The Impact of Migration and Remittances on Wealth Accumulation and Distribution in Rural Thailand[*]

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Abstract

This paper studies the impact of internal migration and remittance flows on wealth accumulation

and distribution in 22 rural villages in Nang Rong, Thailand. Using data from 943 households,

the study constructs indices of household productive and consumer assets with principal

components analysis. The changes in these indices from 1994 to 2000 are modeled as a function

of households' prior migration and remittance behavior while correcting for potential selectivity

bias with propensity score matching. The findings show that rich households face a decrease in

productive assets due to migration of their members, while poor households with migrants gain

productive assets and improve their relative status in their communities. These results suggest an

equalizing effect of migration and remittance flows on wealth distribution in rural Thailand.

1. Introduction

To evaluate the economic impact of migration flows, researchers study the amount and distribution of remittances, funds and goods sent by migrants to their origin families and communities. Remittances from international migrants amount to 240 billion dollars annually, constituting the second largest source of external finance for developing countries after foreign direct investment (Ratha and Xu, 2008). While these flows are critical for understanding the economic trends in the developing world, few studies have garnered the data necessary to evaluate their impact on the receiving economies (e.g., Acosta et al., 2006; Koechlin and Leon, 2007). Furthermore, most of these studies have focused on remittances from international migrants. Only a handful of studies to date have considered the economic consequences of remittances from *internal* migrants within developing countries (e.g., Knowles and Anker, 1981; Rempel and Lobdell, 1978).

To fill this gap in the literature, this study exploits multi-level, longitudinal survey data from 22 rural villages in Nang Rong, Thailand, and evaluates the impact of internal migration and remittance flows on the level and distribution of wealth. The data capture the migration and remittance choices of 943 households residing in these villages in 1993 and 1999, as well as their asset holdings in 1984, 1994 and 2000, and hence allow us to study how a household's migration or remittance choice in prior years, 1993 and 1999, affect its relative economic position in the subsequent period from 1994 to 2000.

The first step in analysis is to measure households' economic positions over time. Building on the widely used Filmer and Pritchett (2001) method, I create an indicator of household wealth in

three time periods (1984, 1994, 2000) based on principal component analysis of 16 asset indicators in the data. Several scholars have argued that the long-term economic and developmental effects of migration and remittance flows will depend on whether migrant households invest remittances in productive or consumer assets (Conway and Cohen, 1998; Durand et al. 1996a, 1996b; McKenzie, 2006; Taylor et al., 1996). To take this argument into account, I create separate wealth indices for households' productive and consumer assets.

In the main analysis of the paper, I employ a regression model to link the *changes* in households' productive and consumer assets from 1994 to 2000 to migration and remittance choices in 1993 and 1999. Because households do not choose migration and remittance strategies randomly, the model needs to correct for potential sample selection bias. I use propensity score matching methods, which address the selection issue by matching households on a range of characteristics and comparing the wealth outcomes of the matched groups (Rosenbaum and Rubin, 1983).

The findings suggest that households' migration and remittance choices have a significant effect on the level and nature of their subsequent investments, and this effect varies by households' initial wealth status. While rich households face a decrease in productive assets due to migration of their members, poor households with migrants gain productive assets and improve their relative status in their communities. Regardless of wealth status, households with migrants do not experience a disproportionate increase in consumer assets compared to households without migrants. These findings refute the popular belief that migrant earnings are spent on consumer goods rather than productive ends, and show that the opposite is the case, especially for poor households, in the Thai setting.

2. Background

International remittances have been increasing consistently in the past decade, reaching 20 percent of the GDP in many developing countries (World Bank, 2008). Scholarly interest in these flows has also grown dramatically in recent years. A key debate in the literature has revolved around the impact of remittance flows on economic development and inequality.

A number of scholars argue that remittances initiate a development dynamic by lessening the production and investment constraints in the economy (Goldring, 1990; Rozelle, Taylor, and de Brauw, 1999; Stark, Taylor, and Yitzhaki, 1988; Stark, 1991; Stark and Lucas, 1988; Taylor et al., 1996a, 1996b; Taylor, 1999), by providing income growth opportunities (Durand et al., 1996a; Massey and Parrado, 1998) or by creating a vessel for risk diversification (Lauby and Stark, 1988). Ample evidence from various settings shows how remittances help migrants establish small businesses in origin (Funkhouser, 1992; Stark, 1991; Woodruff and Zenteno, 2007), afford better education for their children (Edwards and Ureta, 2003; Yang, 2008), and accumulate wealth (Garip, 2010; Greenwood, 1985; Taylor, 1992; Taylor and Wyatt, 1996).

Scholars on the other side of the debate regard remittances as producing a cycle of dependency and stunted development in receiving communities (Papademetriou and Martin 1991; Reichart, 1981; Wiest, 1984). As evidence for this claim, researchers show that remittances in many settings are spent on consumption rather than income- or employment-generating productive activities (such as buying land or establishing a business), hence providing a way of life that cannot be sustained in the long-run or through local means (Brown and Ahlburg, 1999; Grasmuck and Pessar, 1991; Massey and Basem, 1992; Mills, 1999; Mines and DeJanvry, 1982;

Rempell and Lobdel, 1978; Russel, 1992). To counter this pessimistic view, recent research shows that remittances, even used for consumption, generate strong "multiplier" effects in the receiving economy (Durand et al. 1996a, 1996b; Taylor et al., 1996a, 1996b; Taylor, 1999).

A related debate in the migration literature considers the impact of remittances on economic disparities in the receiving countries. A number of scholars link the trends in remittance flows to trends in economic inequality with macro-level data. Others rely on inequality decomposition techniques to measure the contribution of remittances to the overall inequality using household-level income data. These studies yield conflicting findings.

Adams (1989), for example, observes that international remittances increase income inequality in rural Egypt. In his later study of rural Pakistan, the same author (1992) finds that remittances did not alter the distribution of income. In rural Mexico, Stark et al. (1988), Taylor (1992) and Taylor et al. (2005) all show that remittances reduce income inequality, while Mora (2005) and Garip (2010) observe the opposite pattern.

This study seeks to resolve the debate on the economic impact of remittances in the internal migration setting of Thailand. Although remittances from internal migrants are generally smaller in magnitude compared to those from international migrants, these funds comprise a vital component of rural livelihoods in many developing countries. Estimates show that internal remittances comprise at least 20 percent of non-farm earnings in Africa (Reardon, 1997), reaching 40 percent in some countries like Kenya (Rempel and Lobdel, 1978). Thus, these flows comprise a critical, yet understudied, component of economic outcomes in the developing world.

Using data from the Nang Rong district in the Buriram povince of Thailand, this study evaluates how internal migration and remittance flows change the level and distribution of household assets in 22 rural communities. Empirical evidence from other settings suggests that households with migrants earn higher incomes in the short run (Greenwood, 1985) and accumulate more assets in the long run (Taylor, 1992; Garip, 2010). In recent work from the Thai setting, Ford et al. (2009) found that migration and remittances have no effect on asset accumulation in Kanchanaburi province, while Entwisle and Tong (2005) observed strong positive effects in Nang Rong.

The present study uses the same data as Entwisle and Tong (2005), but relies on a different analytic strategy. First, rather than estimating cash values of assets as these authors, I compute a household asset index, where each asset is weighted according to its variation in the data. Second, I consider potential sample selectivity. Households do not randomly select into migration-remittance strategies; therefore, any observed relationship between these strategies and asset accumulation outcomes may reflect this non-random selection process. This issue has been addressed in prior work using Heckman's two-stage selection model (Garip, 2010; Mora, 2005; Taylor et al., 2003) or propensity-score matching techniques (Ford et al., 2009). In this study, I rely on the latter method, and show that controlling for selectivity is crucial for assessing the consequences of migration and remittance behavior. Third, different than these authors, I consider how the impact of migration-remittance flows on household assets differs by households' initial wealth status.

To develop hypotheses, I rely on prior findings from the Thai setting as well as qualitative observations from my fieldwork in selected villages of Nang Rong.[1] Similar to Entwisle and Tong (2005), but considering sample selectivity, I expect to find that households with migrants will acquire more assets and improve their economic standing in their communities compared to households without migrants. This expectation is supported by fieldwork observations. During a focus group discussion, a headman, for instance, asserted that, in his village, "Some migrant households have improved so much from remittances that they are now richer than [initially] rich households." A committee member in a different village similarly commented "Migrant households receive remittances and become rich. In our village, the richest person is not the Kamnan (the town chief) but one of the migrant villagers."

Based on fieldwork, I also expect that migration and remittance flows will increase households' investments in productive, rather than consumer, assets. A number of excerpts from group discussions already confirm this expectation. Asked about how remittances have contributed to her households' welfare, for example, the mother of an urban migrant responded "My life is much better than before. I now own a home and farmland." Referring to a successful migrant, a headman described "[With remittance money] he bought cattle worth of 200,000 baht. He also bought land for his wife worth 200,000-300,000 baht [about 4000-6000 US$]." A return migrant similarly explained that he "opened a grocery store for [his] wife with remittance income." In a different village, the headman told us about a return migrant "who now owns a small mobile coffee shop."

Although such examples of productive use of remittances were numerous, a considerable share of households claimed remittances only covered immediate needs. A migrant explained the situation in her household: "I remit 500 baht [10 US$] home. 300 baht is used to pay down the debt, and 200 baht is used to buy food." The mother of a migrant similarly remarked "I don't save any [remittance] money. I buy food and other things, and the money is all used up." Yet, even when remittances were used for basic consumption needs, migrants saw an improvement in their lives as one of them explained: "[Remittances] have helped a lot. First of all, the family is no longer in hardship. If I didn't remit, my wife would have to borrow money from other people to survive. After I migrated, things have improved. My family does not have any debt anymore."

Based on these observations, I expect that remittances will especially be helpful to poor households. Prior research in other settings shows that economic returns to migration and remittances depend on households' initial economic status (Adams and Page, 2003; Menjivar et al., 1998), yet no study to date has considered these differential effects in the Thai setting. (Vanwey (2003) has come the closest by studying how migration propensities vary by household wealth in Nang Rong.)

In the present study, as stated above, I expect a higher increase in wealth for households with migrants (compared to those without migrants). Depending on the initial wealth status of the household, however, this expectation may work differently. For wealthy households with productive assets, such as land or cattle, migration of a household member may bring about a loss in labor force for economic activities in the origin. As a result, these households may lose income, and subsequently assets, by sending migrants, especially if the migrants do not send

remittances to compensate for their absence. Alternatively, if migrants from wealthy households do send remittances, they may help diversify risks to local earnings, and hence protect households' existing investments.

For poor households, due to lack of other opportunities in origin communities, migration of a household member may boost household assets through remittances, or through reducing consumption needs of the household. This latter point has not been considered in any study to date. Yet, anecdotal evidence from my fieldwork confirms its importance. As a migrant puts it: "There are more expenses if the children stay home. If we go away to work, there are less people home and it is less expensive to feed the family." Hence, migrants from poor households may help the household economy not only by sending back remittances, but also by the sheer fact of leaving and hence relieving the household's burden of supporting them.

3. Analytic Strategy

3.1. Data

The study data come from a survey of 22 villages in Nang Rong, a district in the historically poor Northeast region of Thailand, and an important source of migrants to urban destinations. Migration flows from this region once consisted mostly of seasonal migrants, who sought alternative livelihoods for a few months during droughts that precede the monsoon rains (Phongpaichit, 1990). This seasonal character began to change in the 1980s. From mid-1980s to mid-1990s, Thailand led the world in economic growth, averaging nine percent each year (Jansen, 1997). This growth was fueled by production in export manufacturing, which was a result of the rising value of the Yen, rising wages in nearby newly industrialized countries

(NICs), changes in textile import quotas to the United States, and dramatic increases in foreign direct investment, primarily from Japan (Phongpaichit and Baker, 1998). By 1985, Thai manufacturing exports had outpaced rice and other agricultural exports in value (Warr and Nidhiprabha, 1996). With the growth in manufacturing export came an increased demand for labor in urban destinations (Bello, Cunningham, and Poh, 1998). As a result, rural migrants in their teens and early twenties, mostly from the Northeast region, began to flock to factory, construction and service jobs at unprecedented rates (Mills, 1999). This period of expansive growth began to slow down in the mid-1990s. In 1996, the export growth slumped from over 20 percent to zero, partly due to increasing competition from China and India. In 1997, Asian financial crisis hit Thailand leading to a devaluation of the Thai currency, baht, and precipitating a brief recession. Unemployment rates increased as a consequence, and migration flows from rural to urban regions slowed down.

The Nang Rong data, collected in three survey waves (1984, 1994, and 2000), capture this roller coaster period of economic boom and bust in the country, leading to dramatic changes in migration and remittance flows between rural and urban regions.[2] The 1984 wave was a census of 51 villages in Nang Rong, and collected information on individual demographics, household assets and village characteristics. The 1994 wave not only replicated the 1984 census, following all 1984 respondents still living in the original 51 villages and adding any new residents, but also included a retrospective life history component that recorded migration, education and labor experiences of all individuals between the ages of 13 to 35 from age 13 onward. The 1994 survey also interviewed migrants (who were absent at the time of the village survey) in four major destinations (the provincial capital, Buriram; the regional capital, Korat or Nakhon Ratchasima;

Bangkok and the Bangkok Metropolitan Area; and Eastern Seaboard provinces), reaching 70

percent of eligible migrants from 22 of the original 51 villages (Rindfuss et al., 2007). The final

2000 survey replicated the 1994 wave, following the 1994 respondents and adding any new

residents to the database, and similarly included a life history, as well as a migrant follow-up,

component. Prior research suggests that the full data set from 51 villages may lead to

underestimates of migration flows due to missing data from absent migrants (Curran et al.,

2005). Therefore, in this study, I restrict the analysis to data from 22 villages where migrants

were followed-up in four major destinations.

The study data combines information from household rosters, life history surveys, and village

questionnaires. Specifically, in addition to collecting basic demographic information, the 1994

and 2000 household rosters asked each individual about their migration and remittance behavior

in the past 12 months (that is, in 1993 and 1999). The rosters also collected detailed records of

households' productive (e.g., land, cattle, tractors) and consumer (e.g., TVs, VCRs, refrigerators)

assets. These data are used to compute the key measures for our analysis. Life history survey in

1994 collected retrospective information on annual migration trips, which allow us to compute

migration experience indicators at the household and village level. Finally, village questionnaire

in 1994 recorded various village characteristics, which are included as controls.

3.2. Statistical Methods

The analysis seeks to evaluate how households' migration and remittance behavior in 1993 and

1999 affect subsequent changes in their asset holdings from 1994 to 2000. But households do not

randomly send migrants or receive remittances, thus, a naïve comparison of changes in assets

across households' migration-remittance strategies confounds the effect of those strategies with the selection process into those strategies. This issue can be addressed with statistical matching methods. These methods use a distance measure to group similar observations into 'matched' categories. A popular distance measure is the propensity score, the conditional probability of an outcome (household's migration-remittance behavior in our case) given various relevant characteristics (Rosenbaum and Rubin, 1983). The inverse of the predicted propensity score is then used to weight observations in subsequent models (e.g., of household asset change) to adjust for selection. These methods were originally developed to evaluate the effect of binary outcomes, but recently, Imbens (2000) has extended their application to multi-valued treatments. Similar to Imbens (2000), this study employs a two-stage estimation strategy. The first stage specifies a multinomial logistic equation to model households' choice among three alternative strategies: (i) not migrating, (ii) migrating but not remitting, and (iii) migrating and remitting. The second stage models the changes in households' assets as a function of their strategies, using the predicted probabilities (i.e., propensity scores) from the first stage as sample weights to adjust for selection. I describe these models in detail below.

In the first stage model, each household i chooses a migration and remittance strategy, MR_i, from among three options: 'nonmigrant', 'migrant-nonremitter' and 'migrant-remitter' indexed 1,2 and 3 respectively. Let $\pi_{ij} = \Pr\{MR_i = j\}$ denote the probability that household i chooses strategy j. Taking the 'non-migrant' strategy as the baseline, the log-odds for choosing the other two strategies relative to the baseline, denoted η_{ij} can be written as a linear function of relevant characteristics, x, in a multinomial logit specification:

$$\eta_{ij} = \log \frac{\pi_{ij}}{\pi_{i1}} = x_i \beta_j \qquad (1)$$

where β_j represents the corresponding regression coefficients (for $j = 2,3$).

The second stage model expresses the change in household assets over time as a function household's migration and remittance strategies. Let a indicate the level of household assets and x denote a vector of relevant characteristics. Using observations from two points t_0 and t_1, the change in the assets of household i from t_0 to t_1 is given by

$$\Delta a_i = a_{it_1} - a_{it_0} = x_i \alpha + s_{ij} \omega + \upsilon \qquad j = 2,3 \qquad (2)$$

where s_{ij} is the binary indicator of whether household i chooses migration-remittance strategy j (that is, $MR_i = j$); α and ω are vectors of regression coefficients, and υ is a vector of errors. To control for potential selectivity, the second stage sample is weighted by the inverse of the predicted probabilities (propensity scores) from the first-stage, π_{ij}^* corresponding to household's actual migration-remittance outcome MR_i.

As a benchmark to this two-stage estimation strategy, I estimate an ordinary least squares (OLS) regression of change in household assets. The results, presented in Tables A1 and A2 of Appendix A, are significantly different than the propensity-score adjusted estimates shown in Tables 4 and 5, and confirm the necessity of the latter strategy.[3]

3.2. Operational Measures

A key variable for analysis is households' migration and remittance strategies in 1993 and 1999, constructed from the following questions in 1994 and 2000 households rosters: "Has this person

migrated *in the past 12 months*?" and "Has this migrant sent any goods or money *in the past 12 months?*" A household is defined 'nonmigrant' in 1993 (1999) if there are no migrants among household members in the 1994 (2000) roster. A household with one or more migrants, none of whom send remittances, is considered 'migrant-nonremitter.' A household with migrant members, at least one whom sends remittances, is called 'migrant-remitter.'[4]

Another key variable is the change in household assets from 1994 to 2000. The household rosters in these years include indicators for 16 asset categories.[5] These indicators are used to create a household asset index following the methodology proposed in a highly cited work by Filmer and Pritchett (2001). This methodology is based on principal components analysis (PCA), which aggregates information from several indicators into a few dimensions. PCA assumes a multivariate normal distribution, and is suitable for continuous data. Most demographic surveys, however, contain ordinal measures. To apply PCA to such data, Filmer and Pritchett (2001) convert ordinal variables to binary indicators. But this strategy throws away the qualitative information on the ordering of categories. In recent work, Kolenikov and Angeles (2004) show that one could retain this information by replacing the Pearson's correlation with a *polychoric* correlation measure in PCA.

I use this method, implemented in the `polychoricpca` routine in Stata, to compute weights for the 16 asset indicators in the combined data from 1994 and 2000. These indicators include a continuous measure (household land), counts (number of cows, buffalos or pigs; number of TVs, VCRs, refrigerators, cars, motorcycles, itans (i.e., small tractors), tractors, rice threshers, and sewing machines), and categorical variables (house has windows, household uses gas or

electricity for cooking, whether water is piped into household). The descriptive statistics are

shown in Table B1 of Appendix B. PCA is sensitive to the scaling of variables, therefore, the

only continuous variable in our data (household land) is standardized to mean 0 and variance 1.

In a separate PCA application, I computed the weights for the assets in the 1984 survey, which

included a different set of indicators. I did not include the 1984 data in the global PCA above

because (i) it forces us to drop several indicators measured only in 1994 and 2000, and (ii) the

polychoric PCA procedure does not converge with the 1984 data. Household asset index in 1984

is not a central measure for our analysis; it is only included as a control in the first stage model.

[Table 1. Scoring Coefficients for Productive and Consumer Asset Indices Generated by

Polychoric PCA]

Table 1 displays the scoring coefficients of the first principal component given by the polychoric

PCA using the combined data from 1994 and 2000. (For a comparison with the regular Filmer-

Pritchett PCA, see Table C1 in Appendix C). The first column reports the coefficients for

productive assets: (i) land, (ii) cattle (cows, buffalos and pigs), and (iii) farming tools (itans,

tractors, rice threshers). The second column reports the coefficients for *consumer assets*: (i)

housing quality (windows, type of cooking fuel, water pipe), and (ii) durables (TVs, VCRs,

refrigerators, sewing machines, cars and motorcycles).[6] Household indices for productive and

consumer assets are computed by multiplying each indicator with the corresponding PCA

coefficient, and summing these values up. For ease of interpretation, both asset indices are

scaled to range between 0 and 10. The change in household assets is measured by subtracting the 1994 (productive or consumer) index from its 2000 value.

Other household characteristics from the 1994 survey are included as control variables. Households with dependents may be more likely to send migrants (and receive remittances) to generate extra income, given that enough members are left behind to provide care for the dependents. To capture this pattern, I include counts of seniors (aged 65 or more), children (aged 14 or less), and all household members. A count of sons and daughters (aged 15 or more) captures the number of the more mobile members in the household, who, presumably, are also more likely to remit to pay their debts to their parents (Chamratrithirong, Morgan, and Rindfuss, 1988), or to prove their worth for future inheritances (Curran et al., 2005). An indicator of female-to-male ratio in the household captures the gendered cultural expectations in Thailand, which typically lead women to remit at higher rates than men to fulfill their obligation to support parents (Curran et al., 2005; Vanwey, 2004). The number of economic activities (silk weaving, silk worm raising, other cloth weaving, charcoal making), along with a binary indicator of debt, proxy a household's economic status. Indicators of cumulative trips in the household and village (aggregated from individual life histories until 1993) capture the higher likelihood of migration from households and villages with an established history of migration (Massey, 1990). A measure of destination diversity among village trips (based on Shannon's entropy) captures the idea that prior experience of villagers is more likely prompt new migrants if that experience is more diverse in terms of the opportunities it provides (Garip, 2008).

At the village level, summary measures (mean and gini) of household productive and consumer asset indices proxy the degree and distribution of wealth. A count of months of water shortage captures risks to farming income. Percentage of households receiving remittances measures collective remittance behavior. Binary indicators of remoteness to district, presence of a school, temple or newspaper reading room, and a count of years since village has been electrified roughly proxy village development level. The amount of land available for purchase measures potential investment opportunities in the village.

3.4. Summary of Analyses

In the first stage model, the dependent variable is households' migration-remittance strategies in 1993. To avoid endogeneity, a number of independent variables are either excluded (e.g., the number of economic activities, whether household had debt, percentage of households receiving remittances, all measured only in 1994), or retained in their 1984 values (e.g., indices of households' productive and consumer assets, months of water shortage in village). Other variables (e.g., household size, female-to-male ratio) measured in 1994 are assumed stable from 1993 to 1994. (The household demographic measures in 1994 include migrants, who were followed up in destination, and thus are not endogenous to migration behavior in 1993.)

In the second stage model, the dependent variable is the *change* in households' productive and consumer asset indices from 1994 to 2000. The primary independent variables are binary indicators of households' migration and remittance strategies in 1993 and 1999. The 1997 Asian financial crisis lies roughly in the middle of these years. Our data cannot capture the immediate response to the crisis, but allow us to account for the differential migration or remittance patterns

before and after the crisis. The data also do not capture households' migration and remittance behavior between 1993 and 1999, which may affect subsequent asset acquisition (or loss). Given that households' migration behavior shows remarkable consistency over time (e.g., 80 percent of migrant-remitter households in 1993 were also migrant-remitters in 1999), I expect the 1993 measure to provide a good proxy for the overall migration-remittance patterns from 1993 to 1999.

In the second stage model, I include all the variables from the first stage (except for migration experience indicators), along with those excluded to prevent endogeneity. In both stages, I standardize all continuous independent variables to mean 0 and standard deviation 1. In the second stage, I also standardize the dependent variable, and control for potential selectivity by weighting the sample by the inverse of the predicted probabilities from the first stage. In both stages, I categorize households as poor, medium-wealth, or rich based on the tertiles of the total (productive + consumer) asset index in 1994.[7] By running separate models for each group, I test the hypothesis that the economic impact of migration and remittances varies by households' initial wealth. In a final analysis, I observe the transition rates across wealth categories (e.g., from poor to rich) between 1994 and 2000 based on households' migration choices in 1993, and hence, descriptively assess the overall impact of migration on economic disparities in the 22 Thai villages.

4. Results

Table 2 summarizes the sample characteristics in 1994 and 2000 by households' migration-remittance status in 1993. Households with migrants have a lower number of children, a higher

number of sons and daughters, and a larger overall size than non-migrant households; those with remitters have a higher female-to-male ratio ($p<0.05$). Compared to non-migrants, migrants come from households and villages with more migration experience, and remitters from villages where a higher percentage receive remittances, and where village electrification is more recent and schools are fewer.

[Table 2. Sample Characteristics in 1994 and 2000 by Households' Migration-Remittance Status in 1993]

4.1. First Stage: Modeling Households' Migration and Remittance Behavior in 1993

Table 3 shows the relative-risk ratios from a multinomial logit model of migration and remittance behavior estimated separately for poor, medium-wealth, and rich households. For all groups, the odds of migrating decrease with the number of young children, possibly because parents stay in origin to care for them. For both medium-wealth and rich households, the odds of migrating and remitting (relative to not migrating) increase with the number of sons and daughters (older than 15), who may follow that strategy to fulfill cultural expectations to support parents, or to prove their worth for future inheritances. Alternatively, households with many sons and daughters may afford to forego part of their labor force in origin, and send migrants (and expect remittances) to diversify their earnings. For poor households, one of the best predictors of choosing the migrate-and-remit strategy is the female-to-male ratio in the household, confirming the gendered remitting patterns identified by Vanwey (2004), but suggesting that those patterns work only among the poor. In all wealth groups, the odds of migrating or remitting increase with households' prior migration experience.

[Table 3.   First-Stage Multinomial Regression Model Predicting Household Migration and Remittance Outcomes in 1993]

Moving on to village characteristics, in all wealth groups, the odds of migrating but not remitting (relative to not migrating) are lower in villages where households own more assets on average. Other village characteristics affect migration and remittance choices differently by household wealth. Months of water shortage, for example, increase the relative odds of migrating for only rich households, possibly because these households face the greatest risk to their investments in origin. Similarly, village remoteness to district specifically hurts the odds of receiving remittances for rich households. To the extent that village remoteness (a measure of difficulty of reaching the district, not just distance) proxies village development, this result is consistent with Lindstrom's (1996) finding in the Mexican setting that remittances typically flow to areas with more investment opportunities. Similarly, years since village has been electrified, another measure of development, increases the odds of migration in rich households, but has a mixed effect, increasing the odds of migrating but decreasing the odds of remitting, in medium-wealth households. Presence of a school in the village, suggesting an alternative to migrating for younger migrants, decreases the odds of migrating and remitting in households that are either poor or rich, but not medium-wealth. Finally, the availability of land for purchase provides a motivation to send migrants in poor and medium-wealth households.

Although these patterns are interesting in their own right, in this study, they are only relevant for obtaining the predicted probabilities (or propensity scores) of migration and remittance behavior,

which are used to account for selectivity in the main analysis. We now turn to this analysis, where the changes in productive and consumer assets from 1994 to 2000 are modeled as a function of households' migration and remittance choices in 1993 and 1999.

4.2. Second Stage: Changes in Household Productive and Consumer Assets from 1994 to 2000

Table 4 shows results from a linear regression model of change in households' *productive* assets, estimated separately for poor, medium-wealth, and rich households, and adjusted for selectivity using propensity scores from the first stage model. (See Table A1 in Appendix A for a comparison to OLS.) The primary variables of interest are binary indicators of households' migration and remittance strategies in 1993 and 1999. The estimates for these variables differ strongly by household wealth, as does the fit of the model (which is remarkably good as shown by the R^2 values ranging from 0.46 to 0.77.)

Poor households with migrants *gain* significantly more assets compared to those without migrants (shown in the first column). In particular, having a migrant in 1999, who sends remittances, is associated with a 0.36 standard deviation increase (above the mean) in productive assets in poor households. (The productive asset index is scaled to mean 0 and standard deviation 1.) Interestingly, having a migrant in 1993, who does not send remittances, still generates a 0.18 standard deviation increase in productive assets. Thus, in poor households, migrants contribute to the household economy not just by sending remittances, but also by the sheer fact of leaving and relieving the household from the burden of supporting them. These findings are in line with my initial expectations and the anecdotal evidence from fieldwork presented earlier.

[Table 4. Propensity Score Adjusted Linear Regression Model Predicting Change in Household Productive Assets from 1994 to 2000]

Interestingly, medium-wealth households with migrants do not experience a significantly different change in their assets compared to those without migrants (the second column), while *rich households* with migrants *lose* significantly more assets compared to those without migrants (the third column). Specifically, for rich households, having a migrant in 1993, who does not remit, is associated with a remarkable 0.69 standard deviation *decrease* in productive assets. Having a migrant who sends remittances, by contrast, has no effect on the change in productive assets. One interpretation for these patterns, suggested earlier as a hypothesis, is as follows. Rich households already own productive assets, like land or cattle, which claim part of their labor stock. Migration of a member may help these households diversify earnings, but also implies a loss in the labor for local activities, especially if the household is limited in size. Therefore, rich households with migrants may not be able to maintain their productive assets unless they are sufficiently large, so that local activities can be managed without the migrants, or migrants remit earnings to compensate for their absence. The positive coefficient of household size, which counteracts the negative coefficient of households' migrant-nonremitter status in 1993, supports this interpretation.

The estimates for other household and village characteristics also differ by household wealth. An increase in the number of seniors (older than 64) is associated with a decline in the productive assets for medium-wealth and rich households, but not for the poor. An increase in the female-to-

male ratio decreases the productive assets of the poor, but increases those of the rich. A higher

household debt in 1994 surprisingly brings about a higher increase in productive assets for poor

households. Households with more productive assets in 1994 are likely to observe a steeper

decline in those assets by 2000 in each wealth group, although the effect is a bit more severe in

rich households. Presence of a school or a newspaper reading room in the village increases the

productive asset accumulation among medium-wealth households, while the presence of a

temple decreases it among poor households.

[Table 5. Propensity Score Adjusted Linear Regression Model Predicting Change in Household
Consumer Assets from 1994 to 2000]

Table 5 repeats the same analysis for *consumer assets*. (See Table A2 in Appendix A for a

comparison to OLS.) In all wealth groups, the independent variables explain less of the variation

in consumer assets (R^2 ranging from 0.18 to 0.29) compared to models of productive assets in

Table 4. Moreover, households' migration and remittances strategies in 1993 and 1999, which

had a significant and positive effect on the changes in productive assets in poor households in

Table 4, have *no effect* on the changes in consumer assets in any wealth group. This finding

supports our hypothesis that migrant earnings are more likely to be spent on productive rather

than consumer assets, but only in poor households.

Few of the estimates for other household and village characteristics are significant. An increase

in the number of sons and daughters decreases the consumer assets of the rich, while an increase

in the female-to-male ratio increases the consumer assets of the medium-wealth. A higher index

of productive assets is associated with an increase in consumer assets of medium-wealth households, while a higher index of consumer assets leads to a decline in consumer assets of poor and rich households. Medium-wealth households in more unequal villages (with respect to productive assets) gain consumer assets, while those in villages where more remit lose assets. Poor and medium-wealth households in remote villages lose more assets. Presence of a school in the village increases the consumer asset accumulation among the rich households, while the presence of a temple increases it among the poor and medium-wealth households. The availability of land for purchase in village leads to consumer asset gain in poor households, while it is related to asset loss in medium-wealth households.

Overall, the findings from Tables 4 and 5 yield several insights: (i) households' migration and remittance choices have a significant effect on their subsequent *productive asset* acquisitions (or losses), (ii) this effect varies by household wealth, (iii) while poor households with migrants gain more productive assets compared to those without migrants, rich households with migrants lose more productive assets compared to their non-migrant counterparts. These patterns suggest that migration and remittance flows may have an equalizing effect on the wealth distribution in the rural Thai villages. The following analysis considers this conjecture by observing the changes in households' wealth status from 1994 to 2000 given their migration choices in 1993.

4.3. Descriptive Analysis of Changes in Households' Wealth Status from 1994 to 2000

Table 6 summarizes the changes in households' wealth status from 1994 and 2000. Columns and rows correspond, respectively, to households' migration behavior in 1993 and wealth category in 1994. (Migrants are not separated by remittance status to retain the sample size.) In each

column/row combination, three cells report the percentage of households that are (i) *climbers* (in a higher wealth category in 2000 than 1994), (ii) *stable* (in the same category), and (iii) *decliners* (in a lower income category).

[Table 6. Change in Households' Wealth Category from 1994 to 2000 by Migration Behavior in 1993]

The results show that wealth transitions are strongly differentiated by households' migration choices and their initial wealth. Among *poor* households, those with migrants have a higher percentage of *climbers* (46%) compared to households without migrants (44%). By contrast, among *rich* households, those with migrants have a higher percentage of *decliners* (45%) than those without migrants (40%). Finally, *medium-wealth* households with migrants are more likely to remain *stable* (44%) compared to those without migrants (31%).

The changes from 1994 to 2000 cannot be fully attributed to households' migration behavior. In fact, some of the gains enjoyed by the poor (and the losses borne by the rich) are likely to result from the 1997 Asian financial crisis, which severely affected Thai households. The *differences* between migrant and non-migrant households in rates of wealth transitions, however, do suggest an *equalizing* effect of migration on the distribution of wealth in the Thai villages. This effect could be tested more rigorously in future work, especially if longitudinal data covering the pre- and post-crisis period become available to researchers.

5. Conclusion

This study evaluated the impact of internal migration and remittance flows on wealth accumulation and distribution in 22 rural villages in the Nang Rong district of Thailand. Migration literature remains bifurcated on these questions. A number of studies find that remittances from migrants lead to productive asset accumulation, and therefore support economic growth in the origin, while others show that these funds are spent exclusively on consumption, and hence merely contribute to higher living standards that are unsustainable in the long run. Similarly, many studies claim that remittances decrease economic disparities by closing the gap between the rich and the poor, while others link these funds to increasing economic inequalities in origin communities.

This study sought to resolve these debates in the internal migration setting of Thailand. Using multi-level, longitudinal survey data from 22 rural villages, the study first developed aggregate indices for household productive and consumer assets with principal components analysis. This methodology built on the highly influential work by Filmer and Pritchett (2001), but included a recent statistical improvement that allowed taking into account the qualitative ordering of categorical variables. The main analysis of the paper modeled how households' migration and remittance choices in prior years (1993, 1999) affected their subsequent productive and consumer asset acquisitions from 1994 to 2000, while controlling for potential selectivity with propensity score matching.

The results confirmed some of the prior findings, but also provided novel insights into the economic impact of migration and remittance flows in the Thai setting. Similar to Entwisle and Tong (2005), but controlling for migrant selectivity, I found that households' migration and remittance choices have a significant effect on the level and nature of their subsequent investments. Different than these authors, I considered how this effect varies by households' initial wealth status. I found that *poor* households with migrants *gained productive assets* and improved their relative standing in their communities. Migrants who sent remittances contributed more to subsequent asset accumulation, however, even those who did not remit had a positive impact on asset gain possibly by reducing households' consumption burden. While many studies have observed the former pattern, the latter finding, also echoed in migrants' statements during my fieldwork, has not been shown in any prior work to date.

In stark contrast to poor households, *rich* households with migrants (who did not send remittances) *lost productive assets*. This pattern could be explained as follows. Rich households own many productive assets (e.g., land or cattle) that require labor to maintain. Because migration of a member implies a loss in the household labor force, households with many productive assets who send migrants may not be able to maintain those assets unless the migrants send back remittances to compensate for their absence. This explanation, although plausible in light of the quantitative evidence, needs to be further scrutinized with future qualitative work.

Counter to the popular belief that migrant earnings are spent on consumer goods, in the Thai setting, households with migrants *did not* experience a disproportionate change in *consumer assets* compared to those without migrants. This pattern, combined with the above findings,

suggest that remittances are likely to be used for productive ends in the Thai setting, especially in poor households, and hence provide a potential vessel for economic growth in rural Thailand.

A descriptive analysis drew the implications of these patterns for economic disparities by tracing the changes in households' wealth status from 1994 to 2000 based on their migration and remittance choices in 1993. The findings showed that *poor* households with migrants in 1993 were more likely to *move up* to the medium-wealth or rich category by 2000, compared to those without migrants. By contrast, rich households with migrants in 1993 were more likely to *move down* to the medium-wealth or poor category, and hence lose their relative status by 2000, compared to households without migrants. The overall effect of migration and remittance flows in the 22 villages, then, is a reduced inequality in assets, which results from both the poor moving up, and the rich moving down in the distribution.

One shortcoming of this study was the lack of data to assess how the 1997 Asian financial crisis affected households' asset gains (or losses) from 1994 to 2000. Given that our focus is on the *differences* in wealth accumulation between households *with* and *without migrants*, this omission is not problematic as long as we can assume that the crisis affected all households similarly, regardless of their migration choices. This assumption could be verified (or refuted) in future work if longitudinal data capturing household wealth immediately before and after the crisis became available to researchers.

To conclude, the results in this study suggested that future research should be attentive to the differential effects of migration and remittance flows on different wealth groups. Researchers

should also consider the selectivity of migration and remittance behavior when assessing the

impact of this behavior on economic outcomes.

Endnotes

1. I conducted 24 focus group interviews, with the participation of 158 individuals, in 8 of the 22 Nang Rong survey villages in November 2005. In each village, I consulted with village headmen to identify potential participants for three focus groups: (1) village leaders (village headman, village committee members, and "mothers' group" members), (2) migrant sending household members, and (3) return migrants. Focus groups consisted of six to eight participants, typically equal number of men and women, who discussed the motivations for, and the consequences of, migration behavior.

2. Researchers from the University of North Carolina and Mahidol University in Thailand jointly conducted the survey. More information is available at http://www.cpc.unc.edu/projects/nangrong.

3. Using matching methods, the study implicitly assumes that households' migration and remittance choices are captured by their *observable* characteristics (vector *x* in the equations above). But, households' choices may also be shaped by unobserved factors, say, how ambitious the household members are, which may also affect household assets. Instrumental variable methods address this issue, but require 'an instrument,' a variable that affects migration-remittance choices but not the subsequent changes in household assets, for identification. Such a variable is typically very hard to come by, and not surprisingly, unavailable to us in the Nang Rong data. The analysis, as a result, cannot discard potential selectivity on unobservable factors.

4. In 1993, of the 943 households in our sample, 336 are non-migrants, 126 are migrant-nonremitters, and 481 are migrant-remitters. 63 households have both migrant-nonremitter and migrant-remitter members, and in 9 of those cases, the number of the former exceed the number of the latter. Hence, if we were to change the definition of 'migrant-remitter' as a household with more migrant-remitter members than migrant-nonremitter members, then the classification would change for only 9 households. The results are robust to this change.

5. Although the 2000 survey includes more asset categories, these are excluded from analysis for the sake of consistency.

6. Certain assets in the consumer good category can be considered productive. For example, household members may use a car or motorcycle for work, or a sewing machine to produce clothing to be sold. This alternative classification does not change any of the results.

7. The substantive conclusions are robust to alternative categorizations, for example, based on the quantiles or quintiles of the total asset index (results available upon request).

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Appendix A.   OLS Models of Change in Productive and Consumer Assets

[Table A1. Ordinary Least Squares Model Predicting Change in Household Productive Assets from 1994 to 2000]

[Table A2. Ordinary Least Squares Model Predicting Change in Household Consumer Assets from 1994 to 2000]

Appendix B.   Descriptive Statistics for the Asset Indicators Used in PCA

[Table B1. Descriptive Statistics for Household Asset Indicators in 1994 and 2000 (N=943)]

Appendix C.   Scoring Coefficients from Filmer and Pritchett (2001) PCA

[Table C1. Scoring Coefficients for Productive and Consumer Asset Indices Generated by Filmer-Pritchett PCA]

Tables

Table 1. Scoring Coefficients for Productive and Consumer Asset Indices Generated by Polychoric PCA

Variable		Productive Asset Index	Consumer Asset Index
House has windows			0.40
Use gas or electricity in cooking			0.12
Water piped to house			0.28
Number of tvs			
	1		0.11
	2		0.81
	3		1.09
	4		1.22
Number of vcrs			
	1		0.83
	3		1.31
Number of refrigerators			
	1		0.45
	2		1.25
Number of cars			
	1		0.76
	2		1.10
	3		1.27
Number of motorcycles			
	1		0.29
	2		0.71
	3		0.97
	4		1.19
Number of sewing machines			
	1		0.39
	2		0.65
Household land*		0.42	
Number of itans			
	1	0.68	
	2	1.29	
Number of tractors			
	1	-0.03	
	2	0.42	
	3	0.89	
	4	1.16	
Number of rice threshers			
	1	-0.26	
	2	0.34	
Number of cows raised*		0.20	
Number of buffalos raised*		-0.05	
Number of pigs raised*		0.03	
Variance explained by 1st component		0.29	0.43

* Continuous variables are standardized to mean 0 and variance 1.

Table 2. Sample Characteristics in 1994 and 2000 by Households' Migration-Remittance Status in 1993

Household Characteristics	Non-Migrants (N=336)		Migrant-Nonremitters (N=126)			Migrant-Remitters (N=481)		
	Mean	(s.d.)	Mean	(s.d.)	p	Mean	(s.d.)	p
No of seniors (>64 yr old) in 94	0.46	(0.74)	0.45	(0.70)		0.51	(0.73)	
No of children (<15 yr old) in 94	0.94	(0.91)	0.59	(0.78)	*	0.62	(0.81)	*
No of sons and daughters (≥ 15 yr old) in 94	2.35	(1.61)	2.76	(1.94)	*	3.38	(1.87)	*
Female-to-male ratio in 94	0.52	(0.18)	0.50	(0.19)		0.55	(0.18)	*
Household size in 94	5.87	(1.95)	6.56	(1.96)	*	6.89	(2.10)	*
No of economic activities in 94	0.26	(0.66)	0.33	(0.75)		0.41	(0.82)	*
Household has debt in 94?	0.65	(0.48)	0.63	(0.48)		0.64	(0.48)	
Index of hh productive assets in 84	0.75	(0.65)	0.82	(0.56)	*	0.79	(0.72)	
in 94	3.03	(1.47)	2.85	(1.60)		2.92	(1.40)	
in 00	3.33	(1.40)	2.98	(1.32)		3.19	(1.37)	
Index of hh consumer assets in 84	0.45	(0.73)	0.32	(0.52)		0.41	(0.82)	
in 94	1.76	(1.20)	1.74	(1.26)		1.85	(1.09)	
in 00	2.99	(1.60)	2.78	(1.67)		2.91	(1.46)	
Cumulative Migration Experience								
Migration trips by household members until 94	1.70	(2.63)	3.42	(3.46)	*	3.68	(3.23)	*
Migration trips by village members until 94	2.53	(0.61)	2.67	(0.61)	*	2.73	(0.59)	*
Destination diversity of village trips until 94	7.15	(0.52)	7.18	(0.47)		7.14	(0.50)	

*p<0.05. Two-tailed difference of mean tests are based on comparisons with non-migrant households.
(continued)

Table 2 (cont'd). Sample Characteristics in 1994 and 2000 by Households' Migration-Remittance Status in 1993

	Non-Migrants (N=336)		Migrant-Nonremitters (N=126)			Migrant-Remitters (N=481)		
Village Characteristics	Mean	(s.d.)	Mean	(s.d.)	p	Mean	(s.d.)	p
Mean of <u>productive</u> assets in village in 84	0.80	(0.17)	0.78	(0.14)		0.76	(0.15)	*
in 94	2.96	(0.54)	2.95	(0.54)		2.95	(0.57)	
in 00	3.22	(0.30)	3.19	(0.28)		3.22	(0.29)	
Mean of <u>consumer</u> assets in village in 84	0.46	(0.33)	0.34	(0.26)	*	0.40	(0.29)	*
in 94	1.82	(0.41)	1.69	(0.37)	*	1.82	(0.40)	
in 00	2.95	(0.43)	2.88	(0.50)		2.92	(0.46)	
Gini of <u>productive</u> assets in village in 84	0.41	(0.07)	0.41	(0.06)		0.40	(0.07)	
in 94	0.25	(0.05)	0.25	(0.05)		0.24	(0.04)	
in 00	0.23	(0.06)	0.24	(0.07)		0.22	(0.07)	
Gini of <u>consumer</u> assets in village in 84	0.61	(0.12)	0.62	(0.13)		0.61	(0.12)	
in 94	0.34	(0.06)	0.35	(0.06)		0.33	(0.06)	
in 00	0.28	(0.04)	0.29	(0.05)		0.29	(0.04)	
Months of water shortage in 84	2.55	(1.26)	2.42	(1.53)		2.46	(1.45)	
in 94	2.42	(1.65)	2.28	(1.69)		2.59	(1.75)	
% of households receiving remittances in 94	44	(10.09)	44	(10.94)		48	(9.24)	*
in 00	65	(8.05)	66	(9.34)		67	(7.53)	*
Village remote to district in 94?	0.73	(0.44)	0.81	(0.39)		0.75	(0.43)	
Years since village is electrified in 94	8.32	(3.07)	8.36	(3.47)		7.89	(2.87)	*
Is there a school in village in 94?	0.64	(0.48)	0.60	(0.49)		0.55	(0.50)	*
a temple in village in 94?	0.70	(0.46)	0.76	(0.43)		0.79	(0.40)	*
a newspaper reading room in village in 94?	0.44	(0.50)	0.40	(0.49)		0.43	(0.50)	
Amount of village land for purchase in 94 (1000rai)	1.44	(0.82)	1.41	(0.88)		1.44	(0.82)	

*p<0.05. Two-tailed difference of mean tests are based on comparisons with non-migrant households.

Table 3.   First-Stage Multinomial Regression Model Predicting Household Migration and Remittance Outcomes in 1993

	Poor Households				Medium-wealth Households				Rich Households			
	Migrate & Not Remit		Migrate & Remit		Migrate & Not Remit		Migrate & Remit		Migrate & Not Remit		Migrate & Remit	
Household Characteristics												
No of seniors (>64 yr old) in 94	0.65		1.00		0.65		0.86		0.79		0.84	
No of children (<15 yr old) in 94	0.57	*	0.55	**	0.40	*	0.54	**	0.75		0.55	**
No of sons and daughters (≥ 15 yr old) in 94	0.96		1.29		0.88		1.52	*	0.94		1.45	*
Female-to-male ratio in 94	2.76		7.91	**	0.24		2.27		0.30		2.83	
Household size in 94	1.27		1.03		1.36		0.98		1.25		1.16	
Index of hh productive assets in 84	1.29		1.24		1.24		1.09		0.87		0.84	
Index of hh consumer assets in 84	0.75		1.14		0.76		1.01		0.96		0.99	
Cumulative Migration Experience												
Migration trips by household members until 93	1.26	**	1.22	*	1.20	*	1.28	**	1.23	**	1.24	**
by village members until 93	1.15		1.28		1.70		1.49		1.59		1.77	*
Destination diversity of village trips from 84 to 93	2.30	**	1.01		3.64	**	1.07		0.85		1.24	
Village Characteristics												
Mean of productive assets in village in 84	0.77	*	1.18		0.31	*	0.69		0.86		0.72	
Mean of consumer assets in village in 84	0.54	**	0.91		0.40	**	1.03		0.16	**	0.59	*
Gini of productive assets in village in 84	1.04		0.86		0.72		1.17		0.38	*	0.77	
Gini of consumer assets in village in 84	1.27		0.72		3.18	**	0.91		0.64		1.25	
Months of water shortage in 84	0.77		1.21		0.64	*	1.09		1.65	*	1.25	*
Village remote to district?	1.36		0.57		0.65		0.91		0.31		0.45	*
Years since village is electrified in 94	1.19		1.00		1.33	*	0.86	*	1.47	**	1.20	**
Is there a school in village in 94?	0.58		0.46	**	1.09		1.31		1.13		0.44	**
a temple in village in 94?	0.66		1.90		0.34		2.35	*	2.01		0.70	
a newspaper reading room in village in 94?	1.46		1.23		1.05		1.22		3.94	*	1.58	
Amount of village land available for purchase in 94	2.06	**	0.77		2.02	*	0.95		2.33		1.36	
N (# of Households)	315				314				314			
Pseudo-R^2	0.15				0.21				0.21			

**p<0.01, *p<0.05. Standard errors are adjusted for 22 village clusters. Reference category is non-migrants. Results are presented in relative-risk ratios. Diversity index, asset indices, and mean and gini of these indices are standardized to mean 0 and standard deviation 1.

Table 4. Propensity Score Adjusted Linear Regression Model Predicting Change in Household Productive Assets from 1994 to 2000

Household Migration-Remittance Strategy	Poor Households		Medium-Wealth Households		Rich Households	
Migrant-Nonremitter in 93	0.18	*	-0.26		-0.69	**
in 99	0.03		-0.08		0.31	
Migrant-Remitter in 93	-0.05		-0.06		-0.22	
in 99	0.36	**	-0.01		0.15	
Household Characteristics						
No of seniors (>64 yr old) in 94	0.08		-0.26	**	-0.25	**
No of children (<15 yr old) in 94	0.07		-0.03		0.09	
No of sons and daughters (≥ 15 yr old) in 94	0.06		0.00		-0.06	
Female-to-male ratio in 94	-0.68	**	-0.15		0.55	*
Household size in 94	-0.07		0.06		0.13	*
No of economic activities in 94	0.04		0.06		0.07	
Household has debt in 94?	0.31	**	0.07		0.13	
Index of hh productive assets in 94	-0.54	**	-0.56	**	-0.57	**
Index of hh consumer assets in 94	0.08		0.13		-0.14	*
Village Characteristics						
Mean of productive assets in village in 94	-0.09		-0.06		-0.18	
Mean of consumer assets in village in 94	-0.14		0.04		0.03	
Gini of productive assets in village in 94	0.05		-0.07		-0.02	
Gini of consumer assets in village in 94	-0.03		0.01		0.15	
Months of water shortage in 94	-0.02		-0.03		0.06	
% of households receiving remittances in 94	0.01		0.01		0.00	
Village remote to district?	-0.15		-0.02		0.03	
Years since village is electrified in 94	0.05		0.00		0.01	
Is there a school in village in 94?	-0.10		0.31	*	-0.18	
Is there a temple in village in 94?	-0.35	**	0.02		0.25	
Is there a newspaper reading room in village in 94?	0.10		0.20	*	0.00	
Amount of village land available for purchase in 94	0.11		-0.04		0.09	
Intercept	-0.44		-0.50		-1.15	
N (# of Households)	315		314		314	
R^2	0.51		0.46		0.77	

**p<0.01, *p<0.05. Standard errors are adjusted for 22 village clusters. Reference category is non-migrants. The dependent variable, destination diversity index, asset indices, and mean and gini of these indices are standardized to mean 0 and standard deviation 1.

Table 5. Propensity Score Adjusted Linear Regression Model Predicting Change in Household <u>Consumer</u> Assets from 1994 to 2000

	Poor Households		Medium-Wealth Households		Rich Households	
Household Migration-Remittance Strategy						
Migrant-Nonremitter in 93	-0.31		-0.01		-0.07	
in 99	-0.01		-0.26		0.29	
Migrant-Remitter in 93	-0.08		0.21		0.03	
in 99	-0.02		-0.26		-0.03	
Household Characteristics						
No of seniors (>64 yr old) in 94	-0.10		-0.15		-0.14	
No of children (<15 yr old) in 94	-0.07		0.06		-0.10	
No of sons and daughters (≥ 15 yr old) in 94	0.05		-0.04		-0.17	**
Female-to-male ratio in 94	0.43		0.78	*	-0.54	
Household size in 94	-0.02		-0.04		0.10	
No of economic activities in 94	-0.05		0.04		0.12	
Household has debt in 94?	-0.02		-0.02		-0.06	
Index of hh <u>productive</u> assets in 94	0.13		0.25	**	0.12	
Index of hh <u>consumer</u> assets in 94	-0.37	*	-0.18		-0.24	*
Village Characteristics						
Mean of <u>productive</u> assets in village in 94	0.01		-0.02		-0.05	
Mean of <u>consumer</u> assets in village in 94	-0.22		0.17		-0.23	
Gini of <u>productive</u> assets in village in 94	0.08		0.21	*	-0.04	
Gini of <u>consumer</u> assets in village in 94	-0.05		0.05		-0.13	
Months of water shortage in 94	-0.02		0.00		-0.02	
% of households receiving remittances in 94	-0.01		-0.04	**	0.00	
Village remote to district?	-0.44	*	-0.53	**	-0.12	
Years since village is electrified in 94	0.05		-0.08	*	-0.02	
Is there a school in village in 94?	-0.24		-0.14		0.55	*
Is there a temple in village in 94?	0.30	**	0.44	**	0.37	
Is there a newspaper reading room in village in 94?	-0.10		-0.20		0.26	
Amount of village land available for purchase in 94	0.17	*	-0.10	*	-0.08	
Intercept	-0.06		2.93	**	0.15	
N (# of Households)	315		314		314	
R^2	0.18		0.29		0.22	

**p<0.01, *p<0.05. Standard errors are adjusted for 22 village clusters. Reference category is non-migrants. The dependent variable, destination diversity index, asset indices, and mean and gini of these indices are standardized to mean 0 and standard deviation 1.

Table 6. Change in Households' Wealth Category from 1994 to 2000 by Migration Behavior in 1993

	Nonmigrant Households (N=336)	Migrant Households (N=607)
Poor Households		
Climbers	44%	46%
Stable	56%	54%
Decliners	-	-
Medium-wealth Households		
Climbers	37%	24%
Stable	31%	44%
Decliners	31%	32%
Rich Households		
Climbers	-	-
Stable	60%	55%
Decliners	40%	45%

Note: Results are presented as column percentages. Wealth categories are based on the values of the total (productive + consumer) household asset index in 1994 and 2000.

Appendix Tables

Table A1. Ordinary Least Squares Model Predicting Change in Household <u>Productive</u> Assets from 1994 to 2000

	Poor Households		Medium-Wealth Households		Rich Households	
Household Migration-Remittance Strategy						
Migrant-Nonremitter in 93	0.20		-0.27		-0.31	*
in 99	-0.03		-0.27		-0.01	
Migrant-Remitter in 93	0.01		-0.11		-0.05	
in 99	0.16		-0.15		-0.20	
Household Characteristics						
No of seniors (>64 yr old) in 94	0.04		-0.18	*	-0.09	
No of children (<15 yr old) in 94	0.11	*	0.09		0.07	
No of sons and daughters (≥ 15 yr old) in 94	0.04		0.00		-0.04	
Female-to-male ratio in 94	-0.46	**	-0.18		0.44	
Household size in 94	-0.06		0.05		0.08	
No of economic activities in 94	0.05		0.01		0.14	
Household has debt in 94?	0.24	**	0.07		0.11	
Index of hh <u>productive</u> assets in 94	-0.52	**	-0.59	**	-0.58	**
Index of hh <u>consumer</u> assets in 94	0.24	**	0.07		-0.18	*
Village Characteristics						
Mean of <u>productive</u> assets in village in 94	-0.05		-0.04		-0.03	
Mean of <u>consumer</u> assets in village in 94	-0.19	*	0.02		0.21	
Gini of <u>productive</u> assets in village in 94	0.13		-0.06		-0.02	
Gini of <u>consumer</u> assets in village in 94	-0.05		-0.04		0.11	
Months of water shortage in 94	0.01		0.04		0.11	**
% of households receiving remittances in 94	0.01		0.00		-0.01	
Village remote to district?	-0.05		0.04		0.14	
Years since village is electrified in 94	0.03		0.01		-0.05	
Is there a school in village in 94?	-0.07		0.25		0.20	
Is there a temple in village in 94?	-0.34	*	0.06		0.18	
Is there a newspaper reading room in village in 94?	0.09		0.08		-0.01	
Amount of village land available for purchase in 94	0.09		-0.07		0.01	
Intercept	-0.41		-0.35		-0.23	
N (# of Households)	315		314		314	
R^2	0.42		0.42		0.47	

**p<0.01, *p<0.05. Standard errors are adjusted for 22 village clusters. Reference category is non-migrants. The dependent variable, destination diversity index, asset indices, and mean and gini of these indices are standardized to mean 0 and standard deviation 1.

Table A2. Ordinary Least Squares Model Predicting Change in Household <u>Consumer</u> Assets from 1994 to 2000

	Poor Households		Medium-Wealth Households		Rich Households	
Household Migration-Remittance Strategy						
Migrant-Nonremitter in 93	-0.16		-0.09		-0.32	
in 99	0.00		-0.16		0.22	
Migrant-Remitter in 93	-0.02		0.06		-0.23	*
in 99	0.09		-0.08		0.22	
Household Characteristics						
No of seniors (>64 yr old) in 94	-0.10		-0.13		-0.16	
No of children (<15 yr old) in 94	-0.02		0.04		-0.13	
No of sons and daughters (≥ 15 yr old) in 94	0.02		-0.10	*	-0.08	
Female-to-male ratio in 94	0.20		0.67	*	0.05	
Household size in 94	-0.04		0.00		0.08	
No of economic activities in 94	0.00		0.02		-0.14	
Household has debt in 94?	0.04		-0.05		0.09	
Index of hh <u>productive</u> assets in 94	0.15	*	0.19	**	0.08	
Index of hh <u>consumer</u> assets in 94	-0.28	*	-0.22		-0.14	
Village Characteristics						
Mean of <u>productive</u> assets in village in 94	0.10		0.03		-0.02	
Mean of <u>consumer</u> assets in village in 94	-0.26		-0.05		-0.34	*
Gini of <u>productive</u> assets in village in 94	-0.02		0.17		0.10	
Gini of <u>consumer</u> assets in village in 94	-0.17		-0.04		-0.03	
Months of water shortage in 94	0.01		0.00		-0.06	
% of households receiving remittances in 94	0.00		-0.02	*	0.01	
Village remote to district?	-0.22		-0.42	*	-0.23	
Years since village is electrified in 94	0.08		-0.03		0.04	
Is there a school in village in 94?	-0.23		0.00		0.13	
Is there a temple in village in 94?	0.11		0.21		0.25	
Is there a newspaper reading room in village in 94?	0.02		-0.16		0.07	
Amount of village land available for purchase in 94	0.22	**	-0.09		0.03	
Intercept	-0.60		1.59	**	-1.29	*
N (# of Households)	315		314		314	
R^2	0.14		0.17		0.12	

**p<0.01, *p<0.05. Standard errors are adjusted for 22 village clusters. Reference category is non-migrants. The dependent variable, destination diversity index, asset indices, and mean and gini of these indices are standardized to mean 0 and standard deviation 1.

Table B1. Descriptive Statistics for Household Asset Indicators in 1994 and 2000 (N=943)

	1994		2000	
	Mean	(s.d.)	Mean	(s.d.)
Consumer Assets				
House has windows	0.09	(0.28)	0.17	(0.38)
Use gas or electricity in cooking	0.69	(0.46)	0.88	(0.33)
Water piped to house	0.09	(0.29)	0.42	(0.49)
Number of tvs	0.80	(0.45)	0.82	(0.48)
Number of vcrs	0.01	(0.09)	0.07	(0.27)
Number of refrigerators	0.17	(0.38)	0.52	(0.52)
Number of cars	0.03	(0.17)	0.07	(0.28)
Number of motorcycles	0.27	(0.44)	0.66	(0.70)
Number of sewing machines	0.10	(0.30)	0.08	(0.30)
Productive Assets				
Household land	23.83	(23.40)	18.06	(17.26)
Number of itans	0.03	(0.18)	0.18	(0.39)
Number of tractors	1.12	(1.06)	1.12	(0.87)
Number of rice threshers	1.12	(0.99)	1.52	(0.85)
Number of cows raised	1.78	(6.61)	1.28	(4.16)
Number of buffalos raised	1.89	(2.33)	0.71	(2.08)
Number of pigs raised	0.47	(1.83)	0.38	(2.28)

Table C1. Scoring Coefficients for Productive and Consumer Asset Indices Generated by Filmer-Pritchett PCA

Variable		Productive Asset Index	Consumer Asset Index
House has windows			0.27
Use gas or electricity in cooking			0.30
Water piped to house			0.26
Number of tvs			
	1		0.14
	2		0.24
	3		0.15
	4		0.01
Number of vcrs			
	1		0.35
	3		0.02
Number of refrigerators			
	1		0.44
	2		0.17
Number of cars			
	1		0.32
	2		0.14
	3		0.03
Number of motorcycles			
	1		0.25
	2		0.23
	3		0.19
	4		0.07
Number of sewing machines			
	1		0.17
	2		0.10
Household land*		0.40	
Number of itans			
	1	0.44	
	2	0.04	
Number of tractors			
	1	0.57	
	2	-0.35	
	3	0.12	
	4	0.01	
Number of rice threshers			
	1	0.02	
	2	0.29	
Number of cows raised*		0.27	
Number of buffalos raised*		-0.12	
Number of pigs raised*		0.09	
Variance explained by 1st component		0.17	0.11

* Continuous variables are standardized to mean 0 and variance 1.