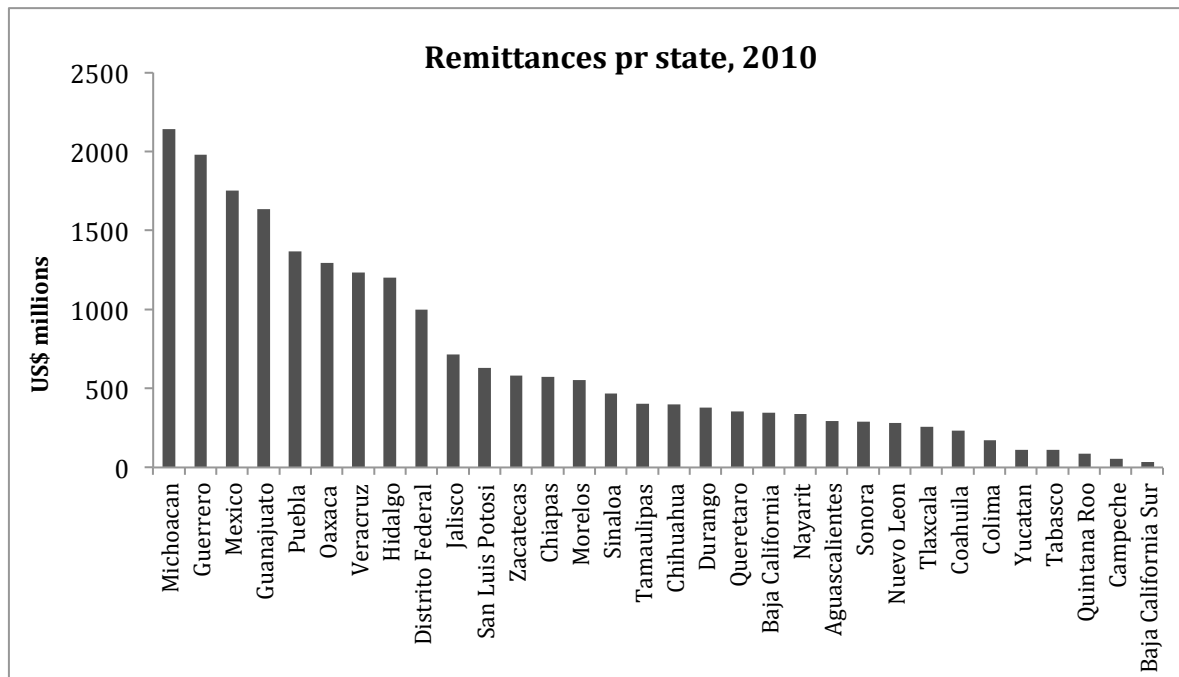
Figure 13 - Inflows of remittances to each of the 31 Mexican states and the Federal District in 2010 (Banco de Mexico, 2011)

3.4 Mexicans' remittance usage

In 2003, Inter-American Development Bank investigated remittance receivers in Mexico. They found evidence indicating that remittances primarily are used to cover current expenditures like the purchase of food, rent payment and public services. Only 1 percent is invested in business and 1 percent is used to purchase land (BID, 2003). In general Mexico is found to be less likely to save and invest in land, business and education, than other Latin American countries (BID, 2003). These results suggests that remittances are not likely to increase the amount of land a household owns, nor the amount of money invested in family businesses. The overall productivity of a household is thereby not very likely to increase just because they are receiving money from abroad.
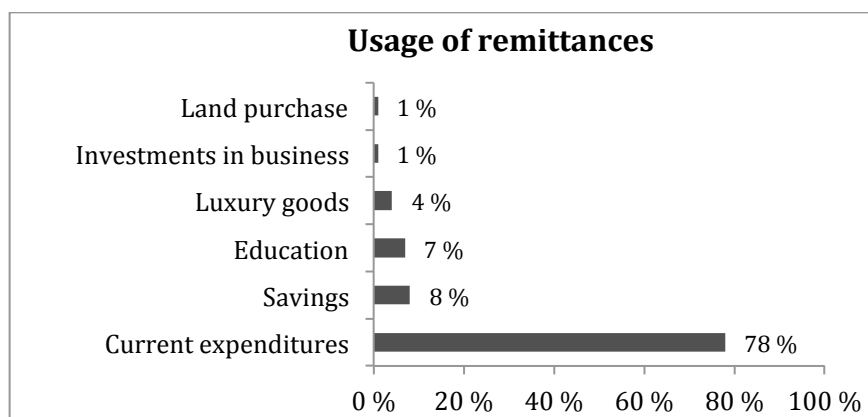
Figure 14 - The distributional usage of remittances in Mexico in 2003 (Inter-American development Bank, 2003).

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4. Theoretical focus and related literature

Migration and remittances are closely linked together. Migration is a necessary condition for households to receive remittances. However, it is not given that a household with a migrant-member will receive remittances. The probability of receiving remittances is thereby determined both by factors influencing the decision to migration, as well as the factors determining whether a migrant decides to remit or not. In this chapter Relevant theories and previous research related to the topic will be presented. It starts out by explaining theories of international migration before continuing to theories on what determines the migrants' decision to send remittances.

4.1 Theories of international migration

4.1.1 A brief overview

In the end of the nineteenth century Ravenstein (1885) presented the first theories on migration. He argued that migration is first and foremost driven by economic causes, but that distance and population densities also play an important role. Lewis (1954, cited in Massey et al., 1993) introduced migration theories based on a neoclassical view. These neoclassical theories focus on differentials in wage and employment between countries as the main factors explaining an individual's decision to migrate (Massey et al, 1993). They have been developed both within a macro-perspective and a micro-perspective. Neoclassical theory states that migration is caused by geographical differences in supply and demand (de Haas, 2007). People in labor-abundant countries will migrate to countries where there is a scarcity of labor, as scarcity implies better employment opportunities, as well as higher wages. Capital on the other hand will be transferred from capital-abundant economies to capital-scarce economies. This process will tend to result in converging wages and capital returns, and in a perfect neoclassical world the flows of migrants will continue until the factor prices are equalized across geographical areas[5] (Harris and Todaro, 1970). The neoclassical micro theory assumes that rational individuals decide to migrate if they expect a positive net (monetary) return from doing so; that is if they consider the benefits from migration to be larger than the migration costs (de Haas, 2007). It should be noted that in theory, free trade of goods would have the same factor equalizing impact as migration, and they could therefore be considered as substitutes for each other.

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[5] As predicted by international trade theory (the Hecksher Ohlin model)

In the 1970s *human capital theory models* appeared, addressing the question; why do some people in a society choose to migrate while others don't? The human capital models take into account the characteristics of the individuals and believe them to affect their potential wages and their possibility of finding a job abroad (Taylor and Martin, 2001). The expected net return of migration will thereby differ between inhabitants of the same society and may explain why some choose to migrate while others stay behind.

Both neoclassical and human capital migration models consider the migration decision to be made by individuals. The *New Economics of Migration* (NELM), first presented by Stark and Bloom in 1985, on the other hand, considers the migration decision to be made by larger units of related people, typically within a family or a household. Typical for the NELM is also its assumption that the decision is made not only with the purpose to maximize expected income, but also to loosen constraints caused by market failures (Massey et al., 1993). Examples of constraints would be absent or unaffordable public or private insurances, and lack of or restrained access to credit. This theory proposes that there are other factors apart from wage and employment differentials, and human capital, that may explain who migrates. In addition the *Relative deprivation theory,* which is derived from the NELM, suggests that migration, not only is a mean to increase the households absolute income, but also to increase income relative to other households in the community.

Finally, social networks abroad are likely to influence the decision to migrate. According to the *network theory* people are more likely to migrate if they have a social network in the receiving-country (Heer, 2002). These networks reduce the costs and risks of migrating, by for example facilitating accommodation and job-search (Vogler and Rotte, 2000), and thereby increasing the expected net returns to migration. The *cumulative causation theory* is similar to the network theory in the sense that it predicts that each additional migrant increases the probability of migration for persons from the same community (Massey, 1990). However this prediction is based on other factors than social networks, such as the cumulative effect of income distribution, land distribution and culture.

There are many theories of international migration explaining the migration decision at different levels. The predictions of one model do not rule out the predictions of the others. Migration is a complex phenomenon and the models should be seen as complements rater than substitutes for each other. For the purpose of this thesis, models taking a micro-perspective, considering the migration decision to be taken within the frames of a household will be explained in more depth. These theories are the new economics of migration, including the relative deprivation theory, the network theory and the cumulative causation theory. The migration hump as a phenomenon will then be explained, before relating the theories to four possible impact of land ownership on the migration decision.

4.1.2 New Economics of Migration (NELM)

The two main characteristics of the NELM are that the decision to migrate is made within the family or the household, and that the decision not only is made with the purpose to maximize expected income, but also as a risk diversification strategy (de Haas, 2007). In developed economies there are several mechanisms that reduce the risk to household income, such as private insurance markets and governmental programs. In developing economies these mechanisms are often lacking. Access to public or private insurance may be insufficient or absent, and so may also be the case regarding access to credit. Rural households are confronted with several potential risks, such as the risk of harvest failure, crop price fluctuations and unemployment. Additionally households may have a desire to make productive investments, but may not be able to due to restrained capital access. Often collaterals are required to be given a loan, thereby excluding the poorest households. The banking system may also have incomplete coverage, mainly serving the richer households.

According to the NELM, households choose to send a family member abroad to minimize risks and to loosen constraints related to different market failures (Massey et al., 1993). The household covers the initial migration costs, expecting the migrant to provide them with liquidity and insurance as soon as he/she has gotten well established in the receiving-country and has found a job. If the harvest were to fail, the crop prices were to drop at the time of sale or the household was to experience

unemployment, the migrant would be able to support them through remittances. Remittances may also provide them with sufficient liquidity and may enable a household to invest in productive assets. One necessary requirement for migration and remittances to work as insurance is that the local and the foreign economies are negatively correlated or uncorrelated. For example, an increase in the unemployment rate in the migrant-sending community should not affect the unemployment rate in the receiving community, if remittances were to function as insurance.

The NELM's migration motives may give households incentives to have more children, as each child would represent a potential source of remittances in the future. The human capital theory has also been incorporated into the NELM. The human capital of the migrant will influence the expected return of migration and thereby the expected income of the household. This will be taken into consideration when deciding on migration. However, the human capital of the other household members will also have an impact on the migration decision (Taylor and Martin, 2001). When a household member migrates the household looses labor force that could have been used in productive activities like cultivation and harvesting. The marginal cost of sending a member abroad will depend on the other family members ability to compensate for the labor loss. Additionally, the potential benefits from remittances partly depend on how the family spends the money. High-skilled households might be more likely to use the money on productive investments, potentially achieving an even higher income in the long run. This increases the benefits from migration, and higher accumulated human capital is thereby likely to increase the probability of sending a family member abroad.

Contrary to the neoclassical migration models, NELM suggests that an income differential, or an expected income differential, between the local and the foreign community, not necessarily is a condition for migration. The fact that there are other factors than expected income from migration affecting the migration decision implies that two households with the same expected income gains may have different likelihood of sending a member abroad. If one household is situated in a community with poor access to capital or high risks of crop failures, it will probably be more likely to send a migrant than another household, with the same expected income from migration, that lives in a community with no capital constraints and low risks of crop

failures. The NELM also imply that constraints in the credit and insurance market, although a motivation for migration, may impede migration as it removes a possible source to finance migration costs. An increase in rural income may thereby increase migration, as the extra income may provide the household with sufficient money to finance the migration costs of a family member (Taylor and Martin, 2001). The NELM concludes that income is not a homogenous good; the source of the income matter, as the income risk related to each source may be different. A diversification of income sources is likely to reduce the risk to household income. Households may therefore have an incentive to invest in or change to a different income source, like remittances, even though it's not expected to increase total household income.

4.1.3 The relative deprivation theory

New economic theorists argue that households do not send a family member abroad with the sole purpose of increasing absolute income, but that their main incentive may be to increase their income relative to other households in the community. This argument assumes that a household compares itself to a reference group, often the households within the same community. If the income gap between the household and the other members of the reference group is large, the migration decision may be motivated by the possibility of reducing their relative deprivation. A household's place in the income distribution is thereby likely to influence the migration decision. According to this theory, households in communities with larger income inequalities are more likely to migrate.

The relative deprivation theory implies that a household may have an incentive to send a family member abroad even though their absolute income and their expected income gain from migration remain unchanged. If the income of the households within the family's community increases, the income distribution changes and the relative income of the family will decrease even though their absolute income remains the same. They are thereby likely to feel relatively more deprived, possibly giving them an incentive of migration.

4.1.4 Network theory

People connect with other people and create social ties between themselves, either through family, friendships or through acquaintances. The strength and quality of the

tie may depend on the characteristics of the relationship. Family ties are often likely to be stronger than friendship, and friendship is often stronger than ties between acquaintances. The social ties often remain even if the geographical location of the people changes. When people migrate, they are likely to stay in touch with family and friends in the sending-community. As more people migrate from a community, migrant networks start to develop. Massey (1990) defines migrant networks as "sets of interpersonal ties that link migrants, former migrants, and nonmigrants in origin and destination areas by ties of kinship, friendship, and shared community origin". In communities, from which many people have migrated and where a large stock of foreign experience has accumulated, people should be more likely to migrate abroad (Massey and Garcia España, 1987).

Social migrant networks abroad lower the costs and risks of migration and facilitate the migration process of new migrants. Migrants already in the destination community may share their knowledge and experience regarding the migration process, they may help new migrants find employment and help with necessary procedures to enable the migrant to live abroad. Increased probability of getting a job abroad, as well as knowledge and help to get established, reduces the migration costs and risks significantly and increase the expected net gain from migration. Well-developed migrant networks are therefore likely to increase the probability of migration.

This theory reduces the importance of wage differentials and employment rates between sending and receiving communities. It also implies that socioeconomic factors not necessarily are the most important determinants of migration, and that the characteristics of the sending community may be equally or even more important. Social migrant networks facilitate the migration process no matter the characteristics of the individuals or the households. People who initially had incentives to migrate, but could not afford the migration costs may be able to migrate if they are a part of a migrant network. Governments may have difficulties controlling the migration flow motivated by social migrant networks once it has begun (Massey et al., 1993). The formation of networks is mainly out of their control and it is difficult to design policies that may change the migration trend.

The cumulative causation theory is to some extent similar to the network theory. Its main idea is that more migration tends to create more migration; the more people that has migrated from a community the more likely that even more people will migrate from that very same community (Massey and Zenteno, 1999). This is the same idea upon which the network theory is based, but the explanation for why this happens is different in the cumulative causation theory. Massey et al. (1993) state "causation is cumulative in that each act of migration alters the social context within each subsequent migration decisions are made, typically in ways that make additional movement more likely". There may be several factors causing this impact, for example: the distribution of income, the distribution of land, the organization of agriculture, culture, the regional distribution of human capital, the social meaning of work.

The distribution of income is one factor that may cause this cumulative migration effect. The relative deprivation theory derived from the NELM suggests that a household decides to migrate based on their relative income compared to the reference group. If one household decides to send a migrant abroad, their total income may increase if the migrant sends remittances. This of course assumes that the costs of migration are lower than the income gain from migration. As long as there is an income gain from migration the income distribution of the household's community will change and that may cause other households within the same community to feel relatively deprived. This may motivate new households to send a family member abroad to decrease the income gap, which again might give incentives for even more migration from the same community (Stark, Taylor, and Yitzhaki, 1986).

Migrant households receiving remittances have better access to capital and are more likely to invest this additional money in farmland. They are also less likely to use this land in a productive manner as long as foreign wage labor is better paid than local agrarian production. Land areas that are not being cultivated implies a lower demand for local labor and may force other households within the same community to send members abroad because of reduced employment opportunities. In that manner *the distribution of land* may enhance a cumulative causation effect on migration (Reichert 1981**).**

Another factor causing this effect is *the organization of agriculture*. Migrant households, as they have better access to capital, are more likely to invest in equipment and machinery to make the production more efficient. This implies using less labor-intensive methods and thereby reducing employment within the community (Massey et al. 1987, cited in Massey et al. 1993). Less job opportunities increase the pressure for outmigration.

Migration may have a long-term impact on *the culture* of the migrants as well as the culture in the sending community. Migrants may start adapting to the destination community and his/her values and habits may be shaped accordingly. Once a person has migrated, he/she therefore has an increased probability of migrating again (Massey, 1986). As more people in the same community migrate, the culture in the sending community may change. Migration becomes a natural part of the society and people are expected to migrate at some point to increase the welfare of the household. Those who do not want to migrate may be considered lazy and unwilling to increase their standard of living (Reichert, 1982), thereby making it difficult for community members chose not to migrate.

Human capital is one of the determinants of migration. The higher level of education, the higher is the expected return to migration. Higher expected return to migration gives incentives to migrate abroad, resulting in a depletion of human capital in the sending community. Reduced human capital levels in the local community may reduce the productivity, and with that the income levels is normally reduced as well (Greenwood, 1985; Greenwood, Hunt, and McDowell 1987). This gives incentive for further outmigration from the community in the attempt to improve their situation. This cumulative effect of migration assumes that more education leads to more migration. It may be argued that education is closely related to poverty and that low-skilled persons may be more likely to migrate than highly skilled persons, as they have higher economic incentives to do so. Whether high-skilled or low-skilled people are more inclined to migrate is likely to depend on the employment possibilities and the differences in demand for high- and low-skilled labor. If there are few employment opportunities for high-skilled workers in the home community, they will be more likely to migrate and vice versa.

4.1.6 The migration hump

Migrants may be motivated to migrate for many different reasons, both personal and economic, the prospects of earning more money is the dominating reason and income is likely to have some impact on most migration decisions (Bohning, 1994). The question is if the impact of income on migration decision is the same for every individual/household at every income level, or if the impact will vary between poor and rich households? Most emigrant countries are rarely among the world's poorest, and the emigrants within a country are mainly coming from low- to middle-income families (Bohning, 1994), suggesting a non-linear relationship between income and migration.

In 1990 the US Commission concluded, in a report for the study of international migration and cooperative economic, that in the short term, economic growth and development in Mexico are likely to increase migration to the United States. It is a paradox as they also conclude that the only way to reduce migration from Mexico in the long term, is to enhance their economic growth and development. Many researchers and policy makers have since that report acknowledged this as a given truth and it has become the conventional wisdom among them (Martin and Taylor, 1996). This relationship has later been given the name "the migration hump" because of its shape. The reasoning for this phenomenon is that a certain amount of money is required to cover the migration costs. The poorest families are lacking sufficient money, so even if they wanted to migrate they would not afford it. By increasing the households' income level, those who had incentives to migrate but not the ability, will now have the necessary means, and migration is likely to happen. As income continues to increase the households will eventually lose an economic incentive to migrate. So even though they now do have the means to cover the migration costs, they do no longer want to migrate.

The migration hump is supported by previously observed patterns. When Southern European countries like Spain and Italy industrialized and joined the European Union, it caused a pressure on out-migration (Martin et al, 1990 cited in Martin and Taylor, 1996). The same pattern was observed in South Korea when they in the 1980s experienced on of the world's fastest migration transition in the same period that they

had a high export-led economic growth (Martin and Taylor, 1996). Several studies also give support to the migration hump, although not all reach the same conclusion. Akerman (1976) finds evidence supporting the hypotheses in data for Sweden from 1851 to 1960. So do Vogler and Rotte as well in their study from year 2000. They find a significant relationship between GDP per capita and its squared value on migration from developing countries to Germany. A study that does not find support for the migration hump theory is Lucas' study from 2005. He finds a negative slope relating emigration and GDP per capita in least developed countries, but no evidence of a hump.

Most studies on the migration hump have been done at a macroeconomic level, comparing different countries over time. However, it is likely to assume that the same effect will be observed at a micro level as well considering income levels of the inhabitants of a country. The migration hump takes the shape of an inverted J and may be illustrated as shown in figure 15.
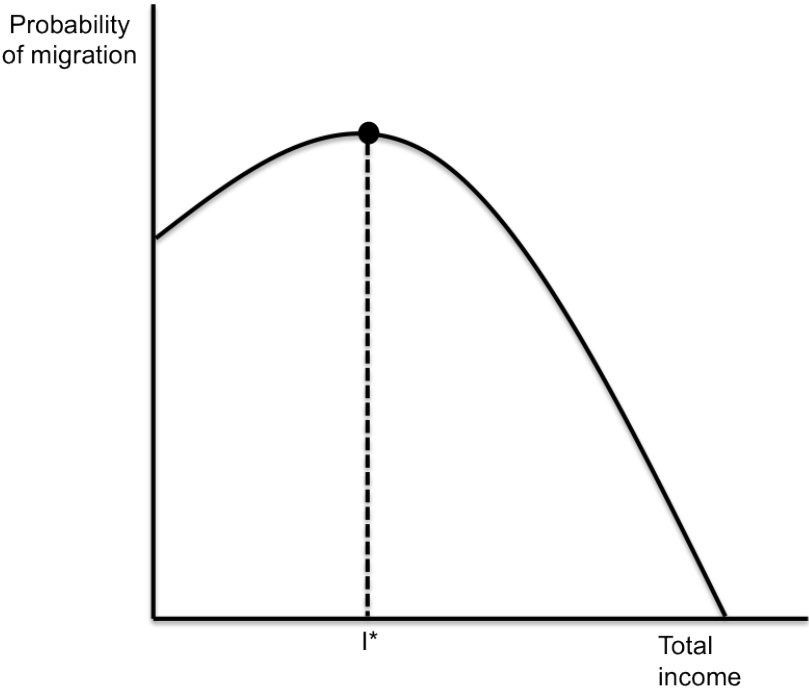
Figure 15 - The migration hump

When the household's income level is low, an increase in income will increase the probability of a family member migrating. Income will have a positive impact on the migration decision until an income level of I* is reached. After reaching that threshold, higher income levels will reduce the probability of migration. Economic development is likely to have the same hump-shaped impact on migration. Poorly developed

communities (poor access to education, health facilities, etc.) offer few opportunities to its inhabitants and give them less opportunities of succeeding abroad. For example is restricted access to education likely to restrict the inhabitants ability to generate income locally, e.g. they will be poorer, but low levels of education also reduce the expected income/gains from migration, both decreasing the probability of migration.

4.1.7 Land ownership

There may be several explanations for how ownership of land affects the migration decision. Studies find different impacts of land on migration; some find evidence for a negative relationship, while others find a positive. Some also argue that the relationship is non-monotonic.. Hoddinott (1994) finds a positive relationship indicating that a household with more landholdings is more likely to send a migrant abroad. Root and De Jong (1991) on the other hand estimate the relationship to be negative, implying that households with less land are more likely to migrate. In 2001 Winters, de Janvry and Sadoulet did a study in Mexico reaching the conclusion that there is a hump-shaped effect of landholdings on migration. Up until approximately 15 hectares, land ownership increase the probability of migration. For households owning more than 15 hectares, land ownership has a negative effect on migration. VanWey (2005) finds evidence for the opposite effect of landholdings. She finds a negative effect of landholdings on international migration with a positive significant effect of the squared term. Evidence for this is found both in Mexico and in Thailand.

The impact of land ownership may be explained in four different ways depending on how land is interpreted: land as *wealth*, as *employment*, as an *investment opportunity* or as a source of *relative deprivation*.
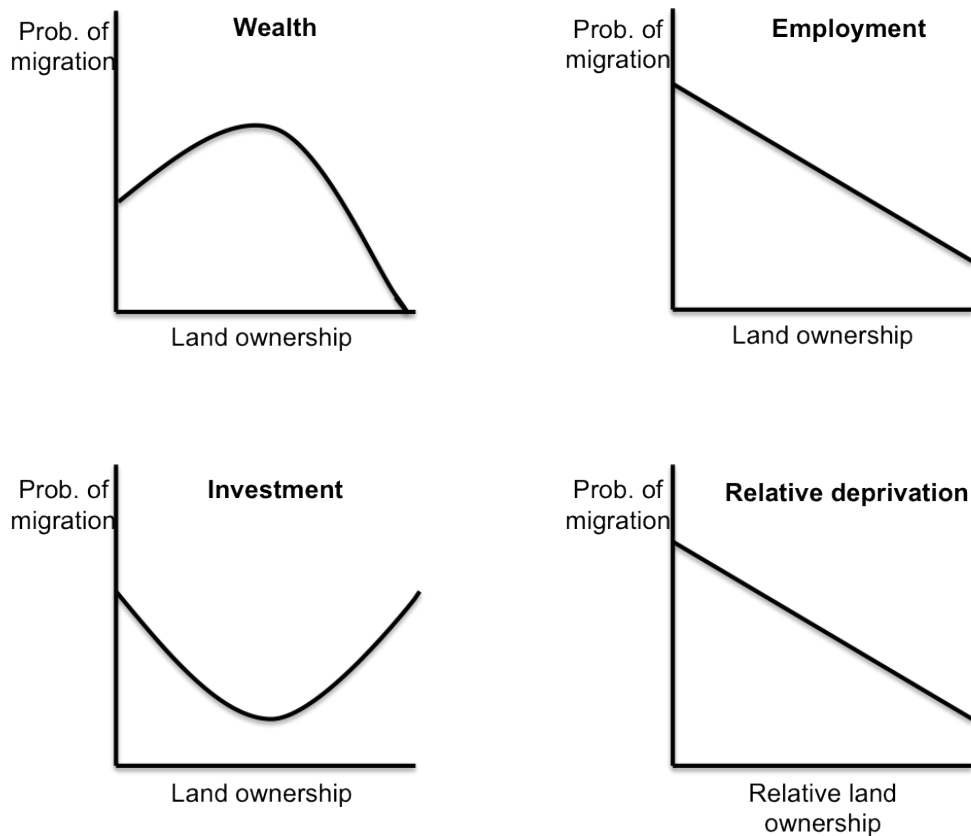
Figure 16 - Relationship between landownership and the probability of migration
Note: The relative deprivation graph refers to the household's relative amount of land property compared to other households in the reference group. A household having relatively little land has a higher probability of migrating than households owning larger areas of land.

Purchasing land requires money and it is likely to assume that the amount of land owned will be closely related to the income level of a household. Land is considered an asset that a household can sell if they would be in need of money. The impact of land ownership on migration may therefore be the same as the impact of other *wealth* variables, such as income. Households with more wealth are better able to pay the migration costs and finance international migration, leading to a positive effect of land on migration. Assuming land to be a wealth indicator implies that we also may observe a migration hump, as found by Winters, de Janvry and Sadoulet (2001).

Apart from being a wealth indicator, land is closely related to *employment*. Land is often used for agriculture, at least in rural areas, and cultivation requires labor. Rural farms in developing countries often cannot afford to invest in machinery and equipment, and most of the work is done manually. The larger the land areas, the more labor is required. In that sense land provides a livelihood for household members in the home community (VanWey, 2005). Considering land as a source of employment, land

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ownership is likely to have a negative impact on migration, as found in the study of Root and De Jong (1991).

Land can also be seen as an *investment opportunity*. The New Economics of Migration (NELM) argues that migration is initiated to overcome constraints resulting from market failure in the home community. One of these market failures may be restrictions or absence of access to credits. Massey and Espinosa (1997) argue that migration is motivated by the possibility of getting capital to purchase land when credits are unavailable. This will first and foremost apply to those households without or with low levels of land. As the amount of land owned increase, the need for capital to purchase land decrease and we should observe a negative relationship between landholdings and migration. Land also represents an opportunity for productive investments at a household-level (VanWey, 2005). Irrigating land, purchasing fertilizers and herbicides, and investing in high-yielding varieties of crops is likely to increase a household's productivity and eventually also its total income. However this requires capital, which is not always easily obtained in rural areas of developing countries. Landholders may therefore be encouraged to send a family member abroad to be able to make such productive investments and increase their total welfare, thereby creating a positive relationship between landholdings and migration. These sort of productive investments exhibit economies of scale and larger pieces of land and are expected to yield higher returns on investment. This positive effect is therefore only likely to be observed for households with larger landholdings (VanWey, 2005). This predicts a curvilinear relationship between land ownership and migration, where households with low and high levels of landholdings have a higher probability of migration, while households with medium levels are more likely to remain in their home community.

The impact of land ownership on migration may also be explained by the *relative deprivation* theory. Households are likely to compare themselves and their welfare with other households in their community. As previously mentioned large inequality in income levels have a positive impact on the migration decision. This pattern is also likely to be observed for inequalities in landholdings. Households may be motivated to send a family member abroad if they feel a relative deprivation in land ownership.

Migration would be driven by the need for capital to enable them to purchase more land to reduce their relative deprivation. This predicts a positive impact of relative deprivation in landholdings on the migration decision. Households with less land would be more inclined to migrate than land-abundant households. Durand and Massey (1992) argue that large land inequalities in a community yield a stream of landless migrants.

Social networks abroad though, may change the predicted effect of landholdings. When a community has sent many migrants abroad and a network is well established, both the cost and risk of migration is decreased. This makes it easier for the community's household to send new migrants and the impact of the amount of landholdings may be reduced.

4.2 Theories of remittances

Factors determining migration indirectly affects a households probability of receiving remittances. However, migration theories only explain one part of the picture. New Economics of Migration establishes a clear link between migration and the migrants' motivations to remit. Families decide to send a family member abroad based on expected net income gains and a risk diversification strategy. They initially pay for the migration costs of the migrant, expecting the migrant to send remittances back home once he/she is well established abroad. This creates an implicit contract between the migrant and its household, which at the time of making the migration decision is expected to be fulfilled. However, once the migration process has happened and the migrant is established abroad, it is not given that the implicit contract will be kept. This is the point where migration theories come to short; why do some migrants chose to remit, while others do not?

Remittances are determined both by the migrant's ability to remit and their willingness or motivation to do so (OECD, 2006). The migrant's income and savings determine his or hers ability to send remittances. Other factors that are likely to influence the decision to remit money are the duration of migration, the family situation and network effects. Remittances are likely to vary depending on how long the migrant is planning on staying; are they migrating temporarily or permanently? Their family

situation is also likely to have an effect; is the migrant single or married, and does he/she have children or not? Finally the migrant's network, that is whether he/she is migrating alone or with his/her family, as well as attachments to those left behind, will most likely have an impact on remittances (OECD, 2006).

The remittance phenomenon and the motivations for remitting money are complex. There is no single theory on remittances that fully explains why some migrants send remittances while others do not. Several models intend to explain the determinants of remittances, among them the altruistic model, the insurance model, pure self-interest, the loan agreement model, and the migrant's saving target. They should not be considered as mutually exclusive, each model enlightens different elements of the remittance phenomenon.

4.2.1 The altruistic model

One of the main motives for remitting money is altruism (de Haas, 2007). The altruistic model is based on the assumption that migrants are concerned about relatives left in the home country. They want the best for their family, and their welfare is their main motivation for sending remittances. Total expected utility of the altruistic migrant is determined by both his own utility of consumption and the households total utility. The amount of money remitted by an altruistic migrant will depend on both his own income and the income of the household. Remittances are likely to increase when the migrant's income increases (Agarwal and Horowitz, 2002). The total welfare is expected to be higher if the migrant and the household each receive a share of the wage increase. On the other hand, if the income of the household increases, the altruistic migrant is likely to send less remittance to the home community, as the marginal utility may be higher if spent by the migrant in the destination country. Considering an altruistic model, it is also likely that remittances decrease over time, as relationships to the family may be gradually weaker (OECD, 2006).

Lucas and Stark (1985) find empirical evidence from Botswana supporting the hypothesis that an increase in migrants' income increases the amount of money remitted to their families. A migrant with low income, experiencing a 1% wage increase will remit 0.25% more money, while migrants with high income will remit 0.75% more

resulting from an increase in wages of 1%, all other factors kept fixed. However, they do not find sufficient evidence for altruism to explain the motivations to remit.

4.2.2 The Insurance model

Another possible motivation to remit money is the insurance the household may provide the migrant (Agarwal and Horowitz, 2002). As established by the NELM it exists an implicit contract between household and migrant members; the household finances the migration costs of the migrant, and the migrant sends remittances home to increase the total welfare of the family. The household may also function as an insurance for the migrant, and the migrant may count on their support if something unexpected were to happen, e.g. in case of health problems or unemployment. He/she will also have the possibility of returning back home if it were to no work out abroad. However, the implicit contract may be broken if the migrant choses not to send remittances, and he is thereby likely to loose this insurance. When deciding whether or not to send remittances and how much to send, the migrant considers his expected utility in each of the scenarios. A very risk-averse migrant is more likely to send remittances than a risk-willing migrant. Factors like employment security, income level and social network will influence the migrant's risk perception and implicitly the amount of money remitted. If the probability of loosing the job is small, the income is relatively high and there are friends or family living in the same destination community, the amount of money remitted is likely to be low. If the future situation in the destination country is uncertain, the remittances will tend to be higher.

4.2.3 Self-interest

The insurance model is based on a migrant's self-interest and the migrant's maximum expected utility is considered the main determinant of how much remittances he will send. Apart from the insurance factor, a migrant's self-interest in remitting money may be motivated by three factors. The first factor is the *aspiration to inherit*. Assuming that inheritance is conditioned on behavior, the migrant may be motivated to remit money to inherit the assets of its family, in particular its parents, at a later time (Lucas and Stark, 1985). The second self-interest factor is *ownership of assets*. Migrants may choose to send remittances to ensure that the family members left behind are taking care of their assets, assuming that the migrant will return at some point (OECD, 2006). Based on these two factors we can establish the hypothesis that wealthy households

are likely to receive more remittances than less wealthy households. Hoddinott (1994) finds support for this hypothesis in his empirical research from Kenya, and the same do Lucas and Stark (1985) in their study of Botswana. However, it is difficult to determine what exactly is motivating this behavior: to ensure inheritance or to take care of the assets.

The third factor related to self-interest is a wish to enhance prestige and political influence and to invest in social assets like the relationships with family and friends in the home community. Migrants may obtain that by sending remittances and investing in real estate, financial assets or public assets in home areas (Lucas and Stark, 1985; OECD, 2006). Glytsos (1997) found empirical evidence supporting this hypothesis. He investigated remittance behavior comparing Greek migrants in Germany, where migrants are more likely to stay temporarily before returning to Greece, and Greek migrants in Australia and the US, where they are more likely to settle down permanently. Per migrant remittance flows were much higher for migrants in Germany than those in the US or Australia. Lowell and de la Garza (2000) find similar evidence by investigating immigrants in the US; a 1% increase in time spent in the US decrease the probability of an immigrant sending remittances home by 2%.

4.2.4 The loan agreement model

The loan agreement model is based on an assumption that there are several loans transferred between the household and the migrant, and back (OECD, 2006). The model assumes three periods. In the first period remittances are considered to be a repayment of an informal or implicit loan that the household gave to the migrants as an investment in their education and migration costs. In the second period, when the "loan" is considered being repaid, the migrants are giving loans themselves to finance the education of younger family members. The aggregated amount of remittances received by the household is expected to diminish, as not all migrants are expected to give such a loan. In the third period, the migrant is likely to send more remittances to the home community and invest more capital, preparing for his own return and retirement in the home country. The amount of money remitted is, according to this theory, likely to vary depending on how long the migrant has stayed abroad.

4.2.5 The migrant's saving target

A migrant's goal by migrating may be to return home with a certain amount of money (OECD, 2006). The flow of remittances from the migrant to the household of origin may be determined in a bargaining process between the two parties. The family is considered the demand side by the fact that they are asking for remittances to be sent, while the migrant is considered the supply side as he is the one making the remittance flow possible. In order to fulfill his goal and return to the home country as soon as possible he has an incentive to minimize his consumption and the money he remits to the family. On the other hand, the family's motivation for sending a member abroad was to increase its income compared to the income of its neighbors. The amount actually remitted will depend on the migrant's income, the per capita income in the home country and the bargaining power of the two parties. Glytsos (1988, 2002) found that per capita income in the country of origin had a positive effect on the amount of remittances received.

5. Analysis

This section will explain the details and the specifications of the analysis. The first part establishes several hypotheses regarding expected results from the analysis. Then the dataset will be briefly presented, before describing the different variables. Finally follows a description of how the research question will be answered and the methodology used in the analysis.

5.1 Hypothesis

Based on the theories of migration and remittances, together with current migration and remittance trends, several hypotheses regarding the determinants of remittances in Mexico may be drawn.

- Female-headed households are more likely to receive remittances, as there is a higher percent of Mexican men migrating than women. Additionally, when women migrate they are often motivated by family reunification, reducing the likeliness of there being a household left in the sending community to send remittances to.

- The probability of receiving remittances increases with the age of the head of household, as it is typically the younger population that migrates.

- The relationship between education and remittances is not given; higher educational levels may both decrease the probability of receiving remittances and increase it. On one hand, education is often positively correlated with income, and higher levels of income are likely to reduce the incentives of migration. On the other hand, assuming that the educational level of the head of household is positively related to the members' education, education would give a higher expected wage in the destination country and the net gain from migration would be higher. High-skilled households would thereby be more likely to send a member abroad.

- The number of children in the household increases the probability of receiving remittances, as well as the amount of remittances received. Migrants with

children left in the home country may feel more obligated to send money back home. Additionally, a higher number of children imply more household members to provide for. At the same time, children who are below the working-age, do not contribute with any income to the household.

- Households with a medium level of income are more likely to receive remittances. The poorest households do not have means to finance the migration costs, while the richer households do not have the economic incentives to do so. The relationship between income and the amount of remittances received depends on the migrants motive for remitting money. Altruistic motives imply that less money is sent when the household's income increases.

- The amount of land property may have several impacts on the probability of receiving remittances. If land ownership is considered as an indicator of wealth, it will have the same impact as household-income and take a hump-shaped form. Land ownership, as it represents opportunities of employment, may have a negative effect on the probability of receiving remittances, as it decreases the probability of migration. Relative deprivation is likely to have the same impact; households with less land may feel relatively deprived compared to other households, and thereby have an incentive to send a migrant abroad to raise capital for investment through remittances. The relationship between the probability of receiving remittances and the amount of land owned by the household may also take a u-shaped form, as land represents an investment opportunity.

- The impact of land ownership on the amount of remittances received is also uncertain. One hypothesis is that land ownership has the same impact as income and it should thereby depend on the migrant's incentive to remit. Altruistic migrants will remit less when the household owns more land, while a migrant remitting money based on self-interest will send more money if the household owns a lot of land. This may also be the case if the migrant wants to make sure that the family members back home are taking care of the areas of land, and

thereby remit money to cover maintenance costs. Considering land as an investment opportunity, the relationship between amount of land owned and the size of the remittances is likely to be negative, as households with less land probably will have a higher incentive to buy more land than those that already have a lot. This is particularly likely to be the case if the household feels relatively deprived of land.

- Social networks increase a household's probability of sending a member abroad and thereby also the probability of receiving remittances.

- The relationship between community development levels and probability of receiving remittances is hump-shaped. The probability of receiving remittances is higher for households in poorly developed communities, as low levels of development may give an incentive for migration. However, inhabitants of poorly developed communities may often encounter migration barriers, as lack of access toeducation may make the inhabitants less able to find work abroad and the wage prospects are lower. Poorly developed towns are also often relatively isolated from the rest of the country. This increases the migration costs and reduces the probability of migration.

- Large income inequalities within the household's community increase the probability of receiving remittances, as poorer household may feel relatively deprived and want to reduce the income gap. Larger income inequalities are also likely to increase the amount of remittances received in order to diminish their perception of relative deprivation.

5.2 The dataset

In 2009, the Food and Agriculture Organization of the United Nations (FAO) conducted a comprehensive survey, interviewing households in rural parts of Mexico. The dataset used for this analysis is mainly based on these data. It contains 25 664 observations, where each observation relates to a household. It is a cross sectional dataset and refers to the period April 2008 to March 2009. All household variables are taken from FAO's dataset. Additionally, some variables characterizing the municipalities in which each

household is situated have been added. These data are obtained from CONAPO and CONEVAL. This section describes the specifications of the variables in the dataset.

5.2.1 Household variables

FAO's dataset contains information about a household's international remittances, gender and educational level of the household-head, ethnicity, number of children, income, land ownership and regional localization. It is the head of the household that has responded to the survey. However, if the household-head was absent at the time of the interview, another household member responded instead. This may bias the gender, education and indigenous variables as they refer to the person responding to the questionnaire and thereby not necessarily the head of the household.

5.2.1.1 Remittances and household characteristics

International remittances are in the questionnaire defined as money received by the household from a family member living outside of Mexico. The amount is given in Mexican pesos. The number of children in a household refers to persons under 14 years old that are economically dependent on the head of household. The head of household is considered being of indigenous decedents if he/she speaks an indigenous language. The variable might be biased if the respondents are able to speak an indigenous language even though they are not of indigenous decedents. However, this is unlikely to be the case for most households. The head of household's education is specified both on educational level and number of years. In Mexico primary school lasts for 6 years, secondary school for 3 years and high school also 3 years. After high school Mexicans can choose to take a technical degree that takes 2 years or a university degree that lasts for 4 to 5 years. Finally they may take a master's degree of 2 years and a doctoral degree of 3 to 5 years.

5.2.1.2 Income

Total income is calculated based on income from the household's productive activity, governmental support and other income. Productive activity relates to agriculture, livestock, aquaculture, fishery, forestry and other non-agricultural activities. Income from these activities includes income from sales in the domestic market, in the foreign market and the household's auto consumption. Governmental support includes all

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governmental programs that imply a direct monetary transfer to the household[6]. Other income refers to money sent from family members within the country, household members' employment outside of the household's production unit, income from renting out land and/or goods, and other income that is not covered by any of the previous categories.

5.2.1.3 Land ownership

Land ownership refers to the amount of land owned by the household and is given in hectares. Seven types of land are specified: irrigated land, rain-fed land, residual moisture land, rangeland, greenhouse, forest and other land. Irrigated land is land artificially supplied with water. Rain-fed land refers to agricultural land that is not artificially irrigated, while residual moisture land is characterized by land containing underground water. All of these three types of land just mentioned are used for agriculture. A household may also own rangeland, which is land suitable for livestock to wander and graze on. Finally they may own land areas dedicated to greenhouse production or areas covered with forest. For the purpose of this analysis irrigated, rain-fed and residual moisture land have been added to one single variable defined as agricultural land, as they are used for the same productive activity.

5.2.1.4 Region

Region refers to the part of the country where the household is situated. The 31 states of Mexico have been divided into nine different regions; Northeast, Central North, Northwest, West, Center, Bajío, The Gulf, Southeast and Yucatán.

5.2.2 Community variables

In addition to household variables, three variables characterizing the communities where the households are situated are included in the dataset. These variables are the Migration intensity index, the Marginalization index and the GINI coefficient. They are all determined at the level of municipality. Each of the indices is matched with the observations from FAO's dataset, depending on the municipality of where the household is situated. 1 816 municipalities are represented in the dataset.

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[6] Governmental programs giving a direct monetary transfer to the households are the following: "PROCAMPO", "Atención a problemas estructurales", "Uso sustentable de recursos naturales para la producción", "Oportunidades", "70 anos y más", "PROARBOL" and other programs not specified in the questionnaire.

5.2.2.1 Migration Intensity Index

The "Consejo Nacional de la Población"[7] (CONAPO) has calculated a Migration Intensity Index for each municipality in Mexico. It only considers migration to the United States. The most recent MII is from 2000. The calculation of the index is based on the Mexican Census from 2000 and is constructed by three variables. The first factor considered is the percentage of households in the municipality where at least one member declares to be receiving remittances from abroad. The second is the percentage of households where one or more members left Mexico to live in the United States between 1995 and 2000. Finally, it takes into consideration the percentage of households where one or more members left Mexico to live in the United States some time between 1995 to 2000, but at the moment of being surveyed had returned and was currently living in Mexico again (CONAPO, 2011a). The index goes from -0.87955 to 6.39536.

The higher value of the index, the higher is the migration intensity. The migration intensity index is used in the analysis as a proxy for social networks abroad. It only considers migration to the United States, but as most Mexican migrants move to the US it should be a fairly good measure of Mexican migration patterns in general. It is not given that migrants from the same community migrate to the same place within the destination country and develops a social network, but the likeliness of a household having a social migration network increases with the number of migrants from the same municipality.

5.2.2.2 Marginalization Index (MI)

CONAPO has also calculated the Marginalization Index for each of the Mexican municipalities. The most recent is from 2005. The MI indicates the level of development in each community. It is based on four main variables; lack of access to education, residency in poor housing, perception of insufficient monetary income and shortages related to living in small towns (CONAPO, 2011b). Lack of education is determined by literacy rates and the percentage of people with incomplete primary education in the population. Poor housing is measured by the percentage of houses within the municipality with deficiencies like no access to electricity and sanitary service. Insufficient income is determined by the percent of the working population

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[7] "The National Population Council"

receiving less than two minimum salaries. Finally, the population distribution factor relates to the percentage of the people living in communities with less than 5000 inhabitants.

The higher the value of the index, the more marginalized is the municipality. In 2005, the least marginalized municipality in Mexico had a MI value of -2.366, while the most marginalized municipality had a MI value of 4.498. The MI indicates how well developed a community is; the lower the marginalization degree is the more developed is the community and the better opportunities do the inhabitants have to make a good life.

5.2.2.3 Gini coefficient

The Gini coefficient is a commonly used measure of income inequality. "Consejo Nacional de Evaluación de la Política de Desarrollo Social"[8] (CONEVAL) has calculated the Gini coefficient for each of the Mexican municipalities (CONEVAL, 2011). The most recent calculations are from 2005. The Gini coefficient is derived from the Lorenz curve and takes a value between 0 and 1. The closer the coefficient is to 1, the higher are the inequalities in income (Todaro and Smith, 2006).

5.2.3 Final adjustments of the dataset

58 observations have been excluded from the initial dataset in the one used for the analysis. A household has been excluded if the age of the household head is below 18, if the household has more than 21 household members, if it has monthly incomes above two million pesos and if it owns very large areas of land[9] compared to other households rich on land. The outliers have been determined based on the variable values of the other households. Households with young survey respondents have been excluded as it is likely that they were not the household heads, but where answering on behalf of the head of the household. Some of the observations had also stated an age of 0. Observations have been excluded based on the other three criteria in an attempt to avoid using observations that resemble a business more than a household. Taking

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[8] "National council for Evaluation of Social Development Policies"
[9] Irrigated land above 1000 hectares (ha) (1 excluded), rain-fed land above 800 ha (one excluded), residual moisture land above 400 ha (one excluded), rangeland above 8 ha (2 excluded), greenhouse above 100 hectares (2 excluded)

these adjustments into account the dataset used for the analysis consists of 25 606 households.

5.3 Descriptive statistics

From April 2008 to March 2009, of the 25 605 households in the dataset, 2 110 of them received some amount of remittances from abroad. This equals 8.2 percent. On average the remittance-receiving households received 17 903 pesos, which constitutes 17.7 percent of their average total income. This section contains statistics for each of the independent variables, comparing the characteristics of the households receiving remittances with those households who do not. The distribution of the two groups should be fairly identical if the variable in question does not have any impact on remittances.

5.3.1 Gender

There are significantly more households in the sample with a male head of household than a female. This is as expected as men traditionally are considered the head of the family. If comparing the households receiving remittances with those who do not, the share of women is 5.4 percent higher among households that receive money from abroad. This suggests that female-headed households are more likely to receive remittances. However, they receive on average less money than men. Average yearly remittances equaled 16 543 pesos for women, while men on average received 18 438 pesos. Men thereby received on average 11.5% more.
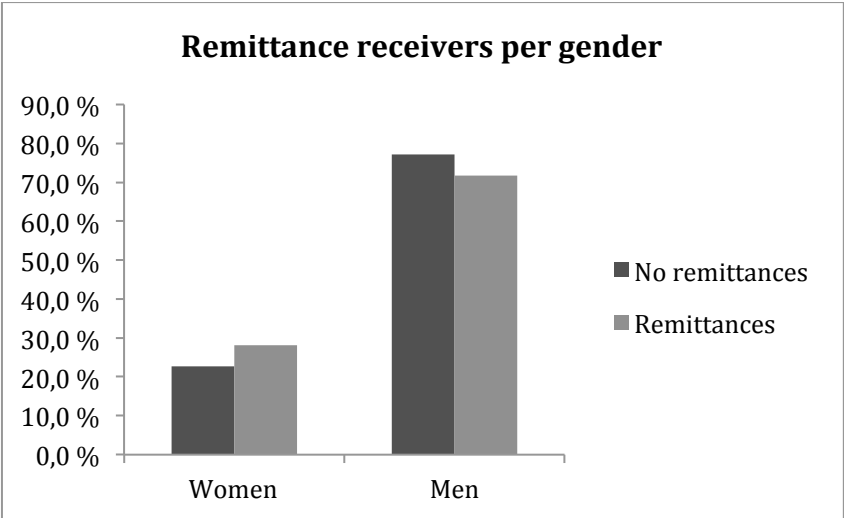
Figure 17: Percentage distribution of remittance-receiving households and non-receiving households for both men and women.

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5.3.2 Age

The average age of the head of household in the sample is 54.4 years and the majority of them (67%) are between 40 and 70 years old. Figure 18 shows the age distribution of remittance-receiving households compared to non-receiving households. There is a tendency of households receiving money from abroad having an older head of household. This indicates that the probability of receiving remittances increases with age. The amount of remittances on the other hand, has a tendency to decline, as the head of household gets older. A person between 18 and 29 years received on average 22 555 pesos a year, while 13 691 pesos on average was sent if the head was 80 to 89 years old.
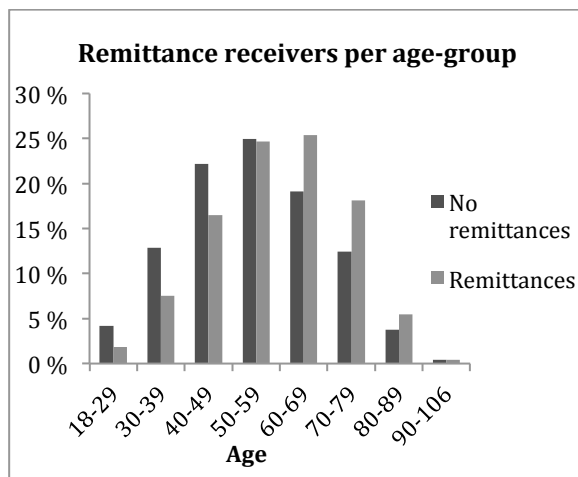
Figure 18 – Percentage distribution of households for remittance-receiving and non-remittance-receiving households per age group of the head of household
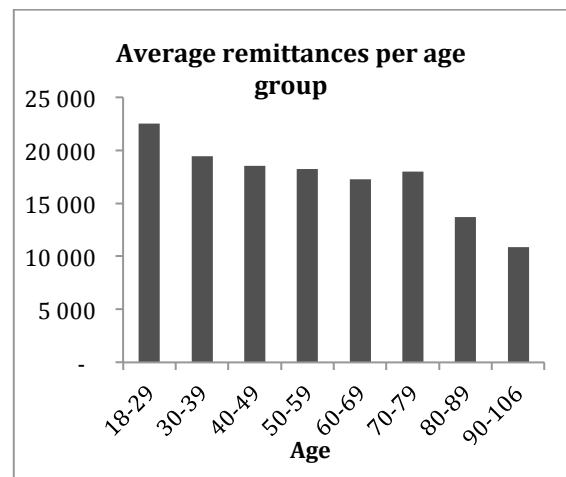
Figure 19 - Average amount of remittances received per age group of the head of household

5.3.3 Education

The educational level in rural Mexico is low. 19 281 of the persons asked never started secondary school, out of which 4 724 persons have no education. Only 1 424 persons have studied at a university level. Figure 20 shows that there is a higher share of persons without education or with only primary school that receives remittances compared to those who do not receive any. Heads of households with higher educational levels than primary school received on average 21 510 pesos, while those with primary school or less on average only received 17 324 pesos. Households with low levels of education thereby received 19.5 percent less in remittances than households with education above primary school.

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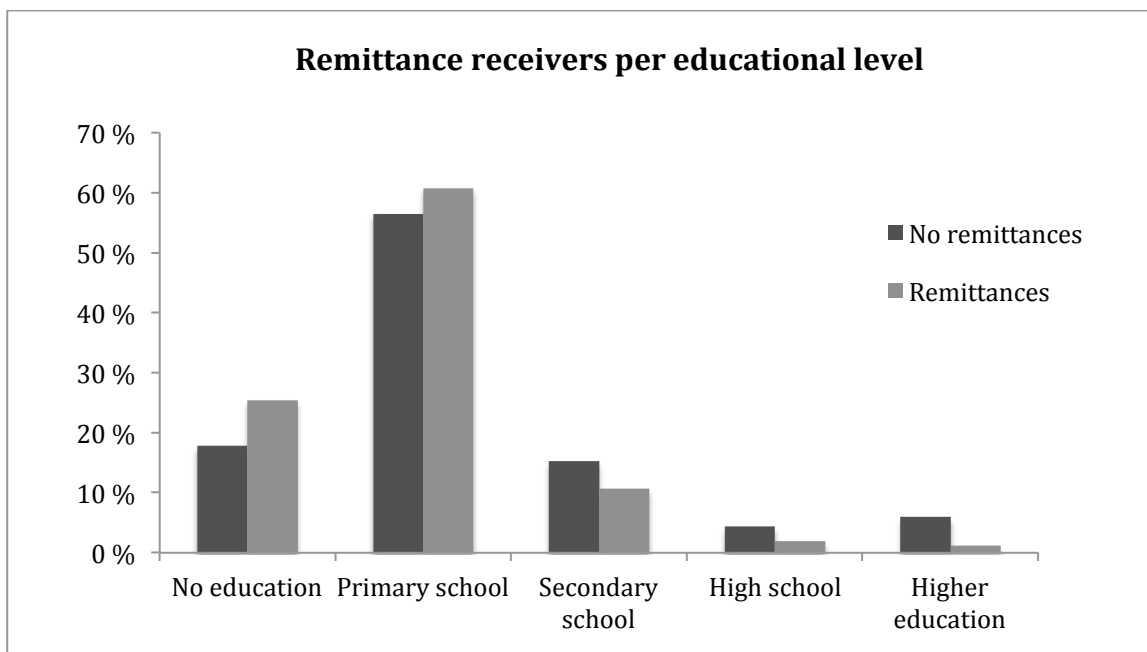
Figure 20 – Percentage distribution of households for remittance-receiving and non-remittance-receiving households per educational level of the head of household

5.3.4 Ethnicity

No more than 16 percent of the sample is of indigenous decedents and the differences between remittance-receiving households and non-receiving households are small. Indigenous people constitute a slightly lower percentage among households receiving remittances, indicating that households of indigenous decedents may be less likely to receive money from abroad. Although only slightly less likely to receive remittances, indigenous remittance-receiving households received on average 14 percent less money compared to households.
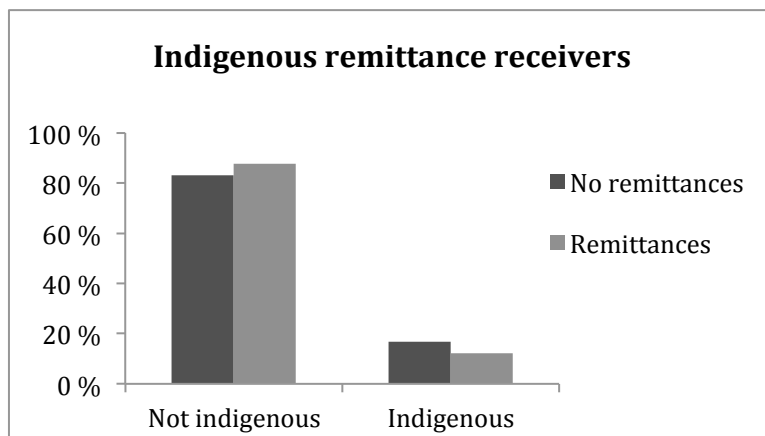
Figure 21 – Percentage distribution of remittance-receiving households and non-remittance-receiving households for indigenous and non-indigenous households

5.3.5 Children

More than 50 percent of the households have no children and the average for the whole sample is 0.97 children. Children are defined as persons below 14 years, which may possibly be one reason for the low average and the high percentage of households without children. Additionally, the average age of the head of household in the sample is 54, which implies that many are expected to have grown-up children. Comparing the distribution of remittance-receiving and non-receiving households according to number of children in the household, no obvious tendency is observed. The share of households with no children is slightly higher in the remittance-receiving group, but apart from that do both groups have fairly similar distributions. The average amount of remittances received seems to be declining as the number of children increases.
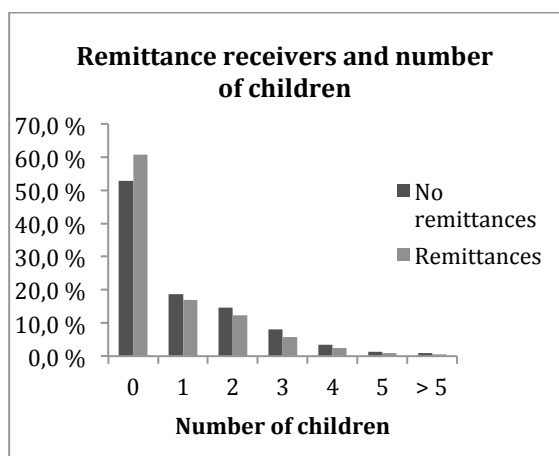
Figure 22 – Percentage distribution of remittance-receiving households and non-remittance-receiving households according to the number of children in the household
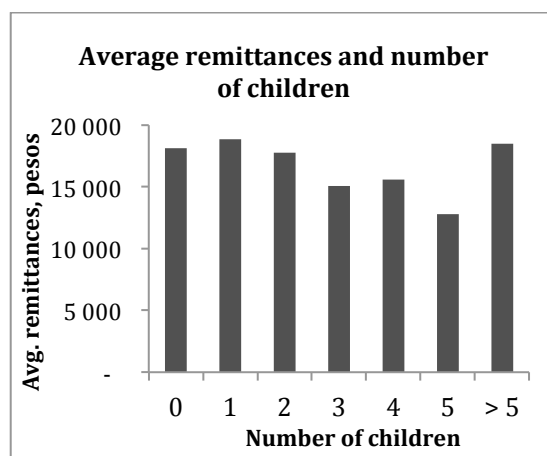
Figure 23 - Average amount of remittances received according to the number of children in the household

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However, households with more than five children received about the same as households with no children or one child. There does not seem to be any clear indication of a relationship between remittances and the number of children in the household.

5.3.6 Income

Figure 24 shows the income distribution of the sample for remittance-receiving and non-receiving households. The households have been grouped according to income deciles, where decile 1 represents the 10 percent poorest in the sample and decile 10 is the 10 percent richest. The share of households in the first income deciles is higher for households receiving remittances than for those who do not. The share in the sixth, seventh and eighth deciles are almost the same for both groups, while there is a significantly higher share of non-remittance-receiving households among the richest 10%. This suggests that the probability of receiving remittances declines the richer the households are. There is no indication of a hump-shaped distribution supporting the theory of the migration hump.
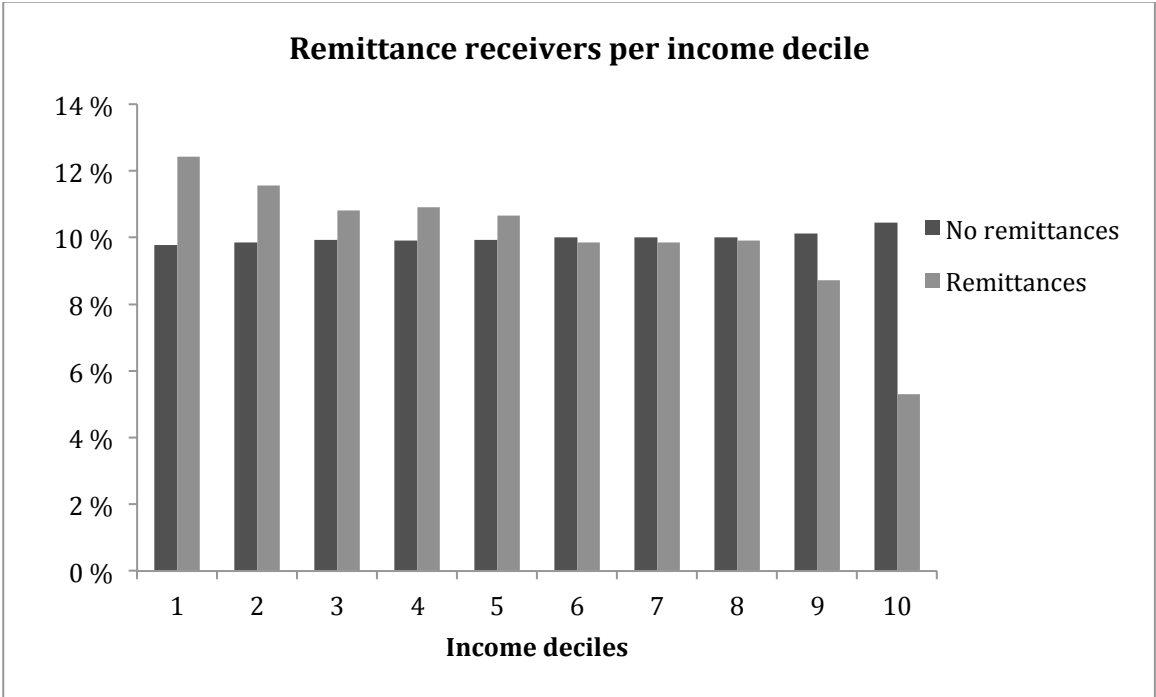
Figure 24 – Percentage distribution of remittance-receiving and non-remittance-receiving households per income decile.

When it comes to the amount of remittances received, there is no significant difference between the first eight income deciles. The 20 percent richest remittance-receiving

households in the sample, on the other hand, received on average a much larger amount of money from abroad than the rest. The 10 percent poorest received an average of 14 486 pesos, while the 10 percent richest on average received 38 070 pesos.
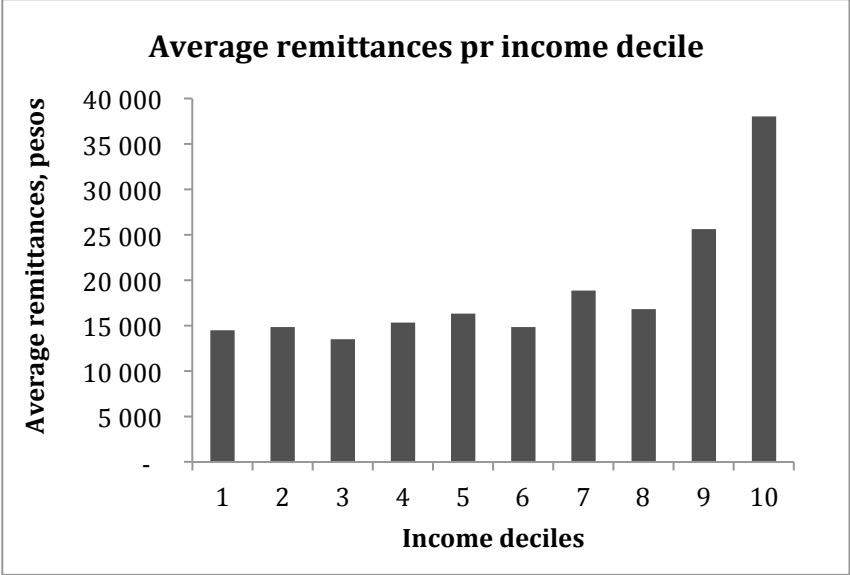
Figure 25 - Average remittances received for each income decile

5.3.7 Land ownership

More than 80 percent of the households in the sample own some amount of agricultural land. This is not very surprising, as the majority of the households are engaged in some agricultural activity. 11.7 percent own rangeland, while ownership of the other types of land is poorly represented with percentages below 2 percent. Additionally there are only four households receiving remittances owning greenhouse, nine owning forest and 15 owning other types of land. These numbers are too low to allow for any valid conclusions regarding remittances, and will not be give any specific focus. The main focus in this analysis will be on agricultural land.

In figure 26 the households have been sorted in deciles by the amount of agricultural land owned. Decile 1 includes the 10 percent with the least amount of agricultural land, while the tenth decile includes the 10 percent with the largest areas of agricultural land. There is a tendency of an increasing share of remittance-receiving households as the amount of land increases. The percentage is especially high in the 7th and 8th deciles. However, the share of households in the tenth decile is significantly higher for

the households that do not receive money from abroad compared to those who do. This suggests a hump-shaped distribution, although it is not a very clear pattern.
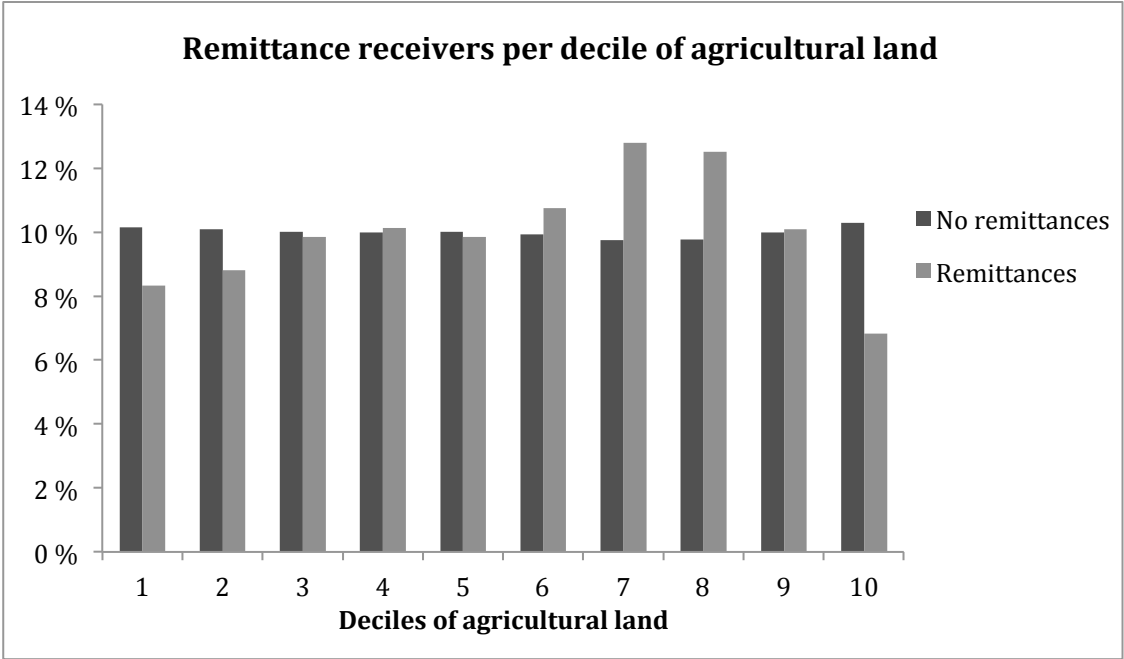
Figure 26 – Percentage distribution of remittance-receiving and non-remittance.-receiving households per decile of agricultural land
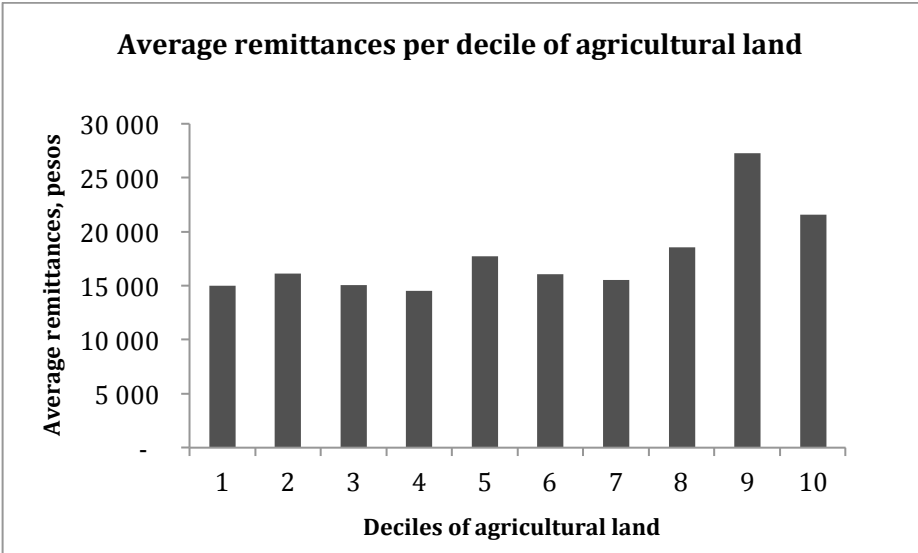
Figure 27 - Average amount of remittances received per decile of agricultural land

Regarding the amount of remittances received by the households depending of how much land they own, there is no specific tendency for the first seven deciles. The average amount increases for the 30 percent most land abundant households, with a top in the ninth decile where they on average received 27 306 pesos. In comparison,

the 10 percent poorest received an average of 14 985 pesos. The average amount decreases some for the tenth decile compared to the ninth, but still remains well above the average of the first decile.

5.3.8 Migration intensity

60.5 percent of the households surveyed live in municipalities with a very low or low degree of migration intensity, while nearly 20 percent lives in communities with a high or very high migration intensity. There is a clear tendency between migration intensity and remittance-receiving households; the more people migrating abroad, the higher is the share of households receiving remittances.

Remittance receivers per migration intensity level
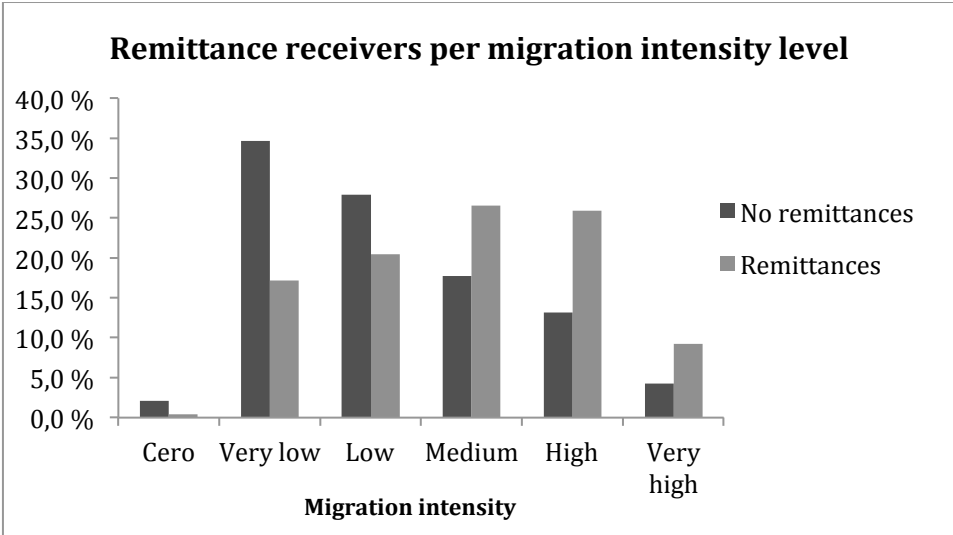
Figure 28 – Percentage distribution of remittance-receiving and non-remittance-receiving households for each level of migration intensity
Note: Migration intensity levels are defined by CONAPO

Considering the amount of remittances received depending on the migration intensity degree, there is no clear trend. Communities with very low migration intensity received the lowest amount with only 15 802 pesos on average. Communities receiving the most on the other hand were those classified with a low migration level. On average, households in these communities received 22 152 pesos.

5.3.9 Marginalization index

38 percent of the households live in communities classified as a high or very high degree of marginalization. There is a higher share of households in communities with a very low degree of marginalization that do not receive remittances than those who do. The share of remittances-receiving households surpasses non-receiving households in

communities with low, medium and high marginalization degree, while it declines in highly marginalized communities. This suggests a hump-shaped form, although the evidence is weak. Households in communities with a very low degree of marginalization received on average 22 523 pesos in remittances, which is higher than for the other four groups. A part from that, there is not any large differences in remittances received between the different marginalization degrees and no clear tendency is observed.
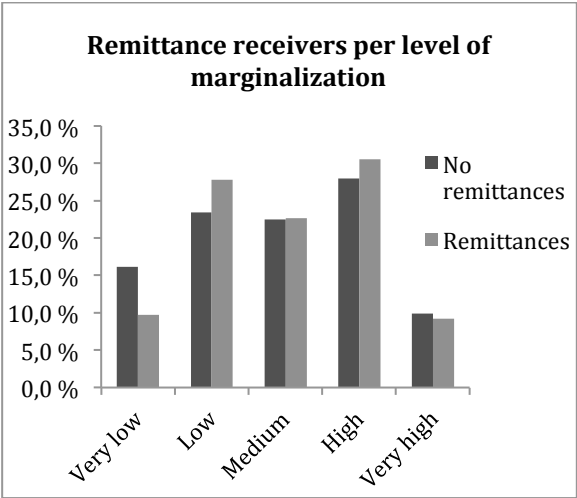
Figure 29 – Percentage distribution of remittance-receiving and non-remittance-receiving households according to the community marginalization degree
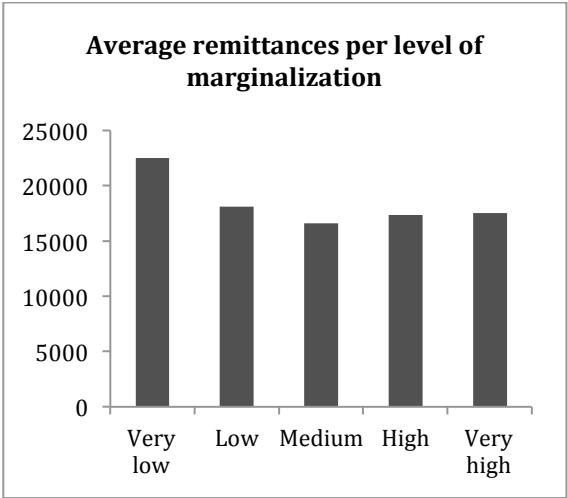
Figure 30 - Average amount of remittances received by depending on the level of marginalization.

5.3.10 Gini coefficient

Figure 31 shows the distribution of households according to deciles of the GINI coefficient. The first decile consists of the households living in communities with the lowest income inequality, while households in the tenth decile have the highest levels of inequalities in income. There are differences in the distribution of remittance-receiving households and non-receiving households depending on the level of income inequalities, but no obvious trend is observed. The amount of remittances received seems to be relatively stable for the first eight Gini-deciles. The average remittance size increases for the last two deciles. Households in communities with high income inequalities received on average a higher amount of remittances than those living in communities with lower income inequalities. Households in the tenth GINI decile received an average of 38 070 pesos, while those in the first GINI decile only received

14 486 on average. That means that the tenth decile received 162 percent more in remittances than the first decile.
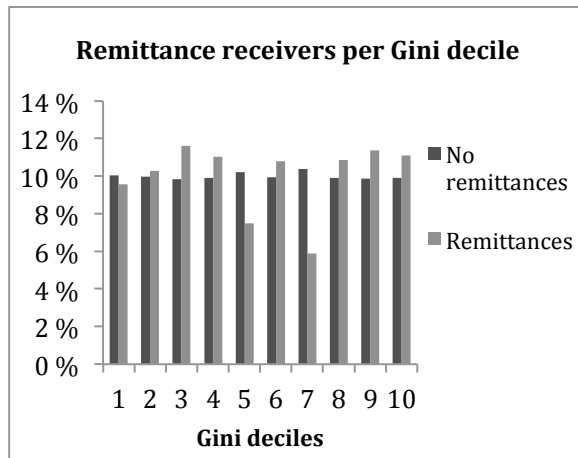
Figure 31 – Percentage distribution of remittance-receiving and non-remittance-receiving households per Gini decile
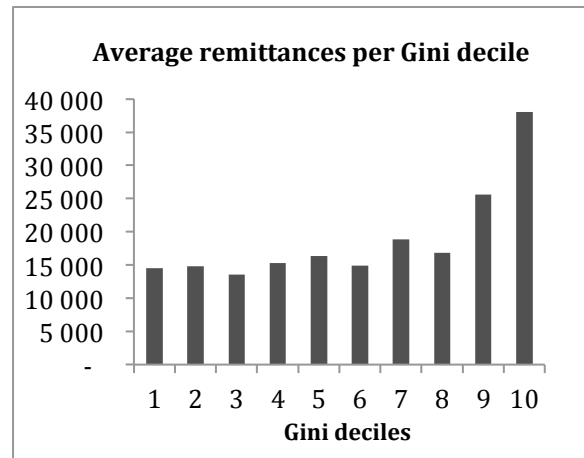
Figure 32 - Average amount of remittances received by households in each Gini decile.

5.4 Methodology

Multiple regressions with ordinary least square (OLS) estimates will be used in the analysis to answer the research question and to test the hypotheses. The investigation consists of three analysis, each consisting of two regressions. The first analysis investigates what determines a household's probability of receiving remittances, the second intends to determine what affect the amount of remittances a household receives, while the third analyzes what influences how important remittances are for a household. Importance in this context refers to remittances as a percentage share of total income. The same dependent variables have been used in all the analysis, which enables investigation of whether or not it is the same determinants affecting the probability of receiving remittances as the ones affecting the amount of remittances received and the importance of remittances. This section will explain how the analysis have been done and the methodology that has been used.

5.4.1 Model specifications

In all three analysis the dependent variable is a measure of remittances while the dependent variables included are *gender, age, education, ethnicity, children, income, land ownership, region, migration intensity, marginalization index,* and *the Gini*

coefficient. Analysis 1 includes all observations in the sample, while analysis 2 and 3 only considers the households receiving remittances.

The regression model in analysis 1 is given by

$$
\begin{aligned}
D_{remittances} = \ & \beta_0 + \beta_1 D_{gender} + \beta_2 age + \beta_3 D_{education} + \beta_4 D_{indigenous} + \beta_5 children \\
& + \beta_6 \ln(income) + \beta_7 agri\_land + \beta_8 rangeland + \beta_9 greenhouse \\
& + +\beta_{10} forest + +\beta_{11} migration\_int + \beta_{12} marg\_ind + +\beta_{13} HDI \\
& + \beta_{14} GINI + \beta_{15} D_{north-east} + \beta_{16} D_{north-west} + \beta_{17} D_{central-north} \\
& + \beta_{18} D_{west} + \beta_{19} D_{bajío} + \beta_{20} D_{golf} + \beta_{21} D_{south-east} + \beta_{22} D_{yucatan} + u
\end{aligned}
$$

where

$D_{remittances}$	= Dummy variable indicating 1 if the household receives remittances
D_{gender}	= Dummy variable indicating 1 if the household-head (HH) is a man
age	= Age of the HH
$D_{education}$	= Dummy variable indicating 1 if the HH has completed primary school.
$D_{indigenous}$	= Dummy variable, indicating one if HH is of indigenous decedents.
$children$	= Children below 14 years in the household
$\ln(income)$	= Logarithm of total income
$agri\_land$	= Agricultural land owned in 100 hectares
$rangeland$	= Rangeland owned in 100 hectares
$greenhouse$	= Greenhouse owned in 100 hectares
$forest$	= Forest owned in 100 hectares
$migration\_int$	= Migration intensity index in the municipality
$marg\_ind$	= Marginalization index in the municipality
HDI	= Human development index in the municipality
$GINI$	= Gini coefficient of the municipality
$D_{north-east}$	= North-east region
$D_{north-west}$	= North-west region
$D_{central-north}$	= Central-north region
D_{west}	= West region
$D_{bajío}$	=Bajío region
D_{golf}	= Golf region

$D_{south-east}$ =South-east region

$D_{yucatan}$ =Yucatan region

The regression in analysis 2 is given by

$$
\begin{aligned}
\ln(remittances) \\
= \; & \beta_0 + \beta_1 D_{gender} + \beta_2 age + \beta_3 D_{education} + \beta_4 D_{indigenous} + \beta_5 children \\
& + \beta_6 \ln(income) + \beta_7 agri\_land + \beta_8 rangeland + \beta_9 greenhouse \\
& + + \beta_{10} forest + + \beta_{11} migration\_int + \beta_{12} marg\_ind + + \beta_{13} HDI \\
& + \beta_{14} GINI + \beta_{15} D_{north-east} + \beta_{16} D_{north-west} + \beta_{17} D_{central-north} \\
& + \beta_{18} D_{west} + \beta_{19} D_{bajío} + \beta_{20} D_{golf} + \beta_{21} D_{south-east} + \beta_{22} D_{yucatan} + u
\end{aligned}
$$

Ln($remittances$) is the logarithm of the amount of remittances the household receives on average each month.

The regression model in analysis 3 is given by

$$
\begin{aligned}
rem\_\% \quad = \; & \beta_{0\,0} + \beta_1 D_{gender} + \beta_2 age + \beta_3 D_{education} + \beta_4 D_{indigenous} + \beta_5 children \\
& + \beta_6 \ln(income) + \beta_7 agri\_land + \beta_8 rangeland + \beta_9 greenhouse \\
& + + \beta_{10} forest + + \beta_{11} migration\_int + \beta_{12} marg\_ind + + \beta_{13} HDI \\
& + \beta_{14} GINI + \beta_{15} D_{north-east} + \beta_{16} D_{north-west} + \beta_{17} D_{central-north} \\
& + \beta_{18} D_{west} + \beta_{19} D_{bajío} + \beta_{20} D_{golf} + \beta_{21} D_{south-east} + \beta_{22} D_{yucatan} + u
\end{aligned}
$$

$rem\_\%$ is the total amount of remittances received by the household as a share of the households total income. Some households report a total income of zero. To be able to calculate a remittance-share for all households, remittances are given as a percentage of total income including remittances. A household reporting remittances as their only income source will thereby have a remittance-percentage of 100.

In order to test the migration hump hypothesis, a second regression including ln(income) as a squared term has been done for all the three analysis. All the ownership variables have also been included as squared terms allowing testing the hypothesis of land ownership possibly being a wealth indicator (migration hump) or an

investment opportunity (u-shaped). Additionally, the marginalization index enters in these regressions with a squared variable to test if this variable also has an inverted u-shape. The model used in the second regression, in all the three analysis, is given by

$$
\begin{aligned}
remittances = \ & \beta_0 + \beta_1 D_{gender} + \beta_2 age + \beta_3 D_{education} + \beta_4 D_{indigenous} + \beta_5 children \\
& + \beta_6 \ln(income) + \beta_7 \ln(income)^2 + \beta_8 agri\_land + \beta_9 agri_{land}^{\;2} \\
& + \beta_{10} rangeland + \beta_{11} rangeland^2 + \beta_{12} greenhouse + \beta_{13} greenhouse^2 \\
& + \beta_{14} forest + \beta_{15} forest^2 + \beta_{16} migration\_int + \beta_{17} marg\_ind \\
& + \beta_{18} marg\_ind^2 + \beta_{19} HDI + \beta_{20} GINI + u
\end{aligned}
$$

where

$\ln(income)^2$ = Logarithm of total income, squared

$agri\_land^2$ = Agricultural land owned in 100 hectares, squared

$rangeland^2$ = Rangeland owned in 100 hectares, squared

$greenhouse^2$ = Greenhouse owned in 100 hectares, squared

$forest^2$ = Forest owned in 100 hectares, squared

$marg\_ind^2$ = Marginalization index, squared

The dependent variable in each of the analysis remains the same as in the first regression; in analysis 1 the dependent variable is the probability of receiving remittances ($D_{remittances}$), in analysis 2 it is the logarithm of total amount of remittances received ($\ln(remittances)$), and in analysis 3 it is remittances as share of income ($remittances\_\%$).

To estimate the impact of the squared marginalization index correctly, the index has been adjusted so that it only includes positive values. The minimum value of the index was initially – 2.37. The variable has been adjusted by adding 2.38 to each of the index values. After the adjustment the minimum value of the index is 0.014 and the maximum value is 6.87.

5.4.2 Heteroscedasticity

One of the assumptions when using OLS is that the variance of the unobserved error, u, conditional on the explanatory variable, is constant. If the variance is not constant we

have heteroscedasticity. The r-squared of the model, as well as the OLS estimators, are unbiased even though the assumption is violated. However, in the presence of heteroscedasticity, the estimators of the variances, Var(Bj), are biased. The OLS standard errors are based directly on these variances, and the confidence intervals and the t statistics are no longer valid. That implies that the significance level of the independent variables no longer is reliable.

A Breusch-Pagan (BP) test has been used to test for heteroscedasticity in each of the regression models in the three analysis. It tests the null hypothesis that the error variances are equal. The BP test, when running it in Stata, calculates p-values below 0.05 for all the regressions in the analysis. The null hypothesis is thereby rejected at a 5% significance level and there are indications of heteroscedasticity in all the regressions. Heteroscedasticity-robust standard errors will therefore be used in the regressions.

5.4.3 OLS vs. Probit

When analyzing the probability of receiving remittances (analysis 1), the dependent variable is binary. The linear probability model (LPM), an OLS model with a binary dependent variable, has a couple of drawbacks. It may give predictions that are less than zero and greater than one, which in a probability model does not make much sense. What does a probability of -0.5 or 2 imply? The second drawback is that it predicts a constant partial effect for all the explanatory variables. This is often not the case in real life, as for example the impact of having an additional child on the amount of remittances received may be different depending on whether the family initially has one or four children. Thirdly, it violates the OLS assumption of homoscedasticity. Some argue that a Probit-model should be used instead as it restricts the predictions of the dependent variable to be between 0 and 1, and deals with the problem of constant partial effect of the explanatory variables. However, the LPM is useful and it is often applied in economics (Woolridge, 2009, p. 249). Angrist and Pischke (2008) have investigated the LPM and find no special challenges in using this model. The problem of heteroscedasticity is avoided by using heteroscedasticity-robust standard errors. Additionally the purpose of this study is not to predict which households that will receive remittances, but to determine which factors that have a significant effect on the

probability of receiving remittances. Model predictions taking values less than zero or higher than 1 does thereby not represent any major problem.

5.4.4 Potential causality problems

The use of a cross sectional dataset, only allows for an analysis of data at one certain point in time. This causes potential causality problems. It may be difficult to determine if it is the independent variable that significantly affects the dependent, or if the dependent variable significantly affects the independent. For example, if the relationship between income and the probability of receiving remittances is found to be positive and significant, there may be two interpretations; higher income increases the probability of receiving remittances from abroad, or remittance-receiving households have a higher income because they receive remittances. The first may be explained by high migration costs, preventing the poorest from migrating, while the latter can be explained by investment of remittances in productive activities, as productive investments have the potential to increase a household's total income. Nevertheless, causality problems will only occur in relation to some independent variables, and even if the causality in some cases may be difficult to determine, the analysis may give valuable information about significant relationships and indicate areas for future research.

6. Results

The results from the regression analysis will be presented and discussed in this section. It starts out with the analysis of which factors that are influencing a households probability of receiving remittances, before moving on to the determinants of the amount of money received and their importance in terms of percentage share of total income. Finally the three analysis will be compared in order to determine if there are the same factors affecting who receives remittances, the amount received and the importance. Region dummies and ownership of all the seven land types have been included in the regressions. The region coefficients are not included in the tables, though, as they only are control factors. The number of households receiving remittances and owning greenhouse, forest or other land, is very low and the results are not considered very reliable. They are therefore not reported in the tables.

6.1 Analysis 1 - probability of receiving remittances

This analysis consists of 25 205 observations. The number is lower than the total number of households in the dataset because several state to have no income when not considering international remittances. Because the income variable is given on logarithmic form, these observations are excluded. In the first regression, all independent variables have been included on simple form, while the income, the land ownership variables and the marginalization index have been added as a square in the second regression. The r-squared is low with only 0.048 and 0.049 in the two regressions respectively. This suggests that there are several other factors influencing the decision to migrate and to send remittances. Nevertheless, several of the determinants included, enter with significant impact.

6.1.1 Household characteristics have significant impacts

The gender of the head of household enters with significant effect on a 1 percent level of significance. It indicates that households with female heads of household have a 2.49 percent higher probability of receiving remittances than those with a man running the household. This supports the established hypothesis and is most likely explained by the high share of men among Mexican migrants. Additionally, when women migrate they are more often motivated by family reunification, which reduces the probability of sending remittances back home. The results also support the hypothesis about

Table 1 – Regression analysis of the determinants of the probability of receiving remittances

	Dependent variable: Probability of receiving remittances	
	(1)	(2)
Gender	-0.0244***	-0.0249***
	(0.00437)	(0.00438)
Age	0.00133***	0.00132***
	(0.000134)	(0.000135)
Education	-0.0177***	-0.0175***
	(0.00400)	(0.00400)
Indigenous	-0.0349***	-0.0313***
	(0.00559)	(0.00574)
Children	-0.00164	-0.00161
	(0.00130)	(0.00130)
Ln (total monthly income)	-0.00856***	-0.00552
	(0.00143)	(0.00916)
Ln (total monthly income)^2		-0.000164
		(0.000529)
Ownership: agricultural land	-0.00415**	-0.00676
	(0.00195)	(0.00477)
Ownership: agricultural land^2		0.000102
		(0.000109)
Ownership: rangeland	0.000561	-0.000288
	(0.000771)	(0.00133)
Ownership: rangeland^2		1.77e-05
		(3.45e-05)
Migration intensity	0.0374***	0.0360***
	(0.00272)	(0.00272)
Marginalization index (adj.)	0.00484**	0.0264***
	(0.00219)	(0.00687)
Marginalization index^2 (adj.)		-0.00442***
		(0.00138)
Gini coefficient	0.0620	0.0849*
	(0.0471)	(0.0478)
Constant	0.0423	-0.00356
	(0.0264)	(0.0470)
Observations	25,205	25,205
R-squared	0.048	0.049

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

increased probability of receiving remittances the older the head of the household is. This is explained by the fact that migrants are within working age, leaving the older family members behind and in charge of the household. Educational level also has a significant impact. Heads of households with education above primary school are less likely to receive remittances from abroad. Normally people have a positive return to education and as the educational levels of a person increases, its potential income is expected to increase as well. Higher income will again reduce the incentives of sending a migrant abroad and thereby also the household's probability of receiving remittances.

Households of indigenous decedents have 3.13 percent lower probability of receiving remittances from abroad. This might possibly be explained by cultural factors like language and traditions. Indigenous people who only speak their own native language may have more difficulties migrating and living in a foreign country. Another explanation may be their lack of traditions for migration. If it is not common within an indigenous community to migrate, the barriers for migrating are likely to be higher. Social networks are an important driving force of migration and the lack of these will reduce the probability of migration and the probability of receiving remittances.

The number of children within the household has no impact on the probability of receiving remittances. This is the opposite of the anticipated hypothesis. The explanation may be related to who migrates. If it is a parent leaving its child/children in the home country, children should increase the probability of the migrant sending remittances. However, a migrant may remit money even though he/she has not left any children in the home community. Some migrants remit money to for example their siblings, and whether the siblings have children living with them in the household or not, will not necessarily affect the migrants' remittance decision.

6.1.2 Wealthy households are less likely to receive remittances

Wealthy households are less likely to receive remittances than poor households. Improved economic conditions are considered one of the main incentives of migration. The observed effect is thereby likely explained by wealthier households having less incentive to migrate. The impact, however, is not very large; a 10 percent increase in total monthly income will reduce the likelihood of receiving remittances by 0.086

percent[10]. Additionally, when including squared monthly income in the second regression, income no longer has any significant impact. There is no evidence found for the migration hump as predicted in the hypothesis. It does not seem to be any particular barriers, such as migration costs, preventing the poorest Mexican households from sending a member abroad. The majority of Mexican migrants go to the United States, which is likely to increase the social migrant networks. Considering that 10.7 percent of the Mexican population has emigrated, there is likely to be a high presence of social networks. This normally reduces the migration costs. Mexico's closeness to the United States may additionally imply that migration costs are lower here than for other parts of the world. These may be the explanations for why the migration hump is not supported by evidence in this analysis.

6.1.3 Land ownership reduces the probability of receiving remittances

The more agricultural land a household owns, the lower is the probability of receiving remittances. This impact may have several explanations. Land may be an indicator of wealth; the more land the household owns, the wealthier it is and the less probable is it that it receives remittances. Secondly, agricultural land represents a source of employment. The larger the area of land owned, the more household members may be employed and it is no longer necessary to migrate in order to find employment. The negative relationship may also possibly be explained by relative deprivation. Large differences in the amount of land owned within a community may cause households to feel relatively deprived. They thereby have an incentive to send a member abroad to supply them with capital through remittances, and enable investments in land. Households with less land will normally feel relatively more deprived and are thereby more likely to migrate. Investment opportunities in general may also explain the effect, however because of potential economies of scale for large amount of land owned, it would be likely to observe a positive relationship between land and remittances when the land area is sufficiently large. This is not observed in the second regression where agricultural land enters with a squared term. Actually, when including the squared term agricultural land no longer has any significant effect on the probability of

---

[10] $\Delta \widehat{d\_remittances} = -\left(\frac{0.00856}{100}\right)(\%\Delta income) \approx -0.000086(\%\Delta income)$. A 1 percent increase in income thereby reduces the probability of receiving remittances by (0.000086*100) 0.0086 percent. A 10% increase reduces the probability by (0.0086*10) 0.086 percent.

receiving remittances. The migration hump is thereby not supported by ownership of agricultural land either.

Ownership of rangeland has no significant impact on the probability of receiving remittances. This suggests that the relationship between land ownership and the reception of remittances is dependent on the type of land owned. The most likely explanation for this difference is that different types of land are used for different purposes. Rangeland is primarily used for livestock and the administration of this type of land is normally less labor intensive than land used for agriculture. Agricultural land also has more usage possibilities than rangeland, and it has a higher return per hectare. This makes it more attractive to invest in agricultural land compared to rangeland. This explains the differences in impact observed for the two types of land; either land is considered a wealth indicator, a source of employment or an investment opportunity.

6.1.4 The marginalization index has a hump-shaped effect

The more marginalized a community is, the more likely are the household living in the community of receiving remittances. This is as expected; marginalized communities, as they are poorly developed and offers less opportunities to its inhabitants, gives incentives for migration. Households in marginalized communities are often poor and living in houses with poor standards. This will give an altruistic migrant an incentive to send remittances back to its family. The impact is though not very large. An increase of one point on the marginalization index will increase the probability of receiving remittances by 0.5 percent. Considering the index taking a minimum value of 0.014 and a maximum of 6.88, the index will only have a very limited impact on remittances. The squared term of the marginalization index (see regression 2) enters significantly with a negative sign. This supports the hypothesis of a hump-shaped impact, indicating that households in very highly marginalized areas are to a larger extent prevented from migrating. Barriers preventing migration may be a lack of abilities resulting from low education, and higher migration costs, as the community is likely to be relatively isolated. The declining effect begins when an index value of 2.99[11] is reached, while the average marginalization degree is 2.11. This suggests that migration barriers may be present in a considerable number of Mexican communities.

---

[11] Turning point calculation: $0.0264/2(0.00442) \approx 2.99$

6.1.5 High migration intensity increase the probability of receiving remittances

There is a positive relationship between the migration intensity of the households' community and the probability of receiving remittances. As the migration intensity is included in the analysis as a proxy for social networks, the results suggest that households having a social network abroad increases their probability of sending a member out of the country, thereby increasing their probability of receiving remittances. This is in compliance with the anticipated hypothesis.

However, the effect of migration intensity is not necessarily explained by the presence of social networks, but may instead indicate other effects predicted by the cumulative causation theory. For reasons such as culture, the distribution of land and the distribution of income, high numbers of migrants from one community may in itself increase the probability of migration. Additionally, a causality problem is encountered with this variable, as sending a migrant from the home community will generally impact the migration intensity. As the migration intensity index was calculated in 2000 and the remittances accounted for in this dataset relates to the agricultural year of 2008, migrants sending remittances home would have had to stay abroad for at least eight years to be accounted for in the index. Nevertheless, some people move abroad to stay there permanently, which thereby weaken the causality between migration intensity and the reception of remittances. Conclusions based on this result should therefore be drawn carefully.

6.1.6 Income inequalities have no effect

The Gini coefficient of the community where the households are situated has no significant impact on their probability of receiving remittances. The hypothesis of income inequalities leading to more migration, as suggested by the theory of relative deprivation, and thereby higher probability of receiving remittances is not supported. Mexican households may not compare their income level to other households within their community. Or it might be the case that they do, but that the differences are not giving them sufficient motives to migrate. Income inequalities may also give incentives to migrate, but the migrants' motivation to remit money will not necessarily be larger than for those migrating for other reasons.

6.2 Analysis 2 – Amount of remittances received

When analyzing what determines the amount of money the households receive in remittances, only households stating to have received remittances during the agricultural year of 2008 are considered. The dependent variable is the logarithm of total remittances. As in analysis 1, the first regression includes independent variables on simple form, while the second includes the squared terms of monthly income, the land ownership variables and the marginalization index. The r-squared for both regressions are low, 0.053 and 0.066 respectively, suggesting that there is several factors not included that determine the amount of remittances the households receive. Nevertheless, this analysis indicates that income, land ownership and age of the head of household all have a significant impact on the size of the remittances received.

6.2.1 Older heads of households receive a smaller amount of remittances

The age of the head of household enters significantly in both regressions. The older he/she is, the less will the household receive in remittances. Each additional year will decrease the amount received by 0.8 percent. A head of household of 60 years is predicted to receive 32 percent less in remittances compared to a 20 year old, holding all other factors constant. The older a person is the more likely he/she is to have children and grandchildren. If the migrant has children, it means that they are in more need of money themselves to provide for these children. The money remitted to their parents is likely to decrease. Additionally, it is possible that the number of household members decreases with the age of the head of household as their children starts their own families and move out. This implies that less money is needed to provide for all household-members, which is likely to decrease the amount of money remitted. This may explain the negative effect of age on remittances received by the household.

Gender, educational level, indigenous decedents and the number of children are found to have no significant effect on the amount of remittances received. The most surprising of these is that children have no effect. Children needs to be provided for and represents thereby a higher cost for the household and higher levels of necessary

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Table 2 - Regression analysis of determinants of remittance size

Dependent variable: ln(total remittances)		
	(1)	(2)
Gender	-0.0405	-0.0482
	(0.0533)	(0.0531)
Age	-0.00815***	-0.00801***
	(0.00189)	(0.00188)
Education	-0.0410	-0.0615
	(0.0740)	(0.0732)
Indigenous	-0.0146	-0.0241
	(0.0749)	(0.0749)
Children	-0.0312	-0.0302
	(0.0202)	(0.0202)
Ln (total monthly income)	0.0893***	-0.727***
	(0.0204)	(0.184)
Ln (total monthly income)^2		0.0503***
		(0.0113)
Ownership: agricultural land	0.532***	0.817***
	(0.168)	(0.295)
Ownership: agricultural land^2		-0.207**
		(0.0883)
Ownership: rangeland	0.00347	0.0271
	(0.00552)	(0.0405)
Ownership: rangeland^2		-0.000325
		(0.000504)
Migration intensity	-0.0473*	-0.0475*
	(0.0258)	(0.0269)
Marginalization index (adj.)	-0.0313	-0.0156
	(0.0319)	(0.111)
Marginalization index^2 (adj.)		-0.00274
		(0.0210)
Gini coefficient	-0.624	-0.710
	(0.559)	(0.556)
Constant	9.337***	12.57***
	(0.312)	(0.799)
Observations	2,076	2,076
R-squared	0.053	0.066

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

expenditures are likely to give more bargaining power and motivate the migrant to send more money. However, this effect will probably be higher if the migrant is a parent of the children. Migrants are not necessarily parents of the children in the household, which may explain the lack of significant effect. It may also be that several migrants are remitting as much money as they are able to and that they will not be able to remit any more money even if there are children in the household.

6.2.2 Wealthier households receive more remittances

The first regression indicates a positive relationship between monthly income and the amount of remittances received. The wealthier the household is, the more remittances will be received from abroad. Migrants being motivated to remit by self-interest reasons may explain this relationship. Higher income often implies that there is more to inherit and migrants have an incentive to remit to assure their future part of this inheritance. A 10 percent increase in monthly income will increase total remittances received by 0.9 percent, holding all other factors constant. In the second regression where a squared term of income variable has been included, the impact of income on remittance size takes a u-shape. There is still support for migrants remitting money based on their own self-interest, however it only applies for higher income levels.

The u-shape suggests that migrants often are motivated to remit by altruistic motives when the household is poor. An altruistic migrant will consider the total welfare of both himself and the household in the home community. Increased household income may cause the money to be better spent another place in order to maximize total welfare. The turning point is at a monthly income of 1 376[12] pesos. Considering the fact that the average monthly income is 11 870 pesos it seems like altruistic motives only apply for the poorest households. Another reason for why the u-shape is observed is that migrants from very poor households do not have prospects of any significant inheritance as the households income is likely to be spent on consumption in order to cover the family's basic needs. The migrant will not have any self-interest in sending remittances to the home community.

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[12] Turning point calculation: $0.727/2(0.0503) \approx 7.22664$. $e^{7.22664} \approx 1376$

Another explanation for the relationship observed may though be that migrants from wealthier families may tend to earn higher salaries abroad. Education levels may be higher, which enables them to get better paid work in the destination country. Higher migrant income is likely to increase the amount of money remitted. Conclusions should therefore be drawn carefully.

There might be problem of double causality in this case, if income levels are higher because the household receives more remittances. This would be the case if remittances were invested in productive activities. However, considering that only 1 percent of the Mexican households invest their remittances (BID, 2003) in their business, this is less likely to be the case.

The motivational process to remit money is very complex and difficult to measure, as it is an intrinsic decision made by the migrant. This analysis do not have enough evidence to conclude that Mexicans remit money mostly based on self-interest. It requires more research to make clear conclusions about migrants' motivational reasons for remitting money.

6.2.3 Agricultural land owned increase the amount of remittances received

The same positive relationship as found related to income, is evident regarding the relationship between hectares of agricultural land owned and the amount of remittances received. This further suggests that migrants are motivated by their own self-interest when remitting money. Larger areas of agricultural land imply a higher fortune for the migrant to inherit. Additionally, if the migrant is the owner of the land he may have incentives to remit money to make sure that the household members in the community of origin take care of maintenance of the land. The more land he owns, the larger will the maintenance costs be. An additional 100 hectares of land owned will increase the amount of remittances received by the household with 53 percent, holding all other factors fixed. Considering that the average amount of agricultural land owned is nine hectares, an increase of 100 hectares is not very likely to happen for most households and the realistic impact of land purchases would be smaller.

When including a squared term, the results indicate a declining effect of land when the household owns more than 197[13] hectares of agricultural land. Assuming that remittances are sent to assure that the migrant will inherit the family fortune at a later stage, the effect of sending higher amounts of remittances is likely to decline at some point. Remittances are also restrained by the migrants' income and the amount of money they are able to send will be constrained. Another explanation for this declining relationship is that economies of scale may be achieved related to maintenance costs. An increase of land will at the margin require less money for maintenance if the land area already is large.

Like with income, there might also be a positive relationship between the migrants' income and the size of the households' land property, explaining why land-abundant households on average receive more remittances. This may especially be the case if land property is an indicator of wealth. There might also be a problem of double causality in this case, as remittances provide the households with capital to purchase more land. The Inter-American Development Bank's study from 2003 concludes that only 1% of the remittances received by Mexican households are invested in land. Remittances are thereby not very likely to increase the amount of land owned. Nevertheless, there are not enough evidence to draw any clear conclusions.

6.2.4 Community variables have no significant effects

The migration intensity, the marginalization index and the Gini coefficient have no significant impact on the amount of remittances received by the households. It could be expected that more money would be sent to households in highly marginalized areas, but this does not seem to be the case. The same could be expected regarding income inequalities; larger income inequalities would motivate larger amount of remittances to cover up the income gap. However, there seems to be other factors more important in determining the remittance size.

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[13] Turning point calculation: $0.817/2(0.207) \approx 1.97$ (hundred hectares). In hectares: $1.97*100 = 197$

6.3 Analysis 3 – the importance of remittances

In the third analysis the determinants of remittances' importance for the household, in economic terms, are investigated. The dependent variable is remittances as a percentage share of total income. When the share of the income is high, remittances represents an important source of income to cover the household's expenses. The percentage share depends on the amount of remittances received and the household's level of income; higher income decreases the percentage while more remittances increase the percentage. In general poorer households with low levels of income are expected to have remittances constituting a larger share of their income. The r-squared is considerably higher in this analysis than in the two previous, 0.529 and 0.56 respectively for the two regressions. Most of it is likely to be explained by total income being the denominator of the dependent variable. The regressions in this analysis indicate that there are the same factors influencing the importance of remittances as those affecting the amount of remittances received.

6.3.1 Poor households are more dependent on remittances

Households with higher income levels are less dependent on remittances. This is an expected effect because of the nature of how the remittance importance is calculated. However, the results from analysis 2 indicate that richer households receive a larger amount of remittances. This could possibly outweigh the decreasing effect caused simply by higher income. The positive sign of the coefficient of the squared income variable in regression 2 suggest that eventually the increase in remittances catches up with the increase in income. However, the turning point does not take place until an income level of 104 757[14] pesos a month is reached. Most households receive a considerably less amount of money per month. The results thereby support the hypothesis that remittances constitute a larger share of the income for poorer households.

6.3.2 Land ownership increase the importance of remittances

Agricultural land ownership has the same effect on the importance of remittances as it has on the amount of remittances received. This is not surprising as more remittances increase its share of total income. Before including a squared term, the relationship

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[14] Turning point calculation: $0.467/2(0.0202) \approx 11.5594$. $e^{11.5594} \approx 104\ 757$

Table 3 - Regression analysis of determinants of remittances' economic importance for the household

	(1)	(2)
Dependent variable: Remittances as a share of total income		
Gender	0.000386	-0.00198
	(0.00847)	(0.00822)
Age	-0.00134***	-0.00127***
	(0.000302)	(0.000287)
Education	0.000642	-0.00815
	(0.0111)	(0.0103)
Indigenous	-3.74e-05	-0.00427
	(0.0127)	(0.0123)
Children	-0.00454	-0.00417
	(0.00311)	(0.00303)
Ln (total monthly income)	-0.142***	-0.467***
	(0.00330)	(0.0314)
Ln (total monthly income)^2		0.0202***
		(0.00186)
Ownership: agricultural land	0.105***	0.114***
	(0.0209)	(0.0321)
Ownership: agricultural land^2		-0.0295***
		(0.0102)
Ownership: rangeland	-7.76e-05	0.00245
	(0.00103)	(0.00446)
Ownership: rangeland^2		-3.69e-05
		(5.50e-05)
Migration intensity	-0.00333	-0.00393
	(0.00407)	(0.00412)
Marginalization index (adj.)	-0.00533	0.00615
	(0.00514)	(0.0169)
Marginalization index^2 (adj.)		-0.00215
		(0.00333)
Gini coefficient	-0.0777	-0.102
	(0.0911)	(0.0881)
Constant	1.539***	2.809***
	(0.0522)	(0.138)
Observations	2,076	2,076
R-squared	0.529	0.565

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

between agricultural land and the remittance percentage is strictly positive. When including the squared term, a declining effect enters for households owning large agricultural land owned is 9 hectares, the effect of land ownership on the importance of remittances is positive for most households. If assuming that land ownership is a part amount of land. The turning point is at 193[15] hectares, slightly lower than in the analysis of the determinants of the remittance size. As the average amount of a household's wealth, this result also supports the hypothesis that remittances are of larger economic importance for less wealthy households.

6.3.3 The majority of the variables have no effect

The majority of the household variables have no effect on the economic importance of remittances for the households. The only exception is the age of the head of household, which has a significant negative impact. This was expected as age was proven to have a significant negative effect on the amount of remittances a household receives. None of the community variables enter significantly in this analysis either, probably for the same reasons they do not affect the amount of remittances received.

6.4 Comparison of the three analysis

Determinants of the probability of receiving remittances are not necessarily the same as the determinants of the amount of remittances received. This is likely explained by the high correlations between migration and remittances. Factors influencing the migration decision are likely to affect the households' probability of receiving remittances. However, these factors are not necessarily related to how much migrants remit once they are well established abroad. The characteristics of the head of household are mainly determinants of who receives remittances and not the amount they receive. The only exception is age; older heads of households are more likely to receive remittances, but the amount they receive is likely to be smaller. Both income and land ownership are strong determinants of both the probability of receiving remittances and the amount received. Wealthier households have decreased probability of receiving remittances, but they normally receive a higher amount of money. Households owning large areas of agricultural land are also less likely to receive remittances, but more likely to receive higher amounts.

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[15] Turning point calculation: (0.114/2(0.0295))*100 ≈ 193 hectares

Community characteristics only have a significant impact on the households' probability of receiving remittances. This suggests that these factors mainly give incentive for a household to send a member abroad, but have no impact on the remittance decision.

7. Conclusion

This thesis investigates the determinants of remittances in Mexico. Agricultural land property and total income have been found to affect both the probability of receiving remittances as well as the size the remittances. Richer and more land abundant households are less likely to receive remittances, but they receive on average a higher amount of money from abroad. This analysis finds no evidence for a migration hump. The positive relationship between income and remittance size suggests that migrants mainly are motivated by their own self-interest; prospects of future inheritance may be one motivation. This is further supported by remittances increasing with the size of land property. However, the motivations for remitting money are hard to measure, as it is an intrinsic decision made by the migrant. It might also be that high-income households often have higher educational level and that the migrant because of that has a higher income in the destination country, which enables him to remit more. Further research is therefore needed to make any certain conclusions about the migrants' motivation for sending remittances.

Household characteristics are proven to have significant impacts on the probability of migration, but no impact on the amount of money received. The only exception is the age of the head of household; the older he is the higher is the probability of receiving remittances, but the amount received is on average less.

Households in poorly developed communities have higher incentives to migrate. The lower the development level is the higher is the probability of receiving remittances. However, a hump-shaped relationship is found and there seems to be migration barriers for households living in the least developed communities. This may possibly be explained by the towns' high degree of isolation from the rest of the country, as well as low educational levels giving prospects of low wages in the destination country. The first increases the migration costs, while the latter reduces the economic gain from migration.

Evidence from the analysis also supports the anticipated hypothesis that remittances have a higher economic importance for poorer households.

7.1 Proposal for future research studies

This thesis concludes that the poorest are more likely to receive remittances, which is in favor of migration having positive impacts on the poverty. On the other hand, the richest remittance-receiving households receive on average a larger amount of money, suggesting that migration may increase inequalities. There has been done several studies on remittances' impact on inequalities, but the results are inconclusive. Continued research should be done on the topic.

The investigation also suggests that indigenous households have a reduced probability of receiving remittances, when controlling for other household characteristics and community variables. To the knowledge of the author there has been done few studies on migration and remittances in indigenous communities. This is a possible area for further investigations.

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