The Effects of Migration Experience on Households' Asset and Capital Accumulation. Evidence from Central America

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Abstract

Previous studies show the important role of international migration and remittances in the purchase of household goods, housing, and investments on 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. Based on preliminary results from the Guatemala Migration Survey (GMS) this paper examines the relationship between non-productive and productive asset ownership and migration experience in 26 Central American communities. The study uses data from Costa Rica, Nicaragua and Guatemala (Quetzaltenango region) from the Latin American Migration Project (LAMP) to expand on a previous analysis of data from the GMS in the Quiché region of Guatemala. This analysis uses multivariate regression models to estimate the effects of internal and international migration experience on the accumulation of household assets, agricultural capital, as well as business ownership.

I. Introduction

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 or small businesses, is less prevalent and more closely tied to the local economic context. Based on preliminary results from the Guatemala Migration Survey (GMS) this paper examines the relationship between non-productive and productive asset ownership and migration experience in 26 Central American communities. The study uses data from Costa Rica, Nicaragua and Guatemala (Quetzaltenango region) from the Latin American Migration Project (LAMP) to expand on previous findings from the GMS in the Quiché region of Guatemala.

In this paper I examine the relationship between non-productive and productive asset ownership and migration experience, in the context of a sample of urban, semi-urban and rural Central American communities. I analyze whether household assets, agricultural capital and business ownership varies across families with internal and international migration experience.

The preliminary results on Guatemala (see table 6) point out that different types of migration play different roles in households' economy. International migration serves primarily as a strategy for social mobility by enabling the purchase of durable goods and the investment in productive activities. Unlike international migration, internal urban migration acts mostly like a wage to cover for household expenses, while rural migration serves as a survival strategy among

poorer households. By doing a comparative study using data from other Central American countries I expect to test the applicability of these findings to a broader geographic context.

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 the reasons motivating migration. Households in the developing world rely on different kinds of activities in order to meet their economic needs, and migration is a key component of these activities. The ways of using migration as an economic strategy can differ 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 economic benefits, but also work collectively to overcome failures in local markets (Massey, *et al.,* 2002; Sana and Massey, 2005); for instance, in many Latin American countries the allocation of resources from both internal and international migration into land, property acquisition and small business investments 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 households' most basic 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 explored the role of remittances in improving households' economic status. However, it is possible that remittances may only bring minimal economic resources to the household, and such resources would only provide enough to guarantee its survival. Interestingly, this type of strategy is often taken for granted in the literature on migration, and is not as widely discussed. When migration is designed to meet specific income needs, investment in durable goods is considered a low-priority for the family, and migration is used mostly to compensate for the lack of economic opportunities in sending communities (Massey, et al., 1998; Kritz, *et al.*, 1992).

In their study in Turkey, Koc and Onan found that households in less developed regions were more likely to use remittances on daily expenses compared to those in more developed regions (2004). 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).

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).

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, very few had the capacity to invest their earnings productively (Durand, *et al.*, 1996).

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, migration is rather 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-building 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). 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).

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 way to further the family's socioeconomic advancement, where 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). 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).

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).

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).

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).

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).

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).

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 converting migration experience into household assets, wealth and production assets? Furthermore, I am interested in learning the way in which the conversion of migration experience into household assets varies by migration type.

From these main research questions, more specific questions can be derived. (1) How prevalent are internal and international migration in the communities of study? And, how many households receive remittances? (2) How are remittances used in the communities? And how prevalent is this use? (3) Does the use of remittances for different purposes vary in a systematic way by type of migration? And (4) 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. But I expect U.S. migration to be positively related to business ownership. 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 households' minimal survival. 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.

And last, I expect international and rural-to-urban migration experience to be strongly and positively associated with household economic advancement and business acquisition even after controlling for other socioeconomic characteristics.

IV. Background

Guatemala

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.

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 population.[2] Unfortunately, by the end of the civil war, both agricultural exports and foreign investment were at alarmingly low

[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 (U.S. State Department, 2006).
[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).

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).[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 has started focusing 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 and more empirical analyses are needed to understand 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.

[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).

Nicaragua

Since the mid-XIX century, people from Nicaragua started migrating to Costa Rica in search work and economic opportunities; since then, Cost Rica has been the main destination for Nicaraguan circular, temporary and even permanent labor migrants. However, in the 1980s during the Contra War, the U.S. took over as the second most important international destination among Nicaraguans. The context of uncertainty and violence due to the war increased international migration and refugee flows towards other countries, including the U.S. (Vargas, 2005).

Recent studies conclude that the composition of the migration flow to Costa Rica and the one to the United States was particularly different. The migration of Nicaraguans to Costa Rica was been driven by the economic conditions of the country and it is not very selective in terms of human or social capital. On the other hand, migration to the U.S. has been more selective and related to the political violence of the Contra War (Lundquist and Massey, 2005; Vargas and Barquero, 2005).

In the nineties, once the political violence reduced, the prevalence of migration for economic reasons increased. According to recent estimates about 11% of Nicaraguan households have at least one member residing abroad (Vargas, 2005:2). In addition, the World Bank calculates that 320 million U.S. dollars of remittances went to Nicaragua in 2000, and in the subsequent years this number has been steadily increasing; for instance, by 2006, remittances amounted to 656 million USD (Ratha and Xu, 2008). Despite the importance of international migration and remittances for Nicaragua, a large proportion of the research focuses on those who migrate to Costa Rica and little research has been done to explore the impact that the outgoing

flow of workers to and the incoming flow of remittances from the United States has on the economy of families and communities in Nicaragua.

Costa Rica

Costa Rica is regarded as the most economically developed and politically stable country in Central America, and unlike Guatemala and Nicaragua, it did not experience civil war or guerrilla violence in the last several decades. Costa Rica's economy is dominated by tourism and services, as well as the production agricultural goods for export; however, in the last few decades foreign investment has also promoted the development of a significant manufacturing industry (U.S. State Departmet, 2009). Even though Costa Rica has been a receiving country for many Nicaraguan refugees and labor migrants throughout the years, it also has a sizeable stock of international out-migrants of its own (Ratha and Xu, 2008).

The main destination of international migrants from Costa Rica has been the United States. Remittances from international migrants to Costa Rica where about 136 million U.S. dollars in 2000, and these numbers have increased in recent years to 250 million in 2002 and 513 million in 2006 (Ratha and Xu, 2008). Despite the growth in international remittances and migration to the United State in the last few years, little research has been done on the patterns and implications of international out-migration from Costa Rica.

V. Data and Analysis

This study will use data on migration and remittances collected by the Guatemala Migration Survey (GMS) and the Latin American Migration Project (LAMP).[5] The data collection was done at different times between 2000 and 2004 in Guatemala, Costa Rica and Nicaragua. The purpose of these surveys is to examine the determinants, dimension, and consequences of international migration in Latin American communities. Table 1 summarizes the characteristics of the samples for the three countries under study. The pooled sample has information on over 4,000 households in 26 communities resulting in more than 24,000 individual records.

The Guatemala Migration Survey was conducted in two rural municipalities in Guatemala, located in the western department of Quiché between 2000 and 2002. 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).

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

[5] This study uses data collected by the Latin American Migration Project (LAMP: lamp.opr.princeton.edu) in the Guatemala, Nicaragua and Costa Rica. The surveys in Nicaragua and Costa Rica were conducted in association with the Central American Population Center of the University of Costa Rica (CCP: http://ccp.ucr.ac.cr), with support from the Mellon Foundation. The LAMP is a collaborative research project based at Princeton University and the University of Guadalajara, supported by the National Institute of Child Health and Human Development (NICHD).

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).

The LAMP data were collected with a survey questionnaire that was administered to household heads and their spouses. The questionnaire is designed to be administered in a semi-structured format to create a flexible, unobtrusive and non-threatening interview. Each questionnaire was adapted to the particular circumstances of the country of study; the LAMP works with local researchers and institutions to assure proper survey design and interpretation, while maintaining comparability across countries.

The LAMP questionnaire collects basic demographic information on all members of the household, as well as children of the household head even if they do not live in the household anymore. The interviewer identifies members of the household with prior migration experience and gathers information on their first and last trips. In addition, life histories are collected for the household heads, including a childbearing story, a property history, a housing history, a business history, a work history and a migration history –which includes details on the last trip made to the U.S.

For the purpose of this analysis, I will use Stata to estimate Ordinary Least Squares and Logistic regression models for the association between migration experience and the accumulation of household assets, agricultural capital, and the probability of owning a business. Models will be estimated separately for the Costa Rica, Nicaragua and Guatemala-Quetzaltenango samples with the same methodological strategy used for the Guatemala-Quiché data. All models and descriptive data analysis with the LAMP data are estimated using the

sample weights provided by the Project; additionally, standard errors are adjusted for each of the communities using the cluster option in Stata.

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. It is important to highlight that both composite variables exclude property and land that were inherited or donated 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. 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 in each

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

country's sample. 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 independent variables are measures of migration experience in the household. Using a migration history for the household heads and their spouses I constructed duration variables that aggregate their migration experience in months. For those cases where the migrant had not returned I calculated the cumulative duration of their trips up to the date of the survey. The types of migration included in this analysis are rural migration, urban migration, and migration to the United States.

The Guatemala Migration Study has both an internal and an U.S. migration history for the heads of the household and their spouses; however the LAMP survey only collects a U.S. migration history. The cumulative duration for U.S. migration is already calculated in the LAMP databases, but for internal migration I used information on the first and last domestic trips for those who had made fewer than two trips in their life, and then I used the occupational history information to calculate the cumulative internal migration experience for those with three or more trips.

In all cases, I only counted migration experience when the purpose of migration was work. Rural migration is defined as a trip outside of the municipality of residence, to another destination within the country to work on agriculture or another rural occupation. Urban migration is defined as a trip outside the municipality of residence to another destination in the

country for a job in an urban type of occupation. And in order to adjust the scale of the duration variables in the multivariate analysis I divided the total months of experience by 100.

Additionally, I constructed cumulative urban and U.S. migration experience variables for all the children of the household head. Unfortunately, I only have information on their first and last trip and total number of trips for domestic and U.S. migration. Fortunately, in the communities surveyed by LAMP they have computed the total number of months and the number of trips of U.S. migration but this is not done for domestic migration, hence the cumulative internal migration variables are only calculated for two trips at most. Despite the limitations, I believe this information is worth including given the fact that children 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 months and in the multivariate models they are divided by 100 for scaling purposes.

In addition to the migration covariates, models include individual characteristics of the head of the household such as gender, age at the time of the survey, marital status and years of education. Besides, I included household composition measures –the number of children younger than 15 years old, and the number of household members who are 15 and older. I also calculated internal and international prevalence measures at the community level by dividing the number of households where the household head had migration experience by the total number of households within each community. Lastly, for each household I calculated the total number of relatives with U.S. migration experience.[7]

[7] The Quiché models include a measure for the number of relatives with urban migration experience. The LAMP questionnaire did not include these measures of migration in the family so for those models I only include relatives with U.S. migration experience.

VI. Descriptive Analysis

Table 2 presents some figures on the prevalence of internal migration, international migration, and remittances receipt among the households in the sample. All countries in the LAMP sample have a prevalence of rural migration smaller than five percent, whereas in the communities from Quiché rural migration is prevalent among one fifth of the surveyed households. About half of the households in Costa Rica have at least one urban migrant, compared to 40 percent of Nicaraguan households, 26 percent of Quiché households and only 17 percent of Quetzaltenango households. Among the countries in this sample, the Guatemalan households have the highest prevalence of U.S. migration, 28% in Quiché followed by 18% in Quetzaltenango. In Nicaragua 10 percent of households have an active U.S. migrant, while nine percent of Costa Rican households do so.

Table 2 also presents the percentage of households receiving remittances, the LAMP data only records remittances received from international locations at the time of the survey, whereas the GMS includes both internal and international migration remittances within the twelve months previous to the survey. Around seven percent of households in Costa Rica receive remittances from the U.S., 12 percent do so from Nicaragua, whereas the Guatemalan communities have the highest proportion of families receiving remittances from the U.S., 22 percent in Quiché and 17 percent in Quetzaltenango.

Migration experience among heads of the household and their spouses is described on table 3, and all statistics are calculated by gender. As we can observe, most of the people in the Costa Rica, Nicaragua and Quetzaltenango samples have only made one or two trips within their

countries, in contrast to the Quiché sample where half of male heads of household and 27 percent of female heads have made 5 trips or more within Guatemala. Regarding international migration, among females with U.S. migration experience, all of the Guatemalan women have only made one or two trips abroad, compared to 97 percent of Nicaraguans and 93 percent of Costa Ricans. In the trends for males, one or two trips to the U.S. are the most common category.

Regarding the duration of trips to the U.S., we can observe that the Costa Rican population tends to spend longer spells of time abroad, while on the other extreme are those migrants from Quiché, who make shorter trips to the U.S. It is important to notice that across all countries females tend to spend longer periods of time in the U.S. when compared to males.

After looking at migration trends among these populations, it is important to take a first look to the effect that migration has on the ownership of assets and other properties among these samples. Table 4 summarizes property, assets, and business ownership across the three countries, and lists the percentage of households that used remittances to acquire such goods –within those who own it. Residential property ownership is almost universal among the households in the LAMP sample, compared to only 85% of homeowners in Quiché. In addition, a larger number of the Guatemalan households that own residential property have used remittances to purchase it, a striking contrast to less than 1% of Nicaraguan Households.

From table 4 we can already see a pattern emerging, the Guatemalan households appear to be making use of remittances to purchase vehicles and residential property, whereas use of remittances from the U.S. among the Costa Rican and Nicaraguan households is not as important. Regarding inputs for agricultural production in Costa Rica, although a smaller proportion of households invest on agriculture, among those who do so, a greater proportion is using dollars to finance these investments. Regarding business ownership, prevalence is

particularly high in Quetzaltenango, and using remittances to finance business enterprises is particularly prevalent in both Guatemalan samples.

Table 5 presents descriptive statistics for the independent variables included in the multivariate analysis models. Guatemalans from Quiché have the smallest cumulative durations for internal migration, however, as we observed in table 2 they had a larger number of trips within the country, this could point out at the fact that among this sample, internal migration trips tent o be short trips that repeat throughout migrants' lives. In contrast, in Nicaragua and Costa Rica, high cumulative durations and the prevalence of fewer internal trips may indicate a more permanent strategy of migration. In all countries, the mean cumulative duration for U.S. migration ranges between 6.2 and 3.7 years.

With regards to the number of relatives with U.S. migration experience, the Guatemalan samples have the highest mean with 4.3 and 4.7 for Quiché and Quetzaltenango respectively, followed by Costa Rica with an average of 2.8 and Nicaragua with the lowest mean at 1.8. This table also includes the proportion of rural, urban and U.S. migrants in the communities of origin, these numbers were calculated by dividing the number of household heads with migration experience divided by the total number of households in the community. As we can see, Nicaragua, Costa Rica and Quetzaltenango have a very small proportion of rural migrants when compared to the communities from Quiché. Costa Rica has the higher prevalence of urban migration, followed by Nicaragua and Quetzaltenango. The communities in Quiché are the ones with the highest prevalence of U.S. migration in the sample, closely followed by Quetzaltenango.

The majority of household heads are male, around 87 percent in the Guatemalan samples, 78 percent in Nicaragua, and 70 percent in Costa Rica. On average, heads of household are in their late forties, with Costa Ricans being the eldest at 49 years-old and Guatemalans from

Quiché being the youngest at 46. In Quiché, almost all heads of household are married, in contrast to Costa Rican where only two thirds are. With regards to education, Nicaraguans and Costa Ricans are the most educated –8 and 7 years of schooling respectively-, and Guatemalans in Quiché are the least educated with less than 4 years of schooling on average.

VII. Multivariate Analysis Results

In this section I present the results for the Ordinary Least Squares and Logistic Regression models for the effects of migration experience on asset and capital accumulation for the GMS and LAMP communities. I begin this section by presenting the preliminary findings from the models using the GMS data, then I will present the new models estimated with the LAMP data.

Preliminary Results for Quiché

Table 6 presents the regression analysis results from the models estimated for Quiché. Several conclusions can be derived from these models, first, rural migration is a subsistence strategy as it is negatively associated with household asset ownership, and it does not have any effect on agricultural capital and business ownership. Second, urban migration works as a substitute for wages and credit for consumption, and it does not play a significant role in upward socioeconomic mobility for households. And third, in contrast, U.S. migration experience is important for the economic advancement of households, because it is positively and significantly associated assets, agricultural capital and business ownership. In addition, U.S. Migration of relatives is only influential for the purchase of agricultural capital. Moreover, higher proportions

of urban and U.S. migration in the community are associated with a higher score on the household assets index.

Results for the LAMP Communities

Using the same research strategy as for Quiché, I estimated models for Costa Rica, Nicaragua and Quetzaltenango, results for these models are presented in tables 7 to 9. A small difference in the models though is that besides migration experience for the heads of the household, I estimated models including covariates for the migration experience of the household heads' sons, since according to preliminary estimations by the LAMP in these populations, migration of children is as prevalent or more prevalent than household heads' migration (LAMP, *Migrant Profiles*). Covariates for sons' migration are presented when significant.

Table 7 presents the results for the Costa Rica models, in the models for this country sons' migration had no significant effects. Interestingly, in the Costa Rica models the cumulative migration experience of the heads of the household has no significant association with household assets ownership. In contrast, U.S. migration experience is negatively associated to the ownership of agricultural assets but is positively associated with business ownership. Relatives' U.S. migration experience has a modest but positive association to assets ownership. Migration at the community level has interesting effects; the proportion of rural migrants is negatively related to household assets ownership whereas the proportion of urban migrants is positively associated with both assets and business ownership. U.S migration at the community level has no significant effect.

For the Costa Rican case we can conclude that U/S. migration associated to socioeconomic advancement through business ownership, whereas urban migration and rural

migration work as a substitute for wages and as credit for consumption. There is small evidence of rural migration being associated with a survival strategy, given that more rural migrants in the community hinder the ability of families to own assets.

In the cases of the Nicaragua and Guatemala-Quetzaltenango samples, the prevalence of rural migration among heads of household was very small, hence, the models presented in tables 8 and 9 do not include rural migration as a covariate. In addition, in the same way as for Costa Rica, I believe son's migration may play an important role hence the models for Nicaragua and Guatemala-Quetzaltenango include sons' urban and U.S. cumulative migration experience.

In the case of Nicaragua, I only estimated models for household assets given that agricultural capital and business ownership are not common in this sample. In the models for Nicaragua (table 8), we can see that there is no significant relationship between household heads migration and any of the outcomes of interest; however son's U.S. migration and U.S. migration among relatives has a positive significant effect on household assets ownership. Additionally, none of the migration measures had a significant effect on the probability of owning a business. We can conclude that household head's migration and sons' urban migration work as a substitute for wages and access to credit, whereas sons' and relatives U.S. migration has a has a positive role in improving the socioeconomic position of the household as defined by assets and property ownership, but not for business ownership.

Table 9 presents the regression models results for the Guatemala-Quetzaltenango sample. We can observe that urban migration of the household heads has a modest positive effect on household assets and business ownership, and that heads' U.S. migration is related to a positive effect on the ownership of agricultural capital. In contrast, urban migration among the household heads' sons is negatively associated to the accumulation of productive capital, both for

investments in agriculture and for business ownership. However, sons' U.S. migration is associated with increased household assets and a higher likelihood of owning a business. In this case, U.S. migration among sons is associated to an improved socioeconomic status in the household that contributes not only to the possession of assets in the household but also to business ownership, also, the same positive effects are associated to the number of relatives with U.S. migration experience.

Interestingly, U.S. migration of the parents leads to improved socioeconomic status through a different route, investments in agriculture. On the other hand, urban migration of parents acts as a substitute for wages and credit, and productive capital for business endeavors. In contrast, son's urban migration has negative effects for the socioeconomic advancement of the family.

VIII. Conclusions

The results of the Quiché analysis emphasize that migration experience is important for the economic advancement of households. Results suggest that rural migration serves as a survival strategy rather than as an effective tool for upward economic mobility. In addition, international migration has 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 to the rural areas, their economic activities remain tied to urban sectors of production and not with rural activities.

Results from Costa Rica support similar trends to the results for Quiché; rural migration is associated to a strategy for survival, whereas urban migration works as a substitute for wages and credit for consumption, but not as a means for socioeconomic mobility. The main difference with the Quiché results is that among the Costa Rican families rural migration has a positive effect on agricultural capital accumulation whereas U.S. migration had a negative effect; moreover, U.S. migration experience only had a positive impact on the accumulation of productive capital for businesses.

An important contrast is found in Nicaragua, where agricultural production and business ownership was not prevalent among the sampled households. Household heads' migration and sons' urban migration had no significant effect on the ownership of household assets. However, U.S. migration among sons and extended family is associated to an improved economic position of the household compared to others in the community as measured by the ownership of assets.

Lastly, in Quetzaltenango, all migration experience measures –except for sons' urban migration– are associated to socioeconomic advancement of the household. Urban migration of the household heads, son's U.S. migration and number of relatives with U.S. experience are all related to a positive effect on asset and business ownership, while heads' U.S. migration translates to a positive effect on accumulation of agricultural capital.

In short, rural migration, in Costa Rica and Guatemala-Quiché are associated with a strategy for subsistence and not with household socioeconomic status improvement. Urban migration does not make a particular difference in the acquisition of assets and productive goods which means that urban migration is mostly a substitute for wages and credit for consumption in the local economic context. Last, in all countries U.S. migration has proven important for the

economic advancement of households, although with mixed results for agricultural capital accumulation, depending on the country we focus on.

The results presented in this paper point at the different consequences that internal and international migration have on the socioeconomic status of families in three different Central American countries. In addition, this study also helps describe differences in strategies motivating and resulting from migration. These results also help distinguish the impact that migration has for households depending on who migrates –parents or children. Results like the ones observed for Nicaragua and Quetzaltenango provide exciting evidence of the complexities of families' economic strategies and the role that migration of different household members plays to fulfill these economic objectives.

After completing the analysis for Quiché, where all types of migrations are more prevalent than in the other countries I expected U.S. migration to not have an effect of the same magnitude and significance in the other countries surveyed by the LAMP. Interestingly, this paper became a way to test if the economic impact of migration exists even in contexts where migration is not so common. The positive role of international migration in improving family's economic position found in the GMS is consistent within the findings from the LAMP communities, which allows me to conclude that the different economic strategies motivating migration exist among all these countries but also that the impact of U.S. migration is quite robust across different social contexts.

Future directions for research will expand by including other international migration destinations; for instance by incorporating trips to Mexico among the Guatemalan sample and trips to Costa Rica among the Nicaraguan sample. I am also considering a larger comparison using data from other Latin American countries.

IX. References

Adams, Richard H. 1991. "The Economic Uses and Impact of International Remittances in Rural Egypt." *Economic Development and Cultural Change* 39:695-722.

Adams, Richard H. 1998. "Remittances, Investment, and Rural Asset Accumulation in Pakistan." *Economic Development and Cultural Change* 47:155-173.

Agunias, Dovelin. 2006. "Remittance Trends in Central America." *Migration Information Source*. Available online: www.migrationinformation.org

Durand, Jorge, William Kandel, Emilio A. Parrado, and Douglas S. Massey. 1996. "International Migration and Development in Mexican Communities." *Demography* 33:249-264.

Durand, Jorge and Douglas S. Massey. 1992. "Mexican Migration to the United States: a Critical Review." *Latin American Research Review* 27:3-42.

Filmer, Deon and Lant Pritchett. 1999. "The effect of Household Wealth on Educational Attainment: Evidence from 35 Countries." *Population and Development Review* 25:85-120

Goldring, Luin. 2004. "Family and Collective Remittances to Mexico: A Multi-dimensional Typology." *Development and Change* 35:799-840.

Itzigsohn, Jose. 1995. "Migrant Remittances, Labor Markets, and Household Strategies: A Comparative Analysis of Low- Income Household Strategies in the Caribbean Basin." *Social Forces* 74:633-655.

Jokisch, Brad D. 2002. "Migration and Agricultural Change: the Case of Smallholder Agriculture in Highland Ecuador." *Human Ecology* 30:523-550.

Koc, Ismet and Isil Onan. 2004. "International Migrant's Remittances and Welfare Status of the Left-Behind Families in Turkey." *International Migration Review* 38:78.

Kritz, Mary M., LIm Lean Lim, and Hania Zlotnik. 1992. *International Migration Systems: A Global Approach.* Oxford: Clarendon Press; New York: Oxford University Press, 354p.

Lindstrom, David P. 1996. "Economic Opportunity in Mexico and Return Migration from the United States." *Demography* 33:357-374.

Lindstrom, David P. and Jose Florentin Martinez Lopez. 2003. "The Changing Dynamics of Guatemalan Labor Migration." Paper presented in the Latin American Migration Project Conference, Costa Rica, 2003.

Lundquist, Jennifer H. and Douglas S. Massey. 2005. "Politics or Economics? International Migration during the Nicaraguan Contra War." *Journal of Latin American Studies* 37:29-53.

Massey, Douglas S., Rafael Alarcon, Jorge Durand and Humberto Gonzalez. 1987. *Return to Aztlan: the social process of international migration from western Mexico,*. Berkeley: University of California Press.

Massey, Douglas S., Jorge Durand, and Nolan J. Malone, 2002. *Beyond smoke and mirrors : Mexican immigration in an era of economic integration*. New York: Russell Sage Foundation.

Migration Information Source. *Country Profile: Guatemala*. Available online: http://www.migrationinformation.org/Resources/guatemala.cfm.

Morrison, Andrew R. and Rachel A. May. 1994. "Escape from Terror: violence and Migration in Post-Revolutionary Guatemala." *Latin American Research Review* 29(2): 111-132.

Orozco, Manuel. 2003. "Remittances, the Rural Sector, and Policy Options in Latin America."

The Inter-American Dialogue. Migration Information Source. Available online: www.migrationinformation.org

Ratha, Dilip and Zhimei Xu. 2008. *Migration and Remittances Factbook.* World Bank. Available online: www.worldbank.org/prospects/migrationandremittances.

Rutstein, Shea O. and Kiersten, Johnson. 2004. *The DHS Wealth Index.* DHS Comparative Reports No. 6. Claverton, Maryland: ORC Macro. 71p.

Sana, Mariano and Douglas S. Massey. 2005. "Household Composition, Family Migration, and Community Context: Migrant Remittances in Four Countries." *Social Science Quarterly* 86:509-528.

Smith, James. 2006. "Guatemala: Economic Migrants Replace Political Refugees." *Migration Information Source.* Available online: www.migrationinformation.org

Stark, Oded and Robert E. B. Lucas. 1988. "Migration, Remittances and the Family." *Economic Development and Cultural Change* 36:465-481.

Stark, Oded and J. Edward Taylor. 19991 "Migration Incentives, Migration Types: The Role of Relative Deprivation." *The Economic Journal* 101:1163-1178.

Swetman, John. 1989."What Else Did Indians Have to Do with Their Time? Alternatives to Labor Migration in Prerevolutionary Guatemala." *Economic Development and Cultural Change* 38:89-112.

Taylor, J. Edward. 1992. "Remittances and inequality reconsidered: direct, indirect, and intertemporal effects." *Journal of Policy Modeling* 14:187-208.

Taylor, J. Edward and T. J. Wyatt. 1996. "The Shadow Value of Migrant Remittances, Income and Inequality in a Household-farm Economy." *The Journal of Development Studies* 32:899-912.

Taylor, Matthew J., Michelle J. Moran-Taylor, and Debra Rodman Ruiz. 2006. "Land, Ethnic and Gender change: Transnational Migration and its Effects on Guatemalan Lives and Landscapes." *Geoforum* 37:41-61.

U.S. State Department, Bureau of Western Hemisphere Affairs. 2006. *Background Note: Guatemala*. Available online: http://www.state.gov/r/pa/ei/bgn/2045.htm

U.S. State Department, Bureau of Western Hemisphere Affairs. 2009. *Background Note: Costa Rica*. Available online: http://www.state.gov/r/pa/ei/bgn/2019.htm

Vargas, Juan Carlos. 2005. "Nicaragüenses en Costa Rica y Estados Unidos: datos de etnoencuestas." *Población y Salud en Mesoamérica* 2(2):1-10.

Vargas, Juan Carlos and Jorge A.Barquero. 2005. "Capital humano y social de los nicaragüenses con experiencia migratoria a Costa Rica y Estados Unidos." *Revista de Estudios Migratorios Latinoamericanos*. 19(56):123-143

X. Tables and Figures

Table 1. Sample Characteristics. LAMP and GMS data

Country	Number of Communities	Number of HH in sample	Number of persons in sampled HHs	Year surveyed
Nicaragua	9	1598	10,420	2000, 2002
Costa Rica	7	1391	7,246	2000, 2002
Guatemala				
Quiché	7	574	3,769	2000
Quetzaltenango	3	513	2,813	2004
Total	**26**	**4076**	**24,248**	

Data for Nicaragua, Costa Rica and Guatemala-Quetzaltenango: Latin American Migration Project.
Data for Guatemala-Quiché: Guatemala Migration Survey
For more information on study methodology and sample design see: http://lamp.opr.princeton.edu/home-en.htm

Table 2. Prevalence of Migration and Remittances Receipt in the Household

	Costa Rica	Nicaragua	Guatemala	
			Quiché	Quetzaltenango
1 or more active migrants: [a]	%	%	%	%
Internal rural	5.1	3.9	26.3	1.4
Internal urban	49.8	39.7	24.2	16.9
To the U.S.	8.8	10.3	28.4	17.8
Receiving remittances			36.6 [b]	
From Guatemala			16.7	
From the U.S.	6.8	12.3	22.5	17.5

[a] At the time of the survey
[b] In the last 12 months for Quiché households

Table 3. Internal and International Migration Experience by Gender

	Costa Rica		Nicaragua		Guatemala			
					Quiché		Quetzaltenango	
	Male	Female	Male	Female	Male	Female	Male	Female
Internal Migration	%	%	%	%	%	%	%	%
Number of trips								
1-2 trips	73.8	77.3	76.8	85.1	39.3	57.6	87.4	97.4
3-4 trips	21.1	17.6	17.6	11.5	13.6	15.1	7.7	1.5
5 or more trips	5.1	5.1	5.6	3.4	47.1	27.3	4.9	1.1
U.S. Migration								
Number of trips								
1-2 trips	87.4	96.5	95.3	92.9	90.3	100	89.5	100
3-4 trips	7.7	0	3.8	4.4	8.0	0	4.7	0
5 or more trips	4.9	3.5	0.9	2.7	1.8	0	5.8	0
Median trip duration [a]	36	60	120	132	26	12	84	96

[a] In months
*All frequencies calculated using sampling weights

Table 4. Household Property, Assets and Business Ownership and Use of Remittances from U.S. Migration

	Costa Rica	Nicaragua	Guatemala	
			Quiché	Quetzaltenango
Housing	%	%	%	%
Own Residential Property	99.8	100	84.8	100
Used remittances from USA	4.5	0.7	13.1	6.2
Inherited Residential Property	18.6	23.8	26.5	32.8
Transportation				
Own Vehicle	44.6	16.9	24.6	30.4
Used remittances from USA	5.9	5.0	29.8	16.9
Agricultural inputs				
Own Agricultural Land	11.4	9.0	57.8	21.8
Used remittances from USA	8.9	2.8	6.0	2.6
Inherited Agricultural Land	43.0	40.4	39.5	44.4
Own Livestock	5.3	16.5	52.1	14.6
Used remittances from USA	6.9	1.9	5.4	5.6
Seeds and Fertilizer	6.9	5.0	62.5	18.9
Used remittances from USA	11.0	5.9	8.9	7.4
Businesses				
Own Business	39.2	43.9	36.4	56.2
Used remittances from USA	5.4	3.7	12.0	9.4

Table 5. Descriptive Statistics of Independent Variables

	Costa Rica		Nicaragua		Guatemala			
					Quiché		Quetzaltenango	
	Mean	**Std. Dev.**	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**
Migration Experience [a]								
Rural cumulative duration	21.31	17.932	17.54	14.822	4.30	5.182	9.3	6.606
Urban cumulative duration	19.35	14.330	18.61	13.903	6.79	8.999	14.60	13.584
U.S. cumulative duration	3.74	4.458	6.24	7.634	4.02	2.805	5.25	5.077
Family Migration Experience								
Relatives with U.S. migration experience	2.83	5.438	1.83	4.773	4.33	7.607	4.67	6.89
Community Migration [b]								
Proportion of rural migrants	0.09	0.048	0.04	0.339	0.34	0.244	0.02	0.008
Proportion of urban migrants	0.32	0.123	0.27	0.531	0.14	0.064	0.24	0.053
Proportion of U.S. migrants	0.11	0.100	0.06	0.028	0.18	0.085	0.14	0.008
Household Head Characteristics								
Male	0.78	0.412	0.705	0.456	0.87	0.331	0.86	0.352
Age [c]	48.00	14.522	49.43	15.027	45.74	15.411	47.7	14.120
Married	0.71	0.453	0.65	0.477	0.97	0.159	0.83	0.372
Years of schooling	8.19	4.440	7.38	5.110	3.38	4.030	6.29	4.758
Household Structure								
Number of adults in the household	2.47	1.403	3.03	1.791	2.85	1.720	2.98	1.568
Number of children in the household	1.06	1.170	1.43	1.460	2.08	1.887	1.39	1.429

[a] In years
[b] Household heads with migration experience, both active and inactive migrants, divided by the number of households in the community
[c] At the time of the survey.

Table 6. Regression Models Predicting the Effect of Migration Experience on Household's Assets, Agricultural Capital and Business Ownership, Guatemala-Quiché

Variable	Household Assets [a]	Agricultural Capital [a]	Business Ownership [b]
Migration Experience			
Rural cumulative experience [c]	-0.319**	0.117	-0.147
Urban cumulative experience [c]	0.055	-0.154	-0.319
U.S. cumulative experience [c]	0.509*	0.204*	0.426*
Family Migration Experience			
Relatives' urban migration experience	0.005	0.002	0.020*
Relatives' U.S. migration experience	0.005	0.012*	0.013
Community Migration			
Proportion of rural migrants	0.450	-1.608**	0.132
Proportion of urban migrants	3.484*	-1.813**	1.631
Proportion of U.S. migrants	2.911*	0.358	4.440
Rural Residence	-0.977*	1.111**	-1.071
Background Characteristics			
Male	0.184	0.538**	0.408
Age	0.048**	0.025	0.062
Age squared	0.0004*	0.0001	-0.001
Ladino	0.144	-0.138	-0.721*
Married	0.278*	-0.173	0.017
Years of schooling	0.085**	-0.016**	0.024
Household Structure			
Number of adults in the household	0.012	0.094*	-0.013
Number of children in the household	-0.035	0.001	-0.033
Constant	-2.868**	-1.061*	-3.335*
R-squared	0.572	0.271	
Log pseudo-likelihood			-327.524

[a] Linear regression: Index of household assets and index of agricultural capital.
[b] Logistic regression: 1=household has business, 0 otherwise.
[c] Total months of experience divided by 100.
Source: Guatemala Migration Study
N=574
* $p < 0.05$ ** $p < 0.01$

Table 7. Regression Models Predicting the Effect of Migration Experience on Household's Assets, Agricultural Capital and Business Ownership, Costa Rica

Variable	Household Assets [a]		Agricultural Capital [a]		Business Ownership [b]	
Migration Experience						
Rural cumulative experience [c]	-0.003		0.086	*	-0.061	
Urban cumulative experience [c]	0.013		-0.017		0.080	
U.S. cumulative experience [c]	0.177		-0.121	***	0.305	**
Family Migration Experience						
Relatives' U.S. migration experience	0.013	**	0.008		0.009	
Community Migration						
Proportion of rural migrants	-2.186	***	0.956		-0.371	
Proportion of urban migrants	1.638	***	-1.783		2.883	***
Proportion of U.S. migrants	-0.092		1.444		-1.389	
Rural Residence	0.244	***	-0.165		0.742	***
Background Characteristics						
Male	-0.138		0.139		0.361	
Age	0.035	*	0.012		0.116	***
Age squared	0.000	*	0.000		-0.001	***
Married	0.422	***	0.012		0.026	**
Years of schooling	0.035	**	0.047		0.605	***
Household Structure						
Number of adults in the household	0.062	*	0.003		0.014	
Number of children in the household	-0.064	*	-0.039		0.013	
Constant	-2.047	***	-0.127		-6.058	***
R-squared	0.1734		0.1345			
Log pseudo-likelihood					-692.325	

[a] Linear regression: Index of household assets and index of agricultural capital.
[b] Logistic regression: 1=household has business, 0 otherwise.
[c] Total months of experience divided by 100.
Source: Latin American Migration Project, Costa Rica.
Models use LAMP sample weights, and Stata's cluster option for communities.
N= 1384
* p < 0.05 ** p < 0.01 *** p < 0.005

Table 8. Regression Models Predicting the Effect of Migration Experience on Household's Assets and Business Ownership, Nicaragua

Variable	Household Assets [a]	
Migration Experience		
Heads' Urban cumulative experience [c]	-0.001	
Heads' U.S. cumulative experience [c]	0.063	
Son's urban cumulative experience [c]	-0.001	
Son's U.S. cumulative experience [c]	0.176	***
Family Migration Experience		
Relatives' U.S. migration experience	0.022	***
Community Migration		
Proportion of rural migrants	-7.340	**
Proportion of urban migrants	1.719	**
Proportion of U.S. migrants	1.809	
Rural Residence	-0.219	
Background Characteristics		
Male	-0.129	
Age	0.045	**
Age squared	0.000	*
Married	0.289	***
Years of schooling	0.072	***
Household Structure		
Number of adults in the household	0.003	
Number of children in the household	-0.062	****
Constant	-2.025	***
R-squared	0.3944	

[a] Linear regression: Index of household assets and index of agricultural capital.
[b] Logistic regression: 1=household has business, 0 otherwise.
[c] Total months of experience divided by 100.
Source: Latin American Migration Project, Nicaragua
Models use LAMP sample weights, and Stata's cluster option for communities.
Covariates do not include rural migration because it is only prevalent in fewer than 5% of the households in the sample
Models do not include investments in agriculture or businesses because they are not particularly prevalent among these households
N=1596
* $p < 0.05$ ** $p < 0.01$ *** $p < 0.005$

Table 9. Regression Models Predicting the Effect of Migration Experience on Household's Assets, Agricultural Capital and Business Ownership, Guatemala-Quetzaltenango

Variable	Household Assets [a]		Agricultural Capital [a]		Business Ownership [b]	
Migration Experience						
Heads' Urban cumulative experience [c]	0.002	*	0.0005		0.006	***
Heads' U.S. cumulative experience [c]	0.308		0.3231	**	0.048	
Son's urban cumulative experience [c]	0.031		-0.1320	*	-0.685	***
Son's U.S. cumulative experience [c]	0.088	**	0.0438		0.266	***
Family Migration Experience						
Relatives' U.S. migration experience	0.021	*	0.0246		0.036	***
Community Migration						
Proportion of urban migrants	2.401	***	-2.7655	***	3.102	***
Proportion of U.S. migrants	-10.199	***	1.4097		-12.814	***
Background Characteristics						
Male	0.041		0.0683		-0.335	
Age	0.039		0.0138		0.059	***
Age squared	0.000		0.0000		-0.001	***
Married	0.117		0.1703		0.532	*
Years of schooling	0.090	*	0.0039		0.010	
Household Structure						
Number of adults in the household	0.047		0.0319		0.035	*
Number of children in the household	-0.043		-0.0284		-0.202	*
Constant	-1.353		-0.6257		-1.088	
R-squared	0.3718		0.103			
Log pseudo-likelihood					-330.494	

[a] Linear regression: Index of household assets and index of agricultural capital.
[b] Logistic regression: 1=household has business, 0 otherwise.
[c] Total months of experience divided by 100.
Source: Latin American Migration Project, Guatemala-Quetzaltenango
Models use LAMP sample weights, and Stata's cluster option for communities.
Covariates do not include rural migration because it is only prevalent in fewer than 5% of the households in the sample
N=510
* $p < 0.05$ ** $p < 0.01$ *** $p < 0.005$

XI. Appendix I: 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 and Latin American Migration Project 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 10 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. [8]

For the Guatemala-Quiché sample, this composite variable explains almost 33% of the variation in the distribution of household assets, and has a standardized Cronbach's alpha of 0.860 (a high value of this reliability coefficient indicates that the index is internally consistent). The index for Guatemala-Quetzaltenango explains 23% of the variation and has an alpha of 0.739; the one for Nicaragua explains 26% of the variation with an alpha of 0.757. Last, the Costa Rican index explains 17% of the variation with an alpha of 0.618.

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

[8] Correlation and component matrices for all indices and countries are available from the author upon request.

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.

The variance explained by this variable for the Guatemala-Quiché sample is of almost 35% with a Cronbach's alpha reliability score of .585. For Guatemala-Quetzaltenango the variance explained is over 38% with an alpha of 0.516, for Nicaragua the variance explained is 52 percent and the alpha is 0.749. Lastly, since agricultural investments are not prevalent in the Costa Rica sample, no agricultural assets index is used.

Table 10. Variable Definitions, Household Assets Index

Variable Label	Description
Owner	Whether or not household owns at least one residential property
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 11. Variable Definitions, Agricultural Capital Index

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