The Effects of Cumulative Migration on Households' Asset and Capital Accumulation in Rural Guatemala

Gabriela Sanchez-Soto

Department of Sociology
and
Population Studies and Training Center
Brown University
Providence, Rhode Island 02912
Gabriela_Sanchez_Soto@Brown.edu
401-837-5131

Paper Submitted for the 2008 Annual Meeting of the Population Association of America

Abstract

Prior analyses have demonstrated the important role of international migration remittances in the purchase of household goods, housing, and investments in home improvement in less developed countries. Studies also indicate that the use of remittances for the acquisition of productive assets, such as agricultural land, is less prevalent and more closely tied to the local economic context. In this paper I examine the relationship between non-productive and productive asset ownership and migration experience, in the context of a sample of semi-urban and rural Guatemalan communities. I analyze whether asset ownership varies across the type of migration experience—international versus internal—and whether the relationship varies by ethnicity. I use data on migration and remittances collected by the Guatemala Migration Survey in 2000-2002. This analysis uses Ordinary Least Squares regression models to estimate the effects of internal and international migration experience on the accumulation of household assets and agricultural capital.

I. Introduction

The main purpose of this paper is to examine the relationship between household asset and agricultural capital ownership and the accumulation of migration experience. Prior work has demonstrated the important role of international migration remittances in the purchase of household goods, housing, and investments in home improvement. Studies indicate that the use of remittances for the acquisition of productive assets, such as agricultural land and business ownership is less prevalent than other uses, and more closely tied to the local economic context.

In this paper I examine the relationship between non-productive and productive asset ownership and migration experience, in the context of a sample of semi-urban and rural Guatemala communities. I analyze whether asset ownership varies across the type of migration experience—international versus internal—and whether the relationship varies by ethnicity.

II. Theories and previous evidence

Studies of remittances are generally focused on how the receipt of remittances from migrants impacts households and communities in places of origin. Remitters are typically household members temporarily working in another location, and the receipt and use of remittances are both activities closely tied to reasons for migration. Households in the developing world rely on different kinds of strategies in order to meet their economic needs; migration is a key component of these strategies. The ways of using migration as

an economic strategy can be defined according to economic situation, resources, needs, aspirations, among other household characteristics (Itzigsohn, 1995; Massey, *et al.*, 1987).

Migrants and households do not only act individually to maximize benefits, but also work collectively to overcome failures in local markets (Massey, *et al.,* 2002; Sana and Massey, 2005). In many Latin American countries the allocation of resources from both internal and international migration into land, property acquisition, and small businesses has become an essential force in alleviating the effects of governmental and private investment neglect (Orozco, 2003). Rural internal migration is more likely to be used as a strategy for survival, whereas other types of migration allow for the household to accumulate resources and acquire durable goods. In the following sections I will discuss previous work on the role that different types of migration play in the economy of the household.

1a. Migration and household survival

Previous research on remittances has emphasized the role of remittances in household survival, this type of strategy is often taken for granted in the literature on migration, so is not as widely discussed as others. When migration is designed to meet specific income needs, investment in durable goods is considered a low-priority for the family, and migration mostly is used to compensate for the lack of economic opportunities in sending communities (Massey, et al., 1998:258; Kritz, *et al.*, 1992).

In their study in Turkey, Koc and Onan found that households in less-developed regions were more likely to spend remittances on daily expenses compared to those in

more developed regions (2004:108). In another study, Adams found that Pakistani households receiving internal remittances were more likely to perceive migration as a survival strategy. In this particular instance, earnings derived from migration were treated as a mixture of permanent and transitory income, used mostly for consumption (1998:171).

In his study of indigenous labor in pre-Revolutionary Guatemala, Swetnam suggests that diversification of economic activities was a strategy used by indigenous households to overcome market failures and limited employment opportunities. He considers that, among the indigenous population in Guatemala, labor migration was one of the most important ways to diversify resources, especially among households engaged in subsistence oriented agriculture (1989:96-101).

Prior research in different sending countries has consistently shown that money resulting from migration is heavily spent on basic consumption. Among those migrants reporting remittances and/or savings still very few had the capacity to invest the money productively (Durand, *et al.*, 1996:259).

1b. Migration as substitute for well paying jobs and consumer credit

For many households in less developed countries migration is not only a strategy to increase income, it is used to overcome failures in capital, credit and futures markets. Households attempt to overcome market failures by making an investment in the migration of one of its members. When the migrant member starts remitting, the household recovers its investment and the new income can be used to finance different

family projects (Stark and Lucas, 1988; Stark and Taylor, 1991; Massey, *et al.*, 2002; Sana and Massey, 2005; Goldring, 2004; Kritz, *et al.*, 1992).

Associated with this type of strategy is the use of remittances for consumption purposes, including subsistence needs, household furnishings, and durable goods. Within this framework, migration is used for family maintenance, and not necessarily for socioeconomic mobility. In these households, after basic needs are met, remittances are more likely to be used for housing. While money investment on housing increases the wealth of households, it does not improve the income capacity of households.

In a study of rural Mexico, Taylor found that migrant remittances have both indirect short-term effects and long-term asset-accumulation effects on the level and distribution of household farm income (Taylor, 1992:206). In Guatemala, remittances were initially used to purchase basic goods such as food and clothing, but more recently, some families started spending the extra money on luxury items such as televisions, and other electrical goods (Smith, 2006).

In Egypt, Adams found that in some communities, once immediate consumption needs were satisfied; migrant households started devoting higher proportions of their income into non-consumption items. Once households have members abroad, they prefer to spend their money on items other than consumption, such as durable goods, they are otherwise not able to afford. Adams study particularly emphasizes the importance of housing as the main use of remittances after basic needs are fulfilled (Adams, 1991:712).

In less developed countries, where credit and insurance markets are missing or imperfect, migrant remittances are essential to loosen constraints of local markets, and they become instrumental in the accumulation of household assets. Once households are

able to overcome their most essential economic constraints, the potential for investment is large (Taylor, 1992).

2. Migration as a strategy for socioeconomic advancement

Migration can also be a strategy aimed at further socioeconomic advancement; in this case remittances are used to enhance the long-term economic status of households through investments in capital assets that will generate income. The use of remittances for this purpose is closely related to local markets and economic opportunities in sending communities (Lindstrom, 1996).

In Turkey, remittances have been strongly associated with a positive impact on household welfare; households receiving remittances are found to be better off than non-remitting households (Koc and Onan, 2004:108-9). Additionally, in rural Mexico migrant remittances have been found to have indirect short-term effects and long-term asset accumulation effects on the level and distribution of farm income, land and livestock holdings (Taylor, 1992:206).

In a study of Pakistan, Adams found that households receiving remittances from international sources have both the resources and the incentives to invest in land. However, this was not the case for households receiving internal remittances. It is worth mentioning that in the Pakistani case, migrants did not use remittances for the accumulation of livestock assets given the fact that returns to this type of investment were lower (Adams, 1998:167-9).

Remittance income is important because it helps increase investment in rural assets by raising the propensity to invest for migrant households, especially when the

household receives international remittances. Internal remittances, on the other side, are more likely to be treated as regular income (Adams, 1998:170).

In a study on Egypt, Adams found that even when controlling for expenditure, migrants are actually more likely than non-migrants to invest additional increments of expenditure. And when housing items are excluded, most migrant investment goes into the purchase of land (Adams 1991:715).

Remittances allow access to productive assets and complementary inputs (Taylor and Wyatt, 1996). According to Durand and Massey (1992), under the right local economic circumstances, remittances and savings can be devoted to productive enterprises. If households use migration as a tool for diversifying income, remittances are probably not the sole source of income for these families; hence they provide enough surplus income to compensate for a lack of credit or insurance for local economic activities (Massey, et al. 1998; Stark 1988). Previous ethnographic work in Guatemala emphasizes that Mayan migrants who return from the United States find pride in owning land for agriculture, thus use remittances to acquire land —for maize and bean production— as well as for building a house (Taylor, *et al.*, 2006:52-53).

According to research Taylor and his colleagues conducted in a few Guatemalan communities, remittances resulted in significant changes in land distribution, because they were used to buy forest land and convert it into cattle pasture or used to plant maize. In addition, remittances also allowed indigenous migrants to participate on the otherwise restricted Ladino land and cattle businesses, which "permits them to slowly challenge ethnic roles that have developed over the last five centuries" (Taylor, *et al.*, 2006:41).

In a study on Ecuador, Jokisch found that non-migrant households were not able to increase their landholdings, whereas most international migrant households were able to do so by an average of 36%. In this particular case, migrant households had similar land use patterns than non-migrant households; however land owned or managed by migrant households remain in a somewhat steady state of cultivation. This finding is important because it acknowledges that even though "international migration has not significantly changed the overall character of smallholder cultivation practices […] it has permitted some migrants to start their own household" (Jokisch, 2002:538-546).

Orozco argues that the influx of remittances generates a demand for goods and ultimately results on "a multiplier effect on the local economy." In rural areas, remittances are the main source of capital to spend on agricultural endeavors, the migradollars are used to purchase "land, materials to work the land, or seed to plant" (Orozco, 2003).

III. Research Questions and Hypotheses

The main question this research aims at answering is: how successful are households in actually converting migration experience into household assets, wealth and production assets? In addition, I am interested in knowing the way in which this varies by migration type and if there is evidence of ethnic differences in the conversion of migration experience into household assets.

From these main research questions, more specific questions can be derived. (1) How are remittances used in the communities? And how prevalent is this use? (2) Does

the use of remittances for different purposes vary in a systematic way by type of migration? (3) Does the use of remittances for different purposes vary by ethnicity? And (4) is cumulative migration experience associated with a great likelihood of owning assets? Are households with more cumulative migration experience more likely to own assets?

Several hypotheses derive from these research questions. First, I anticipate U.S. migration earnings to be associated to a lower likelihood of investing in rural activities. I expect indigenous migrants to be more likely to utilize remittances for the acquisition of agricultural production assets. Overall, I expect remittances to the U.S. to be widely used for the purchase and accumulation of any kind of household asset and properties.

Second, I anticipate rural migration to be closely tied to a survival strategy. On the contrary, I expect urban migration to result in higher income and probability for acquiring durable assets and financing housing purchases. International migration will result in higher economic returns; therefore it will be related to economic advancement and investment on production.

Third, according to previous work, indigenous migrants will be more likely to utilize remittances to purchase agricultural land, inputs and cattle. Access to international migration should also be different for Ladinos than for indigenous people in Guatemala, with international migration being more common among Ladinos. Therefore, I also expect indigenous people to have less access to international remittances than Ladinos. For Ladinos, on the other hand, migration experience should result in a higher likelihood of acquiring household assets, such as large durables and vehicles.

And last, I expect international and rural-to-urban migration experience to be strongly and positively associated with household economic advancement and accumulation of agricultural capital even after controlling for ethnicity and socioeconomic characteristics.

IV. Guatemalan Background

In the last couple of decades Guatemala reached exceptionally high rates of international migration, particularly to North America. This phenomenon is attributed to long-term political instability, natural disasters and the lack of economic opportunity in the Central American country. In addition to international migration, Guatemala has a long tradition of internal migration, particularly temporary rural-to-rural migration as well as long term rural-to-urban migration. Within this setting, rural-to-rural migration has been usually prevalent among the indigenous population, whereas migration to urban areas and other countries is mostly dominated by Ladinos (mixed Amerindian-Spanish).

During the 36-year long civil war, thousands of political refugees went to Mexico, Canada and the United States. Later, by the end of the war, many Guatemalans returned —particularly from Mexico— to find their country's economy utterly shattered. The Guatemalan economy is dominated by the production of agricultural goods[1], where the main sources of capital are foreign, and the main source of labor is the indigenous

[1] The agricultural sector accounts for about one-fourth of GDP, two-thirds of exports, and half of the labor force. Coffee, sugar, and bananas are the main products (US State Department, 2006).

population.[2] Unfortunately, by the end of the civil war, both agricultural exports and foreign investment were at alarmingly low levels.[3] This situation provided a powerful incentive for Guatemalans from all demographic backgrounds to migrate out of the country in search of economic opportunity (Smith, 2006; Morrison and May, 1994:112).[4]

The International Organization for Migration (IOM) reports that more than 1.1 million Guatemalan citizens are living abroad, of whom more than 97% live in the United States. Considering the number of Guatemalans living abroad and the fact that most of them are labor migrants, it is reasonable to say that remittances have become a fundamental source of support for Guatemalan families. In 2005 remittances summed to 3 billion dollars, and about 98% percent came from the United States (Smith, 2006). The remittances are used mainly to purchase basic goods, although their use for investment, savings, education and health is now increasing. It has become clear, that in the last 20 years Guatemala moved rapidly from being an agro-exporter to being a labor exporter with the greatest amount of remittances received among all countries in Central America (Agunias, 2006).

Given the importance of this topic, recent research on Guatemalan migration is increasingly focused on the study of the economic effects of migration for households and communities of origin. Unfortunately, the literature on migration and remittances is still scarce for this country; therefore there is a pressing need to explore this phenomenon empirically.

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[2] In Guatemala about 40% of the population is indigenous; most of them belong to Mayan ethnic groups such as: K'iche (9.1%), Kaqchikel (8.4%), Mam (7.9%), Q'eqchi (6.3%), and other Mayan (8.6%) (Migration Information Source).

[3] Studies report a negative growth in agricultural production in the period from the mid 1970s to 1987 (Smith, 2006)

[4] According to data by the International Organization for Migration, emigration increased from around 40,000 migrants in 1990 to more than 140,000 in 2005 (Smith, 2006).

In addition, an important part of the research on migration is devoted to the study of its consequences on a given social environment. Within this area of study one theme is predominantly salient, the relationship between migration and the accumulation of economic resources by sending households. What is still not very clear in the case of Guatemala are the differences in economic returns between internal —both rural-to-rural and rural-to urban—and international migration. Furthermore, the analysis of migration in Guatemala should not forget to address the differences between indigenous and Ladinos regarding the economic profit derived from migration and the role they play in the structure of social relations within communities.

V. Data and Analysis

This analysis will use data on migration and remittances collected by the Guatemala Migration Survey. This survey was conducted in two rural municipalities in Guatemala, located in the western department of Quiche in 2000-2002, and its purpose is to examine the determinants, dimension, and consequences of both internal and international migration in rural Guatemalan communities. The sample includes the main towns in the respective municipalities as well as five additional villages that were selected on the basis of their diversity in development patterns and ethnic composition, in order to represent a wide array of possible combinations (Lindstrom and Martinez, 2003).[5]

The study selected a random sample of 574 households which yield information on 3,772 individuals in the chosen communities. The data was collected with a survey questionnaire that was administered to household heads and their spouses in two or three

[5] See map 1 for the location of the study municipalities.

interview sessions. The questionnaire gathered basic demographic and migration data for all current household members and non-resident children; information on household assets including residential property, businesses, and agricultural land; information on the migration experience, including remittances use; community leadership roles of relatives of the household head and the spouse of the head; and finally, information on the characteristics of the last U.S. trip for household heads with migration experience (Lindstrom and Martinez, 2003).

For the purpose of this analysis, I will use Ordinary Least Squares regression models to estimate the effects of internal and international migration on the accumulation of household assets and agricultural capital.

Dependent Variables

I constructed two indices to be used as the outcome variables.[6] The first index uses information related to housing conditions and ownership of durable goods to construct a household assets index. This index includes variables such as home ownership; type of flooring and type of roof; the nature of toilet facilities; electricity, water, and gas; number of rooms in the house; appliances such as stove, refrigerator, washing machine; other small durables like radio, CD player, television; in addition to bicycle, motorcycle, automobiles and other vehicles.

The second index deals with agricultural production capital and includes variables like ownership and size of agricultural land; whether or not the household spends money on agricultural inputs like fertilizer, insecticides, or seeds; ownership and number of livestock owned. Both variables exclude property and land that were inherited or donated

[6] See Appendix 2 for a more detailed description of the construction of these variables.

because this analysis only takes into consideration goods that were purchased by the household in a way to control for the economic status of the family before migration.

In order to use these variables in a multivariate analysis, they were aggregated into indices using principal component factor analysis. Factor analysis is a statistical data reduction technique that is used to explain variability among observed random variables. It takes into consideration the correlations between the variables to capture the variation among them. Both indices are highly reliable, the composite variable for agricultural capital has a Cronbach's alpha of .585, whereas the one for the household assets index is .860. These composite indices follow a standard normal distribution. The value of the index for each household indicates its relative position within the distribution of all households. A value of zero in either one of the indices means that the household is at the center of the distribution, while a positive value is associated with a higher economic status. On the contrary, a negative value is related to a lower position in the relative distribution of household assets and agricultural capital.

Independent Variables

The main covariates included in the models are the basic demographic characteristics of the household head such as gender, age at the time of the survey, number of years of education and ethnicity.[7] In addition, using a migration history for the household heads I constructed duration variables that aggregate the migration experience of the household head in years. For those cases where the migrant had not returned I calculated the

[7] The survey asks several questions related to the ethnic identification of the respondent. For the construction of this variable I took into consideration whether or not the respondent considers him or herself to be indigenous, if his/her mother tongue is a Mayan language, if he/she speaks a Mayan language at all, and if he/she wears traditional Mayan attire.

cumulative duration of their trips up to the date of the survey. The types of migration included in this analysis are rural-to-rural migration, rural-to-urban migration, and migration to the United States. In addition, I added two variables that summarize the total number of trips within Guatemala —rural or urban—and to the United States of the head of the household up to the moment of the survey.

I also constructed cumulative migration experience variables for all the sons of the household head. Unfortunately, in the case of sons I only have information on their first and last trip and total number of trips. Despite this limitation, I believe this information is worth including given the fact that sons' migration is a common strategy for households who are at later stages of the life cycle. The duration variables, just like in the case of the heads of the household, are measured in years for rural-to-rural, rural-to-urban and U.S. migration.

VI. Descriptive Analysis

Table 1[8] summarizes the sample characteristics of the 7 survey sites of the Guatemala Migration Study. From these figures it is important to emphasize the variation in ethnic composition in the sample and that it includes households in both rural and semi-urban communities. In addition, basic sociodemographic characteristics of the heads of household in the sample are summarized in table 2. Most household heads are male, only about 12 percent are women and this is the case for both ethnic groups. The mean age of indigenous heads is almost 45 years, while for Ladinos it is 47 years old.

[8] See Appendix 1 for all tables and figures.

Education levels are particularly diverse across the sample, 41 percent of the Mayan household heads have no schooling whereas only 28.6 percent of the Ladinos did not receive education. Most Ladinos received at least elementary education, 41 percent of Maya had 1 to 6 years of education, and also 11 percent of the indigenous interviewees have between 10 to 12 years of schooling. The distribution of education seems odd given that indigenous are the ones negatively affected by ethnic inequality. Education levels like the ones we see in this table could suggest the possibility that differences between indigenous and Ladinos are not related to their access to opportunities for education, but are associated to actual labor market and occupational opportunities later in life.

Table 3 shows migration and remittance receipt prevalence among the households in the sample at the time of the survey. At the moment of the survey, about 40 percent of the households in the sample had at least one migrant within Guatemala, and close to 28 percent have a migrant in the United States. Among the households that had at least one active migrant, 38 percent received remittances.

About 32 percent of all indigenous households receive some kind of remittances, compared to 40% of Ladino households. Focusing on differences between types of migration strategies and remittance sending reveals important differences between Maya and Ladinos. Roughly 33 percent of Mayan households have a member that was an internal migrant at the time of the survey, and from this group of family units, 33 percent receive remittances form Guatemala. The story for indigenous and international migration is quite different, only 19.7% of these households have at least one active migrant in the United States, and among those households 79 percent receive remittances.

Among Ladinos, around 31% of households have a member that is currently working somewhere else in Guatemala; whereas participation in U.S migration is much higher, 48 percent of Ladino households have someone in the United States. From the Ladino households with a migrant member within Guatemala, almost 31 percent receive remittances, while 83% of those with a migrant in the United States do so. The trend looks similar to the one explored before for the Maya, although the proportion for international remittances is particularly higher for Ladinos, as well as their overall participation in migration.

According to preliminary findings by Lindstrom and Martinez, the pervasiveness of international migration in Guatemala may have an impact on the migration patterns of the indigenous population, because "there is some evidence that U.S. migration is drawing indigenous men away from internal migration" (2003:13). The increasing importance of migration among both indigenous and Ladinos in Guatemala points at the also growing importance of remittances and the way these resources are being allocated by households in rural sending communities.

Migration experience of the household heads is summarized in table 4. Rural experience is more prevalent among indigenous; almost 56 percent of the Mayan heads have made a rural-to-rural trip compared to only 30% of Ladinos. Even though indigenous rural-to-rural migrants appear to be making more rural trips than their counterparts, Ladinos have a comparable cumulative duration for rural migration. These differences are possibly related to permanent changes of residence within the rural areas and not necessarily tied to short-term labor migration. It should also be emphasized that

indigenous have a higher prevalence of temporary rural migration compared to Ladinos, possibly associated with seasonal agricultural work.

When looking at rural-to-urban migration it is interesting to notice that the number of trips reduces significantly compared to rural migration, as well as the prevalence of this type of migration among both ethnic groups. However, it is important to notice that higher cumulative duration that could be associated to longer trips to the urban areas, and the presence of a semi-permanent settlement migration strategy. When it comes to rural-to-urban movements, indigenous migrants appear to follow two particular patterns; on one side there are migrants to go to the city for short periods of time, and on the other side, there are the long-term urban migrants.

In the case of international migration, almost 86 percent of the Mayan heads had never gone to the United States; in contrast, about 70 percent of the Ladino heads have not made any trips to the U.S. Although the number of trips is lower than the figures for internal migration, the table shows that the trend in international migration is oriented towards longer stays outside the country. More than 60 percent of the household heads who migrated to the U.S stayed for 3 or more years.

For Guatemala, as well as for other Central American countries, remittances have become a major source of income, exceeding by far traditional export crops such as coffee, bananas and sugar. For instance, in Guatemala, a predominantly rural nation, more than one half of the farm plots, are not big enough for production beyond subsistence farming (Taylor, *et al.*, 2006:42-44).

Table 5 shows property and assets ownership as well as use of remittances from internal and international migration to acquire such goods by ethnicity. Among the 83%

of indigenous households that owned at least one residential property, 21 percent used remittances from Guatemala to finance its purchase. And from the 87% of Ladinos that own residential property only 11% financed it through internal migration. Moreover, more Ladino households used remittances from the U.S. to purchase a house.

In addition, looking at the proportion of Ladinos that have residential properties through inheritances allows us to understand the relative socioeconomic position of the each particular ethnic group. About 36.6 percent of Ladinos have inherited at least one residential property, while only 16.4 percent of indigenous did so. This result points at an interesting issue, indigenous households are using resources derived from migration in order to purchase residential property, and it also suggests that migration has an important role in Maya's capacity to overcome historical economic disadvantage.

The distribution of household assets brings additional evidence of the economic differences between indigenous and Ladinos. When it comes to the proportion owning small goods —like TV, music player, radio or sewing machine—the dissimilarities between Ladinos and Maya are relatively small. However, an important difference is to be found among more expensive appliances such as stove, refrigerator, and washing machine, 50% of indigenous households own this type of goods, whereas 73% of Ladino families have purchased one or more of this durables.

Ownership of vehicles is another asset category that illustrates the different economic circumstances between these ethnic groups. Almost 21 percent of Mayan households own some sort of vehicle, compared to 30 percent of Ladino households. Additionally, Ladinos are more likely to use international remittances to purchase such vehicles, 40 percent of the Ladino vehicle owners used international remittances, while

only 17 percent of indigenous did. Acquisition of a vehicle can be an important symbol of socioeconomic advancement among Ladino U.S. migrants, while it is clearly not the case for indigenous migrants.

Particular differences are found in the use of remittances for agriculture related activities. Among the Mayan households, 62% own agricultural land, within these 16% purchased land using remittances form Guatemala and almost 5% use remittances from the United States. In contrast, only 52% of the Ladino households own agricultural land, and a very small proportion of them actually used remittances for land purchase. It is remarkable that 48 percent of the Ladino households who own land obtained it through inheritance. On the other side, agricultural land ownership is actually much more common among Maya compared to Ladinos.

In the case of livestock, even though the proportion of households that owned any type of farm animals is not substantially different by ethnicity, it is to be noted that indigenous migrants tend to use remittances from internal migration to acquire animals. These ethnic differences carry over to the purchase of other agricultural inputs such as seeds and fertilizer where the use of both internal and international remittances among Maya is important. It is essential to note that Ladinos are not translating migration resources into agriculture in the same proportion the Maya are. It is plausible that Ladinos already have the economic resources for agricultural production, and migration is not part of an agricultural production strategy.

VII. Multivariate Analysis Results

The multivariate analysis consists of two parts. In the first part I estimate the effects of migration experience on household's asset accumulation, and in the second part I estimate the effects of migration experience on the accumulation of agricultural capital. I specified the same four models for each one of these dependent variables. The first model includes only the dependent variable and the variables for cumulative migration duration —for rural, urban and U.S. migration. In the second model I included basic sociodemographic characteristics of the household head such as gender, age, education and ethnicity. For the third model I substituted the duration variables for the total number of rural, urban and U.S. trips to test how sensitive were my results to the way I measure migration experience and kept the sociodemographic characteristics. Then, for the fourth model, I put duration variables back in instead of the trip duration variables, and I added urban and U.S, migration experience for the son's of the household head.

Table 6 summarizes the results of the OLS regression model that estimates the effect of cumulative migration experience on household asset accumulation. The results in this model confirm that migration experience is a very important and significant determinant of household assets accumulation (model 1), and this effect holds even when demographic characteristics are taken into account (model 2).

Additionally, it is important to notice that there are not significant differences between male and female headed households in household asset ownership. On the other side, ethnicity does make a big difference; Ladinos are significantly more likely to have a

better economic position, measured by the household's assets index, even after controlling for other characteristics in the model.

Rural migration is negatively associated with household's asset accumulation, while both urban and U.S. migration result a higher value of the asset index, and these effects are significant in all four models. These results suggest that rural to rural migration is a survival strategy rather than a capital accumulation tactic. Unlike urban and international migration, rural to rural migration does not result in enough surplus income in order to make the household able to invest in improving its relative economic position, whereas both urban and international migration allow for expenditures beyond basic household needs.

A third model was specified where migration experience was measured by the number of trips made instead of the cumulative duration in years. Model 3 shows that the number or rural trips is negatively associated with asset accumulation, while the number of urban trips did not make a difference. In this particular case, it is possible that the effect of urban trips became insignificant because rural-to-urban migrants make fewer trips that last longer; so that duration is a better way to capture the impact of urban migration on household asset accumulation. Finally, in this model, U.S. trips are also an important influence in improving household economic conditions.

Model 4 includes the duration variables and demographic characteristics, as well as the cumulative migration experience of the household head's sons. When we consider sons' migration experience, their migration experience inside Guatemala does not contribute to household economic improvement, whereas their U.S. experience does, controlling for all the other variables in the model.

Table 7 shows the results for the ordinary least squares models estimating the effects of migration on agricultural capital accumulation. Model 1 illustrates a significant relationship between migration and agricultural asset ownership. This relationship remains in model 2 when we control for demographic characteristics for all types of migration. The effect of rural to rural migration becomes less significant, and it remains like that in model 4 when we control for sons' migration experience.

Migration experience is an important predictor for agricultural capital ownership. As hypothesized, rural-to-urban migrants are less likely to invest the returns of migration in agricultural production, whereas international migration is positively associated with the accumulation of agricultural assets, even after controlling for all the other variables in the model. Rural migration is also positively associated with the accumulation of agricultural production capital, although to a lesser extent than U.S. migration.

Moreover, according to what was hypothesized at the beginning, there is a significant difference between Ladinos and indigenous when it comes to the accumulation of agricultural capital. However, the effect goes in the opposite direction to what was expected. Ladinos are considerably more likely to accumulate agricultural assets than Mayan migrants are, even after taking other characteristics into consideration. This result is particularly surprising after seeing that unlike Ladinos, indigenous were using remittances to finance agricultural activities. A reasonable explanation for this trend is that even if Mayan migrants are investing in agriculture, they have smaller holdings of land and fewer livestock. It is possible then, that even with the aid of migration, Mayan households have not yet reached the level of agricultural wealth that Ladino households have enjoyed for a long time.

Migration experience remains important even when we measure it as number of trips in model 3. Urban trips are, in the same way as urban experience, associated with a lower likelihood of owning agricultural capital. In contrast, rural and international trips have a positive effect. Actually, the effect of the number of international trips is remarkably high and highly significant.

The cumulative migration experience of the household head's sons is not a significant predictor of ownership of agricultural assets. Additionally, male headed households are much more likely than female headed households to accumulate agricultural assets. The effect of education is highly significant and every additional year of education is associated with a negative effect on agricultural investment.

VIII. Conclusions

The results of this analysis emphasize that migration experience is important for the economic advancement of households. Results suggest the role of rural migration as a survival strategy rather than as an effective tool for upward economic mobility. In addition, international migration had the biggest impact on both capital and asset accumulation.

Another important finding is that urban migrants do not invest in agriculture; what this result suggests is that even when migrants return or maintain a house to the rural areas, their economic activities remain tied to urban sectors of production and not with rural activities.

Indigenous migrants are disadvantaged in household asset accumulation, and contrary to what was expected, they are also disadvantaged in the accumulation of agricultural capital, even after controlling for other covariates. This is a very important finding since previous ethnographic evidence had associated indigenous migration with greater opportunities and incentives to accumulate land and agricultural assets.

It is also important to emphasize that even though the descriptive analysis highlighted the great importance of remittances as a tool for the Maya to compensate for constant economic disadvantage, this contribution has not yet translated to their relative position in the distribution of household assets and agricultural capital as the multivariate analysis show.

Future directions for research will examine what are the individual and household characteristics that determine household remittances receipt. In addition I would like to further examine the determinants of specific allocation of remittances. I am specifically interested in exploring the relationship between migration and land purchase using event history models.

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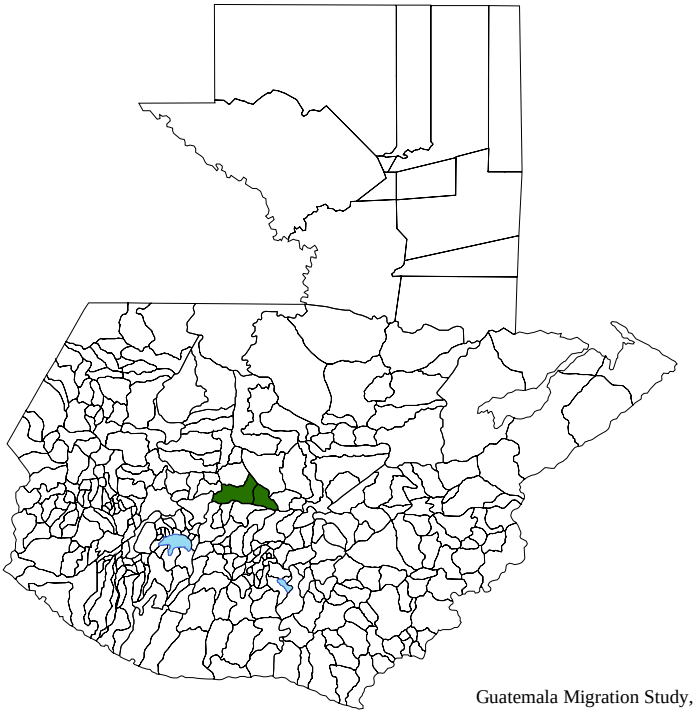
X. Appendix 1: Tables and Figures

Figure 1
Location of the Study Municipios in Guatemala



Guatemala Migration Study, 2000-2002

Table 1. Sample Characteristics.
Guatemala Migration Study

Community	Number of HH	Number of HH in sample	Number of persons in sampled HHs	Percent of sampled indigenous population
Town 1	1400	202	1,218	48.3
Village 1	80	59	412	22.8
Village 2	40	39	269	93.3
Village 3	50	36	242	100
Town 2	500	149	988	11.2
Village 4	50	46	317	0
Village 5	50	39	326	91.1
Total		570	3,772	

Source: Lindstrom and Martinez, 2003

Table 2. Basic Demographic Characteristics of the Household Heads

	Indigenous (61.7%)		Ladinos (38.3%)	
	Mean	**Std. Dev**	**Mean**	**Std. Dev**
Age [a]	44.82	15.380	47.23	15.374
Sex (male)	0.88	0.327	0.87	0.339
Education in years	**%**		**%**	
No education	41.2		28.6	
1-6 years	40.7		63.2	
7-9 years	4.0		3.6	
10-12 years	11.0		3.6	
13 and more years	3.1		.9	

N=574
[a] at the time of the survey.

Table 3. Migration and Remittance Receipt Prevalence Among Households

	Indigenous	Ladinos	All
1 or more active migrants: [a]			
Within Guatemala	33.2%	30.8%	39.4%
To the U.S.	19.7	48.0	27.6
Receiving remittances [a]	32.9	40.5	37.9
From Guatemala	32.7	30.6	31.2
From the U.S.	79.3	82.6	80.5

N=574
[a] at the time of the survey

Table 4. Migration Experience, Household Heads

	Indigenous	Ladinos
Rural Migration		
Number of trips		
0 trips	44.1%	70.0%
1-2 trips	15.3	15.0
3-4 trips	5.9	3.2
4 or more trips	34.7	11.8
Cumulative duration [a]		
Less than 1 year	23.7	19.7
1-3 years	29.3	27.3
3 or more years	47.0	53.0
Urban Migration		
Number of trips		
0 trips	86.2	85.0
1-2 trips	11.6	13.6
3-4 trips	0.6	0.9
4 or more trips	1.7	0.5
Cumulative duration [a]		
Less than 1 year	32.7	21.2
1-3 years	6.1	24.2
3 or more years	61.2	54.5
U.S. Migration		
Number of trips		
0 trips	85.6	70.5
1-2 trips	13.3	26.4
3-4 trips	1.1	3.2
Cumulative duration [a]		
Less than 1 year	9.3	12.7
1-3 years	30.2	25.4
3 or more years	60.5	61.9

N=574

[a] For those with migration experience

Table 5. Property and Assets Ownership and Use of Remittances from Internal and International Migration by Ethnicity

	Indigenous	Ladino
Housing and household goods		
Own Residential Property	83.3%	87.3%
Used remittances from Guatemala	21.0	11.0 [a]
Used remittances from USA	9.5	16.2
Inherited Residential Property	16.4	36.6
Other sources	49.3	36.6
Household Assets		
Large durables [b]	49.7	72.7
Small durables [c]	87.6	94.5
Transportation		
Own Vehicle	20.9	30.5
Used remittances from Guatemala	9.3	1.4
Used remittances from USA	17.3	40.3
Other sources	73.3	58.3
Businesses		
Own Business	37.0	35.5
Used remittances from Guatemala	19.2	9.0
Used remittances from USA	6.9	17.9
Other sources	73.8	73.1
Agricultural inputs		
Own Agricultural Land	61.6	51.8
Used remittances from Guatemala	15.7	3.5 [a]
Used remittances from USA	4.6	7.0
Inherited Agricultural Land	35.0	48.2
Other Sources	44.7	41.2
Own Livestock	52.3	51.8
Used remittances from Guatemala	23.3	8.9 [a]
Used remittances from USA	16.7	12.5
Inherited livestock	0	1.8
Other sources	60.0	78.6
Seeds and Fertilizer	62.1	63.2
Used remittances from Guatemala	22.8	6.2 [a]
Used remittances from USA	11.0	4.8
Other sources	66.2	89.0

N=574 HH

[a] The numbers in this column may not sum 100%, because some Ladinos used remittances from both Guatemala and the U.S.

[b] Such as stove, refrigerator, and washing machine

[c] Such as music player, radio, TV, sewing machine, bicycle

Table 6. OLS Regression Model to Predict the Effect of Migration Experience on Household's Assets Accumulation

Variable	Model 1	Model 2	Model 3	Model 4
Cumulative migration duration				
Rural migration	-0.086***	-0.058***		-0.055***
Urban migration	0.118***	0.070***		0.068***
U.S. migration	0.078***	0.041†		0.040*
Gender				
(Female)				
Male		0.054	0.107	0.046
Age		0.014***	0.014***	0.011***
Education		0.127***	0.116***	0.128***
Ethnicity				
(Indigenous)				
Ladino		0.382***	0.309***	0.357***
Number of Trips				
Rural			-0.031***	
Urban			0.018	
U.S.			0.141*	
Sons' cumulative migration duration				
Urban migration				0.005
U.S. migration				0.013*
Constant	0.020	-1.254***	-1.151***	-1.159***
R Squared	0.125	0.383	0.418	0.390

Source: Guatemala Migration Study
N=574
† $p < 0.05$ * $p < 0.005$ ** $p < 0.001$ *** $p < 0.000$

Table 7. OLS Regression Model to Predict the Effect of Migration Experience on Household's Agricultural Capital Accumulation

Variable	Model 1	Model 2	Model 3	Model 4
Cumulative migration duration				
Rural migration	0.051***	0.030†		0.031†
Urban migration	-0.076***	-0.055**		-0.056***
U.S. migration	0.054*	0.052**		0.052*
Gender				
(Female)				
Male		0.709***	0.665***	0.701***
Age		0.007**	0.006*	0.007†
Education		-0.044***	-0.044***	-0.043***
Ethnicity				
(Indigenous)				
Ladino		0.251**	0.276***	0.249***
Number of Trips				
Rural			0.016***	
Urban			-0.055†	
U.S.			0.183***	
Sons' cumulative migration duration				
Urban migration				-0.004
U.S. migration				0.002
Constant	-0.800	-0.927***	-0.941***	-0.923***
R Squared	0.048	0.147	0.151	0.147

Source: Guatemala Migration Study
N=574
† p < 0.05 * p < 0.01 ** p < 0.005 *** p < 0.000

XI. Appendix 2: Construction of Indices.

In the developing world where income and expenditures are not easily or accurately measured, a good alternative to measure wealth is to use indices constructed with information on household assets, access to services, and properties. According to comparative studies using the Demographic and Health Surveys (DHS), wealth indices represent a more permanent household status than income or expenditure. Additionally, indices are a more convenient measure given that it the information to construct it is easily obtained through standard survey questionnaires (Rutstein and Kiersten, 2004:4).

Households in the Guatemala Migration Study are asked to report on the possession of various household assets and appliances; home and land ownership; dwelling characteristics; vehicle ownership; agricultural inputs; and livestock. In order to use these variables to rank households by their relative socioeconomic status within the community it is necessary to aggregate this information in an index. For the particular purposes of this analysis I constructed both a household assets index, and an agricultural capital index.

Following the DHS wealth index methodology, I used the SPSS factor analysis procedure to create a household's asset index. This procedure first standardizes the indicator variables; then the factor coefficient scores (factor loading) are calculated; and finally, for each household, the indicator values are multiplied by the loadings and summed to produce the household's index values. The resulting sum is a standardized score with a mean of zero and a standard deviation of one (Rutstein and Kiersten, 2004:9; Filmer and Pritchett, 1999:88). The value of the index for each household indicates its

relative position within the distribution of all households. A value of zero means that the household is at the center of the distribution, while a positive value is associated with a higher economic status. On the contrary, a negative value is related to a lower position in the relative distribution of household assets and agricultural capital.

Household Assets Index

For the construction of the household assets index, I used most of the assets and services usually asked about in DHS surveys; table 8 lists the variables I chose to construct the household asset index. This index uses information such as home ownership; type of flooring and type of roof; the nature of toilet facilities; electricity, water, and gas; number of rooms in the house; appliances such as stove, refrigerator, washing machine; other small durables like radio, music player, television; in addition to bicycle, motorcycle and automobiles. A correlation matrix for these variables is shown in table 9.

Table 10 depicts the component matrix for the household assets index; this composite variable explains almost 33% of the variation in the distribution of household assets. Additionally, the resulting index very reliable, it has a standardized Cronbach's alpha of .860; a high value of this reliability coefficient indicates that the index is internally consistent.

Agricultural Assets Index

The second index created for the purpose of this analysis has to do with agricultural production capital and includes variables like ownership and size of agricultural land; whether or not the household spends money on agricultural inputs like fertilizer,

insecticides, or seeds; ownership and number of livestock owned (see table 11). This variable excludes land that was inherited or donated; it only considers property acquired by the members of the household.

In table 12, I show the correlation matrix for the agricultural asset's variables and table 13 depicts the component matrix for the agricultural capital index. The variance explained by this variable is of almost 35% with a Cronbach's alpha reliability score of .585.

Table 8. Variable Definitions, Household Assets Index

Variable Label	Description
Floor	Type of flooring material in the dwelling
Roof	Type of roof material in the dwelling
Toilet	Type of toilet service in the dwelling
Gas/fuel	Type of fuel used for cooking
Number of rooms	Number of rooms in dwelling
Electricity	Electricity service in the dwelling
Water	Source of water service in the dwelling
Stove	Whether or not there is a stove in the house
refrigerator	Whether or not there is a refrigerator in the house
Washing machine	Whether or not there is a washing machine in the house
Telephone	Whether or not there is telephone service in the household
Bicycle	Whether or not the household has a bicycle
Automobile	Whether or not the household has an automobile
Motorcycle	Whether or not the household has a motorcycle
Radio	Whether or not they have a working radio in the house
TV	Whether or not they have a working TV set in the house
Music player	Whether or not they have a working music player in the household

Table 9. Household Assets' Correlation Matrix

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Floor																
2	Roof	.319															
3	Toilet	.530	.245														
4	Gas/fuel	.450	.218	.535													
5	Number of rooms	.288	.161	.267	.236												
6	Electricity	.498	.193	.436	.297	.198											
7	Water	.431	.191	.441	.297	.179	.347										
8	Stove	.573	.225	.612	.609	.305	.388	.382									
9	refrigerator	.433	.258	.521	.467	.378	.311	.300	.567								
10	Washing machine	.181	.102	.222	.237	.351	.104	.107	.228	.320							
11	Telephone	.266	.160	.220	.282	.259	.159	.164	.291	.328	.352						
12	Bicycle	.259	.134	.265	.188	.282	.245	.226	.361	.338	.231	.222					
13	Automobile	.340	.174	.266	.327	.313	.199	.182	.392	.482	.291	.374	.322				
14	Motorcycle	.152	.071	.115	.113	.200	.096	.078	.180	.187	.115	-.015	.096	.135			
15	Radio	.160	.079	.108	.087	.152	.218	.140	.170	.173	.045	.103	.153	.113	.048		
16	TV	.546	.220	.473	.365	.307	.558	.316	.537	.463	.168	.259	.389	.354	.122	.313	
17	Music player	.187	.116	.198	.193	.276	.127	.234	.271	.296	.201	.236	.397	.209	.087	.201	.294

Table 10. Component Matrix, Household Assets Index	
Floor	.729
Roof	.384
Toilet	.722
Gas/fuel	.655
Number of rooms	.522
Electricity	.586
Water	.537
Stove	.787
refrigerator	.740
Washing machine	.417
Telephone	.478
Bicycle	.527
Automobile	.578
Motorcycle	.237
Radio	.298
TV	.728
Music player	.446
Cronbach's Alpha (standardized)	.860
% variance explained	32.877
Extraction method: Principal component analysis	

Table 11. Variable Definitions, Agricultural Capital Index

Land	Size of land owned in 10,000 m^2
Fertilizer	Use of fertilizer
Insecticide	Use of insecticide
Seeds	Use of seeds
Large livestock	Number of bulls, cows, horses, donkeys and mules owned
Small livestock	Number of sheep and pigs owned

Table 12. Agricultural Assets' Correlation Matrix

		1	2	3	4	5
1	Land					
2	Fertilizer	.169				
3	Insecticide	.104	.666			
4	Seeds	.108	.276	.318		
5	Large livestock	.120	.144	.188	.187	
6	Small livestock	.053	.185	.204	.051	.080

Table 13. Component Matrix, Agricultural Capital Index

Land	.324
Fertilizer	.817
Insecticide	.833
Seeds	.568
Large livestock	.411
Small livestock	.366
Cronbach's Alpha (standardized)	.585
% variance explained	34.879

Extraction method: Principal component analysis