Repeat Migration and Cumulative Remittances as Mechanisms for Wealth Inequality in Mexico

(Running head: Migration, Remittances and Inequality)

(Word Count: 11,794)

Filiz Garip

Department of Sociology

Harvard University

Repeat Migration and Cumulative Remittances as
Mechanisms for Wealth Inequality in Mexico

Abstract

Migrant remittances are one of the largest sources of external finance for many developing countries in the world, yet the distributional impact of these flows in origin communities is poorly understood due to theoretical and methodological problems in prior work. To study remittances, researchers focus on migrants, effectively treating migrating and remitting as independent processes, and report mixed empirical findings that suffer from sample selection bias. This study develops a theoretical framework that views migration and remittances as connected and cumulative processes, and draws implications for distributional outcomes. The framework is implemented in an integrated statistical model of remittances that takes into account selectivity of migration, and tested on data from Mexico-U.S. migration flows between 1965 and 2008. The findings show that migrants initially originate from poor households, which, over repeated migration trips and cumulative remittances, reach levels of wealth to surpass households without migrants. This dynamic leads to increasing wealth disparities in migrant-sending communities of Mexico, and challenges the Kuznetsian prediction of first increasing, then declining, inequality with increasing migration.

Repeat Migration and Cumulative Remittances as
Mechanisms for Wealth Inequality in Mexico

International remittances to developing countries have reached US$240 billion annually in 2007,

becoming the second largest source of external finance for these countries after foreign direct

investment (Ratha and Xu 2008). Remittance flows relax budget and credit constraints of origin

households, create investment opportunities in communities, and provide a potential pathway for

poverty reduction as they are directed toward the most deprived regions of the world. While

scholars and policymakers have rejoiced over the developmental potential of remittances, they

remained silent on the distributional impact of these flows in receiving regions. Today,

remittances comprise about one-fifth of the GDP in many developing countries. Due to their

staggering magnitude, these flows have enormous potential to affect the distribution of income or

wealth, creating a new source of social stratification in developing countries.

Recent research on global income inequality tells us that disparities between countries

have stabilized in the past decades (Bourguignon and Morrisson 2002; Firebaugh 1999, 2003).

As a result, the direction of trends in global inequality depends on the current changes in income

disparities *within* countries (Firebaugh 2000). Through their effect on income disparities in

developing countries, remittance flows are likely to shape the future trends in global inequality.

Remittance flows are particularly important to understand the inequality in Latin

America, the most unequal region of the world (Hoffman and Centeno 2003) and the recipient of

25 percent of all remittances to developing countries (Ratha and Xu 2008). The roots of

disparities in the region have been traced back to the distribution of land tenure and political

influence by the colonial order (Gonzalez Casanova 1970; Paige 1997), and more recently to the

weakness of democratic institutions (Huber et al. 2006). Research finds that inequality in the

region has increased in the past decades (Morley 2001), yet reports only a handful of mixed results on how remittance flows contributed to this trend (Acosta et al. 2008; Barham and Boucher 1998; Stark, Taylor and Yitzhaki 1986; Taylor, Mora and Adams 2005).

This study focuses on the largest remittance flows in Latin America, between the United States and Mexico, and investigates how these flows shape the distribution of economic resources in origin communities. This requires asking two related questions: Who migrates in these communities, individuals from wealthy or poor households? Who, among the migrants, sends back remittances, the wealthy or the poor? Prior work has asked these questions separately, and conceptually treated migration and remittance decisions as independent. Students of migration theorized about individual- or household-level motives, such as income maximization or risk diversification, that foster migration, but disregarded the implications of these motives for subsequent remittance behavior. Similarly, studies of remittances identified altruistic or contractual mechanisms as explanations for why some migrants remit while others do not without considering the connections to migration motives. Moreover, neither migration nor remittance scholars have considered the links of their behavioral models to trends in economic inequality.

This study, for the first time, establishes a conceptual link between theories of migration and theories of remittances, exclusively focusing on how individuals' wealth status impacts their propensity to migrate and remit, in order to draw implications for potential trends in inequality. This theoretical elaboration provides a methodological direction to specify an integrated model for migration and remittances, where similar factors are related to both outcomes. This model manages sample selection bias, which confounds the conclusions of prior work on remittances.

The study also considers the cumulative nature of migration decisions neglected in the prevailing economic theories. Migrants may take multiple trips to a destination, send cumulative remittances and acquire wealth over time. The effect of wealth status may vary, and become endogenous to migration and remittance decisions, over multiple trips. This dynamic relationship provides the key to explain the observed patterns in the Mexican case, and exposes the need for a more sociological lens to study migration and remittance behavior from a life course perspective.

The empirical analysis exploits the Mexican Migration Project data, one of the largest migration surveys available, which contain information on the migration and remittance decisions of more than 16,000 household heads from 119 communities between 1965 and 2008. The findings show that migrants originate from poor households in origin communities. Repeated trips to the United States lead to continued remittance flows and wealth accumulation, and households with migrants eventually move to the ranks of the wealthy in their community. This dynamic leads to increasing economic disparities between households with and without migrants in migrant-sending communities of Mexico, and challenges the Kuznetsian prediction of first increasing, then declining, inequality with increasing migration.

BACKGROUND

Remittances and Inequality

Remittance flows to developing countries have been increasing consistently in the past decade, reaching 20 percent of the GDP in many countries in Latin America and Africa (World Bank 2008). An influx of funds of this magnitude is bound to create disruptive effects on the distribution of income or wealth in these countries. Yet, the vast majority of the research so far has focused on the amount and potential economic benefits of remittances rather than their distributional impact in migrant-sending communities (Durand, Parrado and Massey 1996).

By contrast, there is substantial sociological research on the effects of direct investment on income distribution in developing countries (Bornschier, Chase-Dunn, and Rubinson 1978; Bornschier and Chase-Dunn 1985; Dixon and Boswell 1996; Evans and Timberlake 1980; Firebaugh 1992, 1996). This line of research takes a macro-level approach, and links the trends in inequality to trends in investment flows. While relevant, a similar macro-level approach is not appropriate to study the distributional impact of remittances, which, unlike direct investments targeting regions or countries, reach specific migrant-sending households. To the extent that migrant-sending households differ from the overall population in terms of income or wealth, the impact of remittances on the overall inequality in a region cannot be determined a priori. This study takes a micro-level approach to establish the selectivity of migration and determine the target households for remittance flows, and ultimately to predict the macro-level changes in economic inequalities in migrant-sending communities of Mexico.

Migrant Selectivity and Inequality

Stark et al. (1986) were the first to suggest a link between migrant selectivity and the distributional impact of migrants' remittances. The authors envisioned an inverted-U relationship of income inequality to migration prevalence, akin to a Kuznets curve, which suggests a similar relationship between inequality and economic growth (Kuznets 1955). Inequality is expected to increase in the initial take-off period of migration, and then to gradually level off and decline as a community reaches high levels of migration. The reason underlying this pattern is the declining selectivity of migration with increasing migration prevalence. Initial migrants in a community incur high costs to migration, and typically come from middle or upper parts of the income distribution. As migration gains prevalence, experiences of prior migrants help mitigate the costs of migration, and individuals from lower income strata can afford to migrate. Therefore, in

communities where migration is already prevalent, remittances are expected to decrease inequality, with the opposite effect in communities at the initial stages of migration.

Empirical studies provided mixed empirical evidence for the suggested curvilinear relationship between inequality and migration (Adams 1989, 1991; McKenzie and Rapoport 2007; Taylor et al. 2005). Moreover, the assumption underlying this relationship, that selectivity declines with migration prevalence, was not equally supported by evidence from different settings. These inconsistencies reflect the complex and context-dependent nature of migrant selectivity, which cannot be fully captured by a community-level measure of migration prevalence. To connect migration to inequality, we need an explicit, individual-level model of migrant selectivity to establish where in the income (or wealth) distribution migrants are drawn from. We can then investigate which income (or wealth) groups among migrants send remittances, and predict how economic inequalities are likely to change as a result of migration-remittance flows. To establish the theoretical foundations of this approach, I review and connect the behavioral models of migration and remittances, focusing specifically on theories that make claims about migrant selectivity by economic status.

A Theoretical Framework for Migration and Remittances

Neoclassical microeconomics focuses on individuals' relative earning potentials in origin and destination (Hay 1980; Kalzuny 1975; Nakosteen and Zimmer 1980; Navratil and Doyle 1977, Todaro 1969; Yezer and Thurston 1976). Individuals migrate when the expected gain from migrating to a destination is greater than that from staying in the origin. The most likely migrants are individuals whose education or occupation permit higher earnings in destination compared to origin, and who live in sufficiently poor households to find migration attractive.

This view, although still prominent, has been challenged by the so-called 'new economics of labor migration' (Stark and Bloom 1985). This line of research suggested the centrality of the household, rather than the individual, in making the migration decision, and provided two alternative motives for households to send migrants. Households, in one formulation, send migrants to increase their income or wealth, and to decrease their relative deprivation in a community (Stark and Taylor 1989, 1991; Stark and Yitzhaki 1988). In the alternative view, households send migrants as a risk diversification strategy, where migrants' earnings in destination provide a hedge against the domestic shocks to household income or assets (Stark and Levhari 1982; Stark 1984; Stark 1991). The dual motives of income maximization and risk diversification are not always compatible, and carry different implications for migrant selectivity. In the former case migrants are likely to come from poor and relatively deprived households, while in the latter, migrants originate mostly from wealthy households.

The neoclassical and new economics views thus provide different expectations about the position of migrants in the wealth distribution of the community, and also differ in their predictions about remittances. An individual migrant in the neoclassical realm has no incentives to remit. By contrast, within the domain of the new economics, individual's migration reflects a household strategy to increase income or to diversify risks, of which remittances are an essential component. I delineate these connections below after briefly reviewing theories of remittances.

The two principal competing explanations in the literature relate remittances to either altruistic or contractual motives. Models of remittances as altruism embed the utility of other household members in the migrant's utility function, and suggest that migrants remit to improve their households' welfare (Banerjee 1984; Johnson and Whitelaw 1974). By definition, altruism carries an initial cost to the individual, although positive consequences may accrue over time.

Models of contractual motives, on the other hand, view remittances as part of a self-enforcing, cooperative contract between the migrant and household. This contract may involve remittances as part of current or future exchanges of favors in a household. In return for remittances, household members may provide household chores or child care (Lee, Parish and Willis 1994), loans to subsidize migrants' education or travel to destination (Ahlburg and Brown 1998; Cai 2003; Durand et al. 1996a; Regmi and Tisdell 2002), or promise future inheritances (de la Briere et al. 2002; Hoddinott 1994). Remittances may also represent a premium paid by migrants for future insurance against unemployment or low wages (Agarwal and Horowitz 2002; Stark 1991; Stark and Levhari 1982).

Survey data cannot adequately measure individuals' motives. Hence, in empirical studies the presence of extrinsic rewards in the family is taken to signal contractual remittance behavior. These rewards, such as wealth for inheritance or child-care provision, indicate the household's bargaining power to enforce a contract on the migrant (Lucas and Stark 1985, Van Dalen, Groenewold and Fokkema 2005). In the absence of any extrinsic rewards, migrants are assumed to remit altruistically to their families (de la Briere et al. 2002; Hoddinott 1994; VanWey 2004).

To be sure, this empirical strategy provides only a weak test of these alternative theories, whereby remittances are classified as altruistic or contractual based on current and observed (rather than future and potential) exchanges between the migrant and origin household. The shortcomings of this approach, which dominates the empirical literature, need not concern us here. Our goal is not to empirically distinguish between the two behavioral models of remittances, but rather to connect these models to migration theories and to draw out their implications for economic inequality.

According to the neoclassical view of migration, individuals migrate to improve their earnings and mostly originate from poor households that cannot offer alternative economic means. Neoclassical migrants are viewed as individual agents, who are not expected to send remittances. Yet if they do, the remittances are likely to be empirically classified as altruistic (only with respect to wealth exchanges) because the origin households do not possess wealth to offer as a reward in a contractual arrangement.[1] A similar link exists between remittance behavior and household income maximization motive of the new economics theory, which takes the household, instead of the individual, as the agent of study. Migrants come from relatively deprived households seeking to improve income or wealth status, and remit altruistically (that is, not in return for future inheritances or other wealth transfers from the household). An alternative branch within the new economics theory views migration as a risk diversification strategy employed by wealthy households to protect against risks to income or assets. Remittances from risk-diversifying migrants are considered contractual because sending households possess income or assets that serve as a collateral.

It is clear that the income-maximization motive for migrating is logically linked to altruistic remittance behavior, and similarly, migration as a risk-diversification strategy implies a contractual remittance arrangement. Despite their close affinity, theories for migration and remittance behavior have not yet been connected in this, or any other, manner in prior work.

Table 1

It is important to establish these connections between migration and remittance strategies in order to predict the changes in the distribution of income or wealth in origin communities. In particular, migration of income-maximizing agents acting individually (neoclassical) or for the

sake of the household (new economics) brings remittances (altruistic with respect to wealth exchanges) to mostly poor households and is likely to have an *equalizing* effect on the distribution of income or wealth in the sending community. By contrast, migration of risk-diversifying individuals (new economics) leads to contractual remittances to wealthier households (where wealth serves as a collateral), and eventually to a *more unequal* distribution of income or wealth in the origin community. Table 1 summarizes the links between migration-remittance motives and expected inequality outcomes.

Establishing the links between economic theories of migration and remittances is not sufficient to describe the dynamic relationship between wealth and migration that unfolds over time. Specifically, neither the neoclassical nor the new economics perspective captures the clustered and cumulative nature of migration decisions. Sociological research shows that migrants originate from households or communities where migration is already prevalent and typically make multiple trips to a destination (Massey and Espinosa 1997). Migrants' likelihood of being selected on individual and household characteristics varies by the prevalence of migration in their community (Massey, Goldring and Durand 1994) and plausibly over multiple trips through their life course. For example, the selectivity by wealth status may change, and become endogenous to migration and remittance decisions, as migrants accumulate wealth over multiple trips. Due to this dynamic relationship between migration and individual characteristics, the relevance of the competing theories for explaining migration or remittance behavior may depend on individuals' stage in their migration career.

MIGRATION AND INEQUALITY IN MEXICO

The labor migration of workers from Mexico to the United States is the largest contemporary migration flow in the world. In Latin America, a region characterized by severe economic

11

inequality, where the income share of the richest 20 percent of the population is at least 18 times that of the poorest 20 percent, Mexico is the recipient of the largest remittance flows, amounting to US$25 billion annually (Ratha and Xu 2008). Understanding whom these flows reach is crucial to determine the future direction of inequality in the country.

This study employs data from the Mexican Migration Project (MMP) collected in 119 communities between 1987 and 2008. Each community was surveyed once in this period, during the winter months, when migrants are likely to visit their origin households.[2] Detailed migration information was obtained from about 200 randomly selected household heads, mostly men, in each community. These data, collected retrospectively in a life history survey, allow us to observe migration and remittance decisions of more than 16,000 household heads from multiple communities (ranging from small villages to metropolitan areas) over several years.

Prior research suggests that remittance flows to a region will initially increase inequality (McKenzie and Rapoport 2007; Stark et al. 1986). This initial effect is due to the positive selectivity of early migrants on income or wealth, and will eventually be offset by increasing migration prevalence in a community, which mitigates the costs of migration and allows for lower-income individuals to migrate as well. I explore this compelling idea in the Mexican context using the MMP data.

Table 2

Table 2 displays wealth and income inequality measures for 92 communities grouped into low, medium and high migration prevalence categories. Migration prevalence is defined as the percentage of individuals who have ever migrated in a community.[3] Each community is observed in the year it was surveyed when annual household income was also recorded. The results show

that the average household income, land and properties are all higher in high prevalence communities. The inequality in the distribution of household income is highest in the high prevalence group, followed by the medium and low prevalence communities. Household income is defined as the wages earned (fixed to year 2000 US$) by the household head in the survey year. This pattern is consistent across three different inequality measures (gini, coefficient of variation and standard deviation of logarithms), and with the Lorenz curves for household income displayed in Figure 1. In low prevalence communities, the poorest 80 percent of households receive about 50 percent of all income in those communities, while, in the high prevalence communities, the poorest 80 percent of households receive about 30 percent of all income. Moreover, the Lorenz curve for the high (medium) prevalence group lies everywhere outside the Lorenz curve for the medium (low) prevalence group.

Figure 1

Similarly, in Table 2, household properties (measured in total number of rooms) are more unequally distributed in high prevalence communities compared to the medium or low prevalence group. Inequality in the distribution of household land displays a more complicated pattern. It remains constant across prevalence categories according to the gini measure, declines with prevalence in the coefficient of variation, and increases in the standard deviation of logarithm. This inconsistency is not surprising given the differing sensitivity of each measure to different parts of the distribution. The results, while remaining inconclusive about land inequality, show clearly that the inequality in household income and properties is higher in communities with higher migration prevalence.

These results challenge Stark et al.'s (1986) claim that inequality will increase at lower levels of migration prevalence, and then decline at higher levels. One explanation is that these communities have not yet reached sufficiently high prevalence levels to observe the equalizing effects of migration. Given that the percentage of individuals who have ever migrated ranges from 25 to 89 in the high prevalence communities, this explanation is not very plausible. Rather, it is likely that the necessary condition for Stark et al.'s (1986) theory, which asserts that migrant selectivity declines with increasing migration prevalence in a community, does not hold. The remainder of this paper seeks to solve this puzzle, and identify the mechanisms that explain the positive relationship between migration and inequality in the Mexican communities.

EMPIRICAL STRATEGY

The theoretical section showed a disconnect between behavioral models of migration and remittances, which manifests itself in the methodological problems in empirical work. Because migration and remittances are conceptually viewed as independent processes, studies of remittances focus exclusively on migrants, a non-random segment of the population, and confound the determinants of remitting with the selection process into the migrant sample. This issue of sample selection poses a serious methodological problem with potentially dramatic consequences for substantive conclusions.

When a portion of the data is systematically excluded, both external and internal validity of the conclusions are threatened (Berk 1983). Imagine a community where only rich individuals can afford to migrate due to high costs of migrating, and all individuals are equally likely to remit once they migrate. Estimating a model of remittances on a sample of migrants underestimates the effect of wealth in the overall population, and compromises the external validity of conclusions (Lieberson 1985). Internal validity is also vulnerable to sample selection

14

even if our interest lies only on migrants. Assume that families send more responsible sons or

daughters as migrants, and these individuals are more likely to command greater earnings, and

send remittances. This unobserved characteristic affects both migration and remittance behavior,

and leads to biased conclusions about the latter.

An accurate evaluation of the determinants of remittances requires a correction for

migrant selectivity. To pose the problem formally, let the amount remitted by individual i be

represented by y_{1i} and governed by the following equation:

$$y_{1i} = x_{1i}\beta_1 + \varepsilon_{1i} \qquad (1)$$

where x represents independent variables, β is the corresponding coefficient vector, and ε is the

identically and normally distributed error term. Let migration decision of individual i be

represented by a binary dependent variable y_{2i} generated by a probit equation and related to an

unobserved latent variable y_{2i}^* as follows:

$$y_{2i}^* = x_{2i}\beta_2 + \varepsilon_{2i} \qquad (2)$$

$$y_{2i} = \begin{cases} 1 & \text{if } y_{2i}^* > 0 \\ 0 & \text{if } y_{2i}^* \leq 0 \end{cases}$$

We observe y_{1i} if and only if a person migrates ($y_{2i} = 1$). This leads to a specification where the

probit equation (2) for migration is completely observed, but for the remittance equation (1), we

have a selected sample. In the case of a non-zero correlation (ρ) between the error terms $(\varepsilon_{1i}, \varepsilon_{2i})$,

separately estimating the migration and remittance equations with standard OLS will lead to

selectivity bias in the estimates of the latter. We can account for this bias by employing

Heckman's (1979) two-step selection model.

This model has been strongly criticized for various reasons. Most notably, the estimation

calls for an independent variable, known as an instrument or exclusion restriction, in the

migration (selection) equation not be included in the remittance (outcome) equation. This restriction is not strictly required for identification. However, if the set of regressors are identical for the selection and outcome equations, the estimation is poor due to high multicollinearity (Berk 1983). Few studies that used Heckman's model in the context of migration-remittance decisions have not been successful in justifying a credible instrument (Hoddinott 1994; Rivera 2005; Taylor, Rozelle and de Brauw 2003).

Even with a credible instrument, Heckman two-stage model could lead to highly imprecise estimates, especially in small samples. The model aims to reduce bias, but the reduction in bias is counteracted by decreased efficiency (Hartman 1991; Stolzenberg and Relles 1997). To address the concerns, the recommendation is to check whether different specifications yield similar results. I use an alternative model suggested by Sartori (2003), which relaxes the requirement for the exclusion restriction for a case where both selection and outcome variables are binary, and instead relies on a different assumption that error terms are identical in both equations. The results based on this approach, available from the author upon request, are in complete agreement with those from the Heckman model, and suggest the robustness of findings.

Operational Measures

The sample for the study is 16,269 household heads residing in 119 communities from 21 states in Mexico. Life history survey provides a panel data set of individuals' migration decisions from 1965 (the end of the Bracero program) to 2008 (the year of the last survey). All the moves an individual makes until the survey year are recorded in the data, yet information about remittances is only collected for the *last migration trip* to avoid recall bias. The person-year observations are supplemented with contextual information from the household and community surveys and geographic data collected by the author.

The dependent variables are a binary indicator of whether a person migrated to the United States in a year, and the amount of remittances sent or savings brought home by a migrant in that year. For the purposes of this study, both transfers are referred to as remittances, and the total amount is computed by multiplying the trip duration by monthly remittances and adding up the total savings brought home by a migrant during her or his last trip. The logarithm of the monthly amount (converted to year 2000 US$) is used in the analysis.

The key independent variables are individuals' income and wealth status. Household income is measured in the survey year alone, therefore does not permit a longitudinal analysis. Household land and properties, on the other hand, are recorded in each year, and provide useful proxies for household wealth. I compute the total value of household land by multiplying the hectares owned with the average price of land in the community (in 2000 US$). There is no information on average property values in the community survey. I use the total number of rooms in household properties as a proxy for their value. Land and property measures are used in logarithm form to take into account their skewed distribution, lagged by a year to prevent simultaneity with migration decisions, and standardized to mean 0 and standard deviation 1 for comparability. Figure A1 in the Appendix shows histograms for land, properties, remittances and savings (non-zero values only). Logarithms of all four indicators are approximately normal in distribution.

Several individual characteristics related to migration and remittance behavior are included in models: age, sex, education (primary, secondary, advanced), marital status (also if spouse is in the United States), and the number of children in the household. Prior research shows that individuals are more likely to migrate if they have prior migration experience, or if they are related to prior migrants through household or community ties. To capture this pattern, I

measure individuals' prior migration experience by their accumulated number of U.S. trips. Prior household experience is measured by a binary indicator of whether an individual's parents were U.S. migrants. Community experience is captured by migration prevalence ratio, defined as the proportion of individuals who have ever migrated in a community. Agriculture production is highly dependent on weather conditions, and differences across communities in this respect are controlled with an indicator of average rainfall to the state in the past three years. Community distance to the U.S. border is also included as a proxy for costs of migrating. Figure A2 in the Appendix shows the average migration prevalence across sample communities in the 21 Mexican states in 1980. The 10 states not covered in the data are shown in white. Prevalence level reaches high levels in some states, where one in five have migrated at least once, while it remains at low levels in others, where less than one in ten have migrated. To capture this geographic variation, which may not be fully accounted for by community-level variables, I include binary state indicators in all models. Year indicators are also included to capture the variation over time.

Indicators for migrant characteristics are included only in remittance models. Prior research finds remittances to be a repayment for migration costs incurred by the household. An indicator for whether family paid for coyote (smuggler) fees captures this idea. Prior work also shows that remittances decrease as migrants' ties to origin weaken over time (Durand et al. 1996a), which is captured by indicators of years since an individual migrated, and whether migrant has U.S. documentation. Other control variables are migrants' monthly wages (in 2000 US$), and binary indicators for their destination (Northeast, Midwest, South and West).

Table 3

Table 3 displays means for all variables separately for the overall sample, migrants and remitters along with results from cluster-adjusted difference-of-means tests comparing migrants to non-migrants, and remitters to non-remitters. (The means for non-migrants and non-remitters are not shown to conserve space.) Strikingly, migrants (about 20 percent of individuals) differ significantly from non-migrants in all variables, but the indicator for primary education or less. Migrants are wealthier in land and properties, more likely to be male, younger and single (and with a spouse in the U.S., if married). The cumulative dynamic of migration is apparent in the high number of prior trips for each migrant, and the high percentage of migrants with parents who were also U.S. migrants. Migrants come from communities where migration is already prevalent, and where cultivation may have recently suffered from low levels of rainfall. These comparisons suggest that migrants are a highly selective group in Mexican communities, and support our intuition that analysis of remittances in this group alone is likely to yield biased results. The differences between the remitter and non-remitter samples are less noticeable, possibly due to the small size of the latter. 92 percent of migrants brought funds to Mexico as remittances ($457 per month on average) and/or savings upon return ($249 per month) adding up to 45 percent of their U.S. earnings ($1564 per month).

Using Geographic Variation as an Instrument for Migration

Because remittances are observed for migrants only, a highly selective group in Mexican communities, a consistent estimate of the effect of wealth on remittances requires a correction for selection. Heckman's two-step model, introduced above, provides a correction given that there is an instrument that affects migration, but does not directly affect remittances, nor is it correlated with the unobservable factors affecting remittances. Environmental or geographic variables have been used as instruments in various applications, based on the underlying

assumption that individuals have no control over the characteristics of the region in which they live in (Moffitt 2003). In the Mexican case, proximity to the U.S. border may lead us to a viable geographic instrument. Individuals who live in a community far from the border face higher travel costs to migration, which may reduce their migration propensity.

A central concern with distance as an instrument is that it might be associated with the unobserved determinants of migration and remittances, leading to spuriously estimated effects. The unobserved characteristics of communities close to the border (say, lack of economic opportunities) could simultaneously increase both migration propensity and the amount of remittances. Moreover, proximity to the border could encourage frequent visits to origin households, and increase remittances independently of its effects on migration. To assess the empirical relevance of these concerns, I examine how the effect of distance on migration varies across individuals. If the estimated effect of distance reflects variation in costs of migrating (rather than omitted characteristics), then, this effect should be especially severe for individuals who have low migration propensities (Card 1995).

This insight is verified with a descriptive analysis. The 119 communities are split into three groups based on their distance to the U.S. border. A community is considered 'far' (n=36) if it is more than 750 km away from the border, 'medium distance' (n=35) if it is 600 to 750 km away, and 'close' (n=48) otherwise. I fit a probit model to migration outcomes of individuals who live in far villages to better capture the migration behavior of this presumably disadvantaged group. All indicators of interest are included in the model, while the distance indicator is deliberately left out. I compute predicted migration probabilities for the whole sample based on the estimated model, then divide the sample into quartiles of predicted migration, and observe how the odds of migrating differ by distance in each quartile. Figure 2 plots the odds ratios of

migration in close versus far communities by quartile of predicted migration probability. For

individuals in the two highest predicted quartiles of migration, the effect of distance to border is

modest (odds ratio is 1.2). For individuals in the first and second quartiles, by contrast, the odds

ratios are 2.3 and 1.7, respectively. A similar pattern, of high odds ratios in the lowest quartiles

that decline and reach unity in the higher quartiles, is observed in a comparison of close versus

medium-distance communities. These results suggest that distance to border is a strong detriment

to migration, especially for individuals who have lower propensities to migrate.

Figure 2

Prior research on the MMP data shows that individuals' migration propensity increases

with the prevalence of migration in their community because prior migrants act as resources of

information or assistance reducing the costs, and increasing the benefits, of migration (Massey

and Espinosa 1997). If these resources indeed facilitate migration, the observed negative effect

of distance on individuals' migration propensity should be *weaker* in high migration prevalence

communities. We can use the *interaction* between distance to the border and community

migration prevalence as an instrument for migration. The maintained assumption is that the

direct effect of distance on remittances does not vary by migration prevalence in an individual's

community. This assumption of instrument exogeneity is essentially untestable, although ad hoc

empirical evidence presented below suggests its viability, and firmly establishes instrument

validity.

Table 4

The first column of Table 4 presents the marginal effects of distance by community

migration prevalence estimated in a probit model of U.S. migration. Distance is measured with a

binary indicator of living farther than 750 km from the border, and prevalence is captured by the proportion of individuals who have ever migrated in a community. (The Pearson's correlation between distance and prevalence is only -0.04.) In zero migration prevalence villages that are far from the border (7 villages in the sample), the probability of migrating is reduced by 0.6 percentage points for individuals. By contrast, in the medium prevalence villages, where about 15 percent of individuals have migrated, that are also far from the border, the probability of migrating is reduced by a negligible margin, 0.08 percentage points ($-0.006 + 0.035 \times 0.15 = -0.0008$). As expected, the results confirm that the negative effect of distance is concentrated among individuals living in communities with low migration prevalence, and suggest the validity of the interaction term for explaining migration. An additional analysis suggested by Staiger and Stock (1997) tested for weak instruments by excluding the distance-prevalence interaction from the migration model. The resulting F-statistic was 109.6 (df=366,231), ten-fold the lower bound of 10 suggested by the authors to reject the hypothesis of weak instruments.

As a final check for instrument validity, I observe the effect of the instrument on internal migration decisions within Mexico (data available in the MMP). If the distance-prevalence interaction captures the cost of migrating to the United States and not the influence of omitted variables, this instrument should have no effect on internal migration decisions within Mexico. The second model in Table 4 displays the marginal effects of distance and prevalence, and their interaction, estimated in a probit equation of internal migration in Mexico. Both distance and its interaction with prevalence have tiny and statistically insignificant effects on individuals' probability of domestic migration. This result suggests that the effects related to distance indicators are likely to reflect variation in the cost of international migration rather than omitted characteristics of communities.

To provide evidence for instrument exogeneity, which is not directly testable, I examine the partial correlations between the instrument and migrants' U.S. wages, which are strongly correlated with remittances. If the instrument is associated with the unobserved determinants of remittances, we would expect it to be correlated with the observed measures, such as wages, as well. The regression results in the third model of Table 4 show that distance to border or migration prevalence in community have statistically insignificant associations with migrants' U.S. wages. Overall the evidence summarized in Table 4 suggests the distance-prevalence interaction as a valid source of identification in Heckman's selection-correction model.

RESULTS

Migration

The first column reports the estimated marginal effects of wealth on migration from a specification including as controls demographic information (9 variables), prior migration indicators (3 variables), community characteristics (3 variables), fixed effects for state (21 variables) and year (42 variables). Land and property indicators are in logarithm form and standardized to mean 0 and standard deviation 1. Standard errors are adjusted for clustering at the individual level. The sample contains migrants observed on the year of their last trip (when remittances were measured), and non-migrants observed in each year. Although migrants make up about 20 percent of the individuals in the sample (3,101 out of 16,269), migrant-years (for which we have remittance information) account for less than 1 percent of all person-year observations (3,101 out of 366,309). As a result, the marginal effects estimated below seem extremely small in magnitude. These effects become larger, while retaining their sign, significance and relative magnitude, if we include all migrant-years in the sample without restricting the observations to those from the last migration trip (results available upon request).

Table 5

The results indicate that the propensity to migrate is strongly associated with land and property ownership. Specifically, a standard deviation increase in land value above its mean generates a 0.1 percentage-point increase in the probability of migration. Similarly, a standard deviation increase in household properties increases the migration probability by 0.07 percentage-points. Before focusing on this curious positive link between wealth and migration, which has enormous implications for economic inequality in origin communities, I briefly discuss the estimates for the other covariates.

Probability of migrating increases with age, and then declines once a threshold age (around 24) is reached. Men are more likely to migrate, partially due to a gender bias in the data, which come from household heads alone. The likelihood of migrating is lower for individuals with secondary education (compared to those with primary education or less), and lowest for those with advanced degrees. Individuals are more likely to migrate if they have a spouse in the United States. Having a spouse in Mexico, which is the case for the majority of migrants (about 63 percent), does not alter the migration probability. Because wives typically stay home due to a traditional division of labor within the family, having young children should not affect men's migration probability. The sample is mostly (80 percent) men, and the small and insignificant coefficient for minor children reflects this pattern. Having family members who are prior U.S. migrants, or living in a community with a high proportion of prior migrants, significantly increases the likelihood of migration. Rain shortages in a community decrease income from agriculture, and are expected to increase migration. In our case, migration is higher in states that have received higher than average rainfall in the past three years. This surprising positive effect may be due to the failure of the state-level rainfall variable to capture the within-state variations,

which may be higher than the variation between states. Finally, community distance to the U.S. border decreases the probability of migration, but less so in communities with a high proportion of prior migrants.

Exploring the relationship between wealth and migration

Why are wealthier individuals more likely to migrate? One explanation is the high costs of crossing the border (Donato, Wagner and Patterson 2008), which, in addition to the cost of transportation, may include the smuggling fees for undocumented migrants amounting to $1500 according to 2001 estimates (Cornelius 2001). Given these costs, it is understandable that migrants come from the middle or upper part of the wealth distribution to be able to afford migration (Massey et al. 1994). A different explanation is given by the new economics of labor migration theory: wealthy households may send migrants as part of an economic strategy to diversify risks to household income (Stark et al. 1986). A final, unexplored, explanation considers the dynamic relationship between wealth and migration: household wealth may be a result, rather than a cause, of migration and remittance flows (Wong, Palloni and Soldo 2007).

Table 6

To investigate plausibility of a reverse relationship between wealth and migration, I compare model estimates from two samples in Table 6. The first sample includes non-migrants (13,168 individuals who have never migrated, observed over many years) and first-time migrants (1,180 individuals observed on their first U.S. trip, which is also their last trip in the data). The second sample includes non-migrants and repeat migrants (1,921 individuals who have migrated at least once, observed on their last U.S. trip). If past migration and remittances help individuals acquire wealth, then first-time and repeat migrants should vary significantly in their selectivity

by wealth. Indeed, the estimates from a probit model of migration show that the effects of wealth indicators are dramatically different across the two samples. The probability of first-time migration *decreases* significantly with the number of properties household owns. By contrast, the probability of repeat migration *increases* significantly, and by a large margin, with both property and land ownership. Compared to non-migrants, first-time migrants are likely to be poorer, and repeat migrants are likely to be richer. While first-time migrants own on average US$2,594 worth of land and 1.25 rooms in properties, repeat migrants own an average of $7,050 worth of land and 2.92 rooms (difference-of-means tests are significant 0.001 level).

These results suggest that migration-remittance flows could be a mechanism for wealth accumulation in the Mexican communities. The results also hint the potential endogeneity of wealth indicators to migration and remittance outcomes, which may bias the empirical conclusions. To address this issue, I lag the household wealth indicators by a year to ensure that wealth is not the result of the current remittance decisions. This method does not solve the endogeneity problem if current remittance decisions are correlated with past remittances, which affect household wealth in the past. To test if this is the case, I perform a procedure suggested by Spencer and Berk (1981). I estimate a model of wealth (for both land and property indicators) with exogenous regressors (past rainfall and real interest rates, which are likely to affect wealth). Then, in the remittance equation, I add the residuals from the two wealth equations as extra regressors. The coefficients for both regressors are jointly insignificant (F-statistic = 0.47, *df* = 2984, *p* = .63), and the null hypothesis that the wealth indicators are orthogonal to the errors cannot be rejected. This result suggests that the lagged wealth indicators can be treated as exogenous to current remittances.

Remittances

The selectivity-corrected Heckman model estimates displayed in the third column of Table 5 show that the amount of remittances sent by a migrant is strongly related to household land and properties. A standard deviation increase in land value and number of properties above the mean increases the logarithm of remittances by 0.07 and 0.13, respectively. A migrant in an average wealth household sending $1000 a month would send an additional $67 if household land increased by a standard deviation, all else equal. A commensurate increase in household properties would bring an additional $143 to the migrant-sending household. The OLS estimates in the second column are slightly smaller and more imprecise for the household land variable, and identical in magnitude and significance for the property indicator.

The amount of remittances increases with age, at a decreasing rate as a migrant gets older, and decreases with a migrant's education. Men remit more than women, and the difference is larger in the Heckman estimates, which account for men's higher propensity to migrate. Migrants with spouses in destination seem to remit less in the OLS model, an effect that disappears in the Heckman estimate. Migrants with children send more remittances, as do migrants whose parents were prior migrants. The latter effect is only apparent in the selectivity-corrected estimate. In both models, the longer migrants stay in the destination, the less remittances they send, attributable to a weakening of ties to origin household. Expectedly, migrants earning higher wages in destination send more remittances.

The fact that coefficient estimates are not dramatically altered in the Heckman specification compared to OLS suggests that the unobserved factors influencing migration do not significantly alter the effect of the observed factors on remittances. The insignificant correlation coefficient between the errors of the migration and remittance equations, ρ, also supports this

conclusion. Focusing on a sample of migrants only, and ignoring selectivity, does not seem to threaten the internal validity of our conclusions about remittances given that the intended inference is about *migrants only*. The effect of wealth is accurately (yet imprecisely in the case of land) estimated using OLS. Yet, the external validity of our conclusions, that is, their generalizability to the overall population is still questionable. Specifically, the coefficient estimates for the remittance models (both OLS and Heckman) capture only the direct effect of regressors on remittances, and can be misleading. Household wealth affects remittances directly as well as indirectly through its influence on migration probability. To assess the overall impact of wealth, we need to consider how a change in its value alters both the migration probability and the amount of remittances sent.

Migration and remittance model estimates jointly show that migrants are likely to belong to wealthy households, and tend to send more remittances back home the wealthier they are. These results, taken at face value, support the predictions of the new economics theory of migration that wealthy households send migrants (and expect remittances) as a risk diversification strategy. The results also lend support to a contractual view of remittances, as typically defined and measured in the literature. Wealthier households, not only have the incentives to send migrants to hedge against the risks to domestic income or assets, but they are also able to enforce a contractual arrangement with the migrant using their wealth as a collateral.

However, a comparison of first-time and repeat migrants in Table 6 provides a different perspective. The positive selectivity of migration holds for repeat migrants, but not for those who are migrating for the first time. First-time migrants are poorer than the overall population on average, while repeat migrants are wealthier. This pattern suggests that sending migrants and collecting remittances may be a mechanism through which households achieve wealth,

28

eventually overcoming their initial disadvantage and surpassing the households without migrants. This result suggests a dynamic link between wealth, migration and remittances, combining predictions from the neoclassical and new economics views of migration, as well as altruistic and contractual explanations of remittances.

Migrants originate from poor households in the Mexican case, and are likely to be motivated by a desire to increase income or wealth as the neoclassical economics predicts. They may send remittances to their origin households altruistically or in return for non-monetary favors. Over time, households with migrants begin to accumulate wealth through remittances, and the motive for migrating may shift from income maximization to risk diversification for the existing endowments, as the new economics view suggests. Households at this stage may also be able to enforce a contractual arrangement with the migrant to ensure continued remittances using their wealth as a collateral.

These behavioral mechanisms are based on one interpretation, among many possible, of the observed empirical patterns and cannot be substantiated with the existing survey data. Regardless of any favored interpretation, however, the results show that the link between household wealth and migration-remittance decision varies over the different stages of individuals' migration career. This dynamic mechanism is not captured by the prevailing economic theories and suggests the need for a more sociological theory of migration and remittance behavior from a life course perspective.

IMPLICATIONS FOR INEQUALITY

To trace the changes in the wealth distribution and inequality at the community-level, and to see whether they can be attributed to migration flows, I classify communities into two groups based on the percentage of individuals who have ever migrated in the sample by the survey year. Each

group contains about 60 communities that vary on several dimensions such as population size or development level, but share similar migration levels. By averaging within each group, any systematic differences across groups can reasonably be attributed to differences in migration trajectories.

Figure 3

Figure 3 provides a detailed graphical presentation of the changes in the migrant composition, remittance patterns, distribution of wealth and inequality from 1975 to 1995 in the 119 Mexican communities. (The periods outside this range contain few community observations and may bias the descriptive results.) The top and bottom panels of Figure 3 correspond to high and low migration communities, respectively. The left panels (1a and 1b) display the percentage of first-time and repeat migrants over time. In the low migration group, migrant streams comprise mostly of first-time migrants, while in the high migration group, repeat migrants make up the majority of the migrant population.

The panels in column (2) show the average monthly remittances (US$ per capita) sent by first-time and repeat migrants pooled over five-year periods. (Because remittance information is recorded for a migrant's last trip alone, there are a small number of observations per year.) In the pool of high migration communities (panel 2a), remittances per capita increase over time, at a higher rate than the increase in the percentage of migrants (shown in panel 1a), and come mostly from repeat migrants as opposed to first-time migrants. By contrast, in the low migration villages, remittances are much lower, and equally likely to come from migrants on their first or repeat trips. Separate analysis shows that in all villages combined, first-time migrants send $420 on average, compared to $564 sent by repeat migrants. This difference (significant at the 0.001

level) may be attributed to the higher earning potential of repeat migrants afforded by prior experience in destination.

Given that the same individuals migrate repeatedly and continue to send remittances in high migration communities, households with migrants are likely to accumulate wealth quickly. The panels in column (3) of Figure 3 compare the average wealth (number of rooms in properties) among non-migrants, first-time migrants and repeat migrants. (Due to the retrospective nature of the data, older, and consequently, wealthier individuals are observed in later years. To assure that the same age group is compared across time, I restrict the age group to 25-45 year olds in each year.) In high migration communities (panel 3a), households with repeat migrants own on average 3 rooms, a number that is significantly higher than the 2.5 rooms owned by households of non-migrants and first-time migrants. The differences are negligible in low migration communities (panel 3b), where an average household, regardless of its migration status, owns about 2.5 rooms, a figure that remains constant over time.

These patterns provide further evidence that migration is a mechanism for wealth accumulation, and imply dramatic changes in the distribution of wealth in communities with high levels of migration. To isolate the changes in wealth inequality due to migration and remittance flows, the right panels in Figure 3 (4a and 4b) show the inequality *between* migrant and non-migrant households as a percentage of the overall inequality. Gini coefficient is the measure of choice, and between-group inequality is computed by setting the wealth of each individual to the group mean. In low migration communities, the share of inequality due to differences between migrants and non-migrants is negligible and stable over time. By contrast, in communities with high levels of migration, the inequality between migrants and non-migrants obtains an increasing

share of the overall inequality over time. From 1975 to 1995, the percentage of inequality due to the wealth gap between migrants and non-migrants increases from 20 to almost 40 percent.

These results are not informative of the *overall* trends in inequality, which may change due to idiosyncratic economic shocks and indeed vary across communities in the data (results available upon request). Yet, the results strongly establish that migration and remittance flows systematically create a divide between households with links to the United States and those without them, and potentially generate a new system of stratification in Mexico. The results also challenge the existing theoretical elaborations about inequality and migration.

Prior research has suggested an inverted-U, Kuznetsian relationship between inequality and migration. Inequality in a community would initially increase due to the migration of the wealthy, but eventually decline as migration became a less selective endeavor (Stark et al. 1986). The results for the Mexican case presented so far show that inequality is higher in communities with high migration prevalence. Remittances sent by repeat migrants, which reach wealthy households and increase inequality, seem to overwhelm the equalizing effect of remittances sent by the new migrants to poor households. The end result is a positive linear relationship between inequality and migration in Mexican communities, which defies the Kuznetsian curvilinear relationship suggested in prior work.

CONCLUSION

In a period when inequalities between countries have reached a "great plateau," understanding the disparities within countries became crucial to predict future trends in global inequality (Firebaugh 1999, 2000). Despite their growing magnitude and importance for the developing regions of the world, remittance flows have not been considered as an integral component of within-country inequalities. This study focused on the largest contemporary migration stream in

32

the world between Mexico and the United States generating the largest remittance flows to Latin America, the most unequal region of the world.

I explored the distributional impact of migration-remittance flows in 119 communities of Mexico by asking two related questions: Where in the wealth distribution are migrants drawn from? Which wealth groups within migrants send remittances? Answering these questions required first establishing a conceptual link between theories of migration and theories of remittances. I connected the neoclassical and new economics of labor migration perspectives of migration to the altruistic and contractual explanations of remittances, to derive expectations about how individuals' wealth status affects their migration-remittance behavior, and to draw implications for future trends in within-community inequalities.

This theoretical connection helped address the methodological problems in prior work. Most empirical work in the literature models migration and remittances separately, treating them as independent processes. Because remittance behavior is only observed among migrants, a non-random segment of the population, the determinants of remitting can be confounded with the selection process into the migrant sample. To address this problem, I presented an integrated statistical model, which treated migration as a mechanism for selection in a Heckman specification of remittances. The empirical analysis employed data from about 16,000 individuals observed retrospectively from 1965 to 2008 in 119 communities surveyed by the Mexican Migration Project, one of the largest migration surveys available. The coefficient estimates from the Heckman model were similar to those based on a conventional OLS model, and suggested that sample selection does not bias our conclusions about the determinants of remittances *among migrants* in Mexican communities. Yet, considering migration and

remittances as integrated processes did improve the conclusions in the *overall* sample by allowing us to first identify the migrants, and then determine, who among them will remit.

The results showed that migrants in the overall sample, and remitters among migrants are both likely to belong to wealthier households. This puzzling pattern is explained by comparing migrants on their first trip to those who have migrated repeatedly. New migrants typically originate from poor households that lack the economic means or opportunities for young adults. These migrants are likely to be motivated by a desire to increase income, in line with the neoclassical view of migration, and send remittances to help their households in an altruistic gesture, or in return for non-monetary favors by the household. As households get more prosperous from remittances, migration may become a strategy to diversify risks and protect the accumulating wealth in the origin community, as the new economics theory suggests. Migrants' remittances at this point may serve to fulfill a contractual arrangement, where the existing wealth serves as a collateral. Regardless of the underlying motives, which cannot be substantiated with the existing data, the observed migration and remittance patterns affect the wealth distribution in Mexican communities. Specifically, the repeat migration of the increasingly wealthy individuals, who continue to send remittances, leads to the disproportionate accumulation of wealth in migrant-sending households. The outcome is an increasing divide between households with and without migrants within migrant-sending communities in Mexico.

These results suggest the inadequacy of the prevailing economic theories to explain the dynamic relationship between migration, remittances and inequality. Specifically in the Mexican setting, the relevance of the neoclassical or new economics perspectives for explaining the observed patterns depends on individuals' stage in their migration careers. The expectations of the neoclassical theory are supported for first-time migrants, while the predictions from the new

economics perspective hold for repeat migrants. This finding exposes a gap in the literature to study migration and remittance processes from a more sociological, life course perspective. Future work should explore individuals' migration-remittance trajectories using a longitudinal research design, which was not possible in this study due to the limitations of the Mexican data.

The results also challenge the general applicability of the inverted-U relationship between inequality and migration suggested in prior work. In this Kuznetsian view, inequality increases with migration at first, due to positive selectivity of initial migrants on wealth, but decreases at later stages of migration, as migrants become increasingly representative of the overall population. As this study shows, the selectivity of migration could show a reverse pattern over time, or even across the multiple trips taken by the same individual. In the Mexican case, initial migrants are poor, yet accumulate wealth over repeated trips to reach and exceed the average levels of wealth in their community. The inequality in income or wealth, as a result, increases with increasing prevalence of migration. To identify the community- or country-level changes in inequality due to migration and remittances, rather than look for a pattern (Kuznetsian or any other) that fits all cases, it is necessary to understand the individual-level patterns of selectivity. This study made a first attempt to achieve these connections across different levels of analysis.

The study only considered the direct effects of remittances on wealth accumulation. Yet, there are also indirect pathways through which these flows may increase inequality. Prior work has elaborated on the implications of a remittance influx on wages, land and housing prices (Papademetriou and Martin 1991). More work is necessary to establish these indirect links through which remittances can shape opportunities for individuals in receiving economies.

To conclude, the increasing inequality observed in the migrant-sending communities of Mexico points to the need to think critically about the implications of remittances. Researchers

and policy makers have consistently emphasized the positive and multiplier effects of remittances for receiving countries. However, remittances may also have enormous disruptive effects on the income or wealth distribution in a country. To evaluate the implications of remittance flows, it is necessary to weight their positive effects on the average income or assets by the negative distributional impact that potentially leads to increased inequality.

REFERENCES

Adams, Richard. 1989. "Worker Remittances and Inequality in Rural Egypt." *Economic Development and Cultural Change* 38(1): 45-71.

Adams, Richard. 1991. "The effects of International Remittances on Poverty, Inequality, and Development in Rural Egypt." *Research Report 86, International Food Policy Research Institute.*

Agarwal, Reena and Andrew W. Horowitz. 2002. "Are international remittances altruism or insurance? Evidence from Guyana using multiple-migrant households." *World Development* 30(11): 2033-2044.

Ahlburg, Dennis A. and Richard P. C. Brown. 1998. "Migrants' intentions to return home and capital transfers: A study of Tongans and Samoans in Australia." *Journal of Development Studies* 35(2): 125-151.

Banerjee, Biswajit. 1984. "The probability, size, and uses of remittances from urban to rural areas in India." *Journal of Development Economics* 16: 293–311.

Barham, Bradford and Stephen Boucher. 1998. "Migration, Remittances, and Inequality: Estimating the Net Effects of Migration on Income Distribution." *Journal of Development Economics* 55: 307-331.

Berk, Richard A. 1983. "An Introduction to Sample Selection Bias in Sociological Data." *American Sociological Review* 48(3): 386-398.

Bornschier, Volker, and Christopher Chase-Dunn. 1985. *Transnational Corporations and Underdevelopment.* New York: Praeger.

Bornschier, Volker, Christopher Chase-Dunn, and Richard Rubinson. 1978. "Cross- National Evidence of the Effects of Foreign Investment and Aid on Economic Growth and Inequality: A Survey of Findings and a Reanalysis." *American Journal of Sociology* 84: 651-83.

Bourguignon, Francois and Christian Morrisson. 2002. "Inequality among World Citizens: 1820-1992." *American Economic Review* 92(4): 727-744.

Cai, Qian. 2003. "Migrant remittances and family ties: a case study in China." *International Journal of Population Geography* 9(6): 471-483.

Card, David. 1995. "Using Geographic Variation in College Proximity to Estimate the Returns to Schooling." Pp. 201-221 in L.N. Christofides et al. (Eds.), *Aspects of Labour Market Behavior: Essays in Honor of John Vanderkamp.* Toronto: University of Toronto Press.

Cornelius, Wayne A.. 2001. "Death at the Border: Efficacy and Unintended Consequences of U.S. Immigration Control Policy." *Population and Development Review* 27(4): 661-685.

De la Brière, Bénédicte, Elisabeth Sadoulet, Alain de Janvry, Sylvie Lambert. 2002. "The roles of destination, gender, and household composition in explaining remittances: an analysis for the Dominican Sierra." *Journal of Development Economics* 68(2): 309-328.

Dixon, William J. and Terry Boswell. 1996. "Dependency, Disarticulation, and Denominator Effects: Another Look at Foreign Capital Penetration." *American Journal of Sociology* 102: 543-62.

Donato, Katherine M., Brandon Wagner, and Evelyn Patterson. 2008. "The Cat and Mouse Game at the Mexico-U.S. Border: Gendered Patterns and Recent Shifts." *International Migration Review* 42(2): 330-359.

Durand, Jorge, William Kandel, Emilio A. Parrado, and Douglas S. Massey. 1996a. "International Migration and Development in Mexican Communities." *Demography* 33(2): 249-64.

Durand, Jorge, Emilio A. Parrado, and Douglas S. Massey. 1996b. "Migradollars and Development: Reconsideration of the Mexican Case." *International Migration Review* 30: 423-44.

Evans, Peter, and Michael Timberlake. 1980. "Dependence, Inequality, and the Growth of the Tertiary: A Comparative Analysis of Less Developed Countries." *American Sociological Review* 45:531-52.

Firebaugh, Glenn. 2003. *The New Geography of Global Income Inequality*. Cambridge, M.A.: Harvard University Press.

Firebaugh, Glenn. 2000. "The Trend in Between-Nation Income Inequality." *Annual Review of Sociology* 26: 323-339.

Firebaugh, Glenn. 1999. "Empirics of World Income Inequality." *American Journal of Sociology* 104(6): 1597-1630.

Firebaugh, Glenn. 1996. "Does Foreign Capital Harm Poor Nations? New Estimates Based on Dixon and Boswell's Measure of Capital Penetration." *American Journal of Sociology* 102: 563-75.

Firebaugh, Glenn. 1992. "Growth Effects of Foreign and Domestic Investment." *American Journal of Sociology* 98: 105-30.

Gonzalez Casanova, Pablo. 1970. *Democracy in Mexico.* 2nd Edition. New York: Oxford University Press.

Hay, Michael J. 1980. "A structural equations model of migration in Tunisia." *Economic Development and Cultural Change* 28: 345–358.

Heckman, James. 1979. "Sample Selection Bias as a Specification Error." *Econometrica* 47: 153-162.

Hoddinott, John. 1994. "A model of migration and remittances applied to western Kenya." *Oxford Economic Papers* 46: 459–476.

Hoffman, Kelly and Miguel A. Centeno. 2003. "The Lopsided Continent: Inequality in Latin America." *Annual Review of Sociology* 29: 363-390.

Huber, Evelyne, Francois Nielsen, Jenny Pribble and John D. Stephens. 2006. "Politics and Inequality in Latin America and the Caribbean." *American Sociological Review* 71(6): 943-963.

Johnson, George E. and W. E. Whitelaw. 1974. "Urban-rural income transfers in Kenya: an estimated-remittances function." *Economic Development and Cultural Change* 22: 473–479.

Kalzuny, Richard L. 1975. "Determinants of household migration: a comparative study by race and poverty level." *Review of Economics and Statistics* 57: 269–274.

Kuznets, Simon. 1955. "Economic Growth and Income Inequality." *American Economic Review* 45(1): 1-28.

Lee, Yean-Ju, William L. Parish and Robert J. Willis. 1994. "Sons, Daughters, and Intergenerational Support in Taiwan." *American Journal of Sociology* 99(4): 1010-1041.

Lieberson, Stanley. 1985. *Making It Count: The Improvement of Social Research and Theory.* Berkeley: University of California Press.

Lucas, Robert E. B. and Oded Stark. 1985. "Motivations to Remit: Evidence from Botswana." *Journal of Political Economy* 93(5): 901-918.

Massey, Douglas S. and Kristin Espinosa. 1997. "What's Driving Mexico-U.S. Migration? A Theoretical, Empirical, and Policy Analysis." *American Journal of Sociology* 102(4): 939-999.

Massey, Douglas S., Luin Goldring, and Jorge Durand. 1994. "Continuities in Transnational Migration: An Analysis of Nineteen Mexican Communities." *American Journal of Sociology* 99(6): 1492-1533.

McKenzie, David and Hillel Rapoport. 2007. "Network Effects and the Dynamics of Migration and Inequality: Theory and Evidence from Mexico." *Journal of Development Economics* 84(1): 1-24.

Moffitt, Robert. 2003. "Causal Analysis in Population Research: An Economist's Perspective." *Population and Development Review* 29(3): 448-458.

Morley, Samuel. 2001. *The Income Distribution Problem in Latin America and the Caribbean.* Santiago: United Nations Press.

Nakosteen, Robert A. and Michael Zimmer. 1980. "Migration and Income: the Question of Self-selection." *Southern Economic Journal* 46: 84–85.

Navratil, Frank J. and James J. Doyle. 1977. "The Socio-economic Determinants of Migration and the Level of Aggregation." *Southern Economic Journal* 43(4): 1547–1559.

Paige, Jeffrey M. 1997. *Coffee and Power: Revolution and the Rise of Democracy in Central America.* Cambridge: Harvard University Press.

Papademetriou, Demetrios G. and Philip L. Martin. 1991. *The Unsettled Relationship: Labor Migration and Economic Development."* New York: Greenwood Press.

Ratha, Dilip and Zhimei Xu. 2008. *Migration and Remittances Factbook 2008.* World Bank Publications.

Rempel, Henry and Richard A. Lobdell. 1978. "The Role of Urban-to-Rural Remittances in Rural Development." *Journal of Development Studies* 14(3): 324-341.

Rivera, Jose Jorge Mora. 2005. "The Impact of Migration and Remittances on Distribution and Sources of Income." *United Nations Population Division Working Paper.*

Roberts, Bryan R., Reanne Frank, and Fernando Lozano-Ascencio. 1999. "Transnational Migrant Communities and Mexican Migration to the U.S." *Ethnic and Racial Studies* 22 (2): 238-66.

Sartori, Anne. 2003. "An Estimator for Some Binary-Outcome Selection Models Without Exclusion Restrictions." *Political Analysis* 11: 111-138.

Spencer, David F. and K.T. Berk. 1981. "A limited information specification test." *Econometrica* 49: 1079-1085.

Staiger, Douglas and James H. Stock. 1997. "Instrumental Variables Regression with Weak Instruments." *Econometrica* 65(3): 557-586.

Stark, Oded. 1984. "Migration Decision Making: A Review Article." *Journal of Development Economics* 14: 251-259.

Stark, Oded. 1991. "Migration in LDCs: Risk, Remittances, and the Family." *Finance and Development* 28(4): 39–41.

Stark, Oded and David Levhari. 1982. "On Migration and Risk in LDCs." *Economic Development and Cultural Change* 31: 191–196.

Stark, Oded and J. Edward Taylor. 1989. "Relative Deprivation and International Migration." *Demography* 26: 1-14.

Stark, Oded and J. Edward Taylor. 1991. "Migration Incentives, Migration Types: The Role of Relative Deprivation." *The Economic Journal* 101(408): 1163-1178.

Stark, Oded, J. Edward Taylor, and Shlomo Yitzhaki. 1986. "Remittances and Inequality." *Economic Journal* 96:722-41.

Stark, Oded and Shlomo Yitzhaki. 1988. "Labor Migration as a Response to Relative Deprivation." *Journal of Population Economics* 1: 57-70.

Stolzenberg, Ross M. and Daniel A. Relles. 1997. "Tools for Intuition about Sample Selection Bias and Its Correction." *American Sociological Review* 62(3): 494-507.

Taylor, J. Edward. 1999. "The New Economics of Labour Migration and the Role of Remittances in the Migration Process." *International Migration* 37(1):63-88.

Taylor, J. Edward, Scott Rozelle and Alan de Brauw. 2003. "Migration and Incomes in Source Communities: A New Economics of Migration Perspective from China." *Economic Development and Cultural Change* 52: 75-101.

Taylor, J. Edward, Jorge Mora and Richard Adams. 2005. "Remittances, Inequality and Poverty: Evidence from Rural Mexico." Mimeo. University of California, Davis.

Todaro, Michael P. 1969. "A Model of Labor Migration and Urban Unemployment in Less Developed Countries." *American Economic Review* 59(1):138-48.

Van Dalen, Hendrik P., George Groenewold, and Tineke Fokkema. 2005. "The Effect of Remittances on Emigration Intentions in Egypt, Morocco, and Turkey." *Population Studies: A Journal of Demography* 59(3): 375-392.

Vanwey, Leah K. 2004. "Altruistic and Contractual Remittances Between Male and Female Migrants and Households in Rural Thailand." *Demography* 41(4): 739-756.

Wong, Rebeca, Alberto Palloni and Beth J. Soldo. 2007. "Wealth in Middle and Old Age in Mexico: The Role of International Migration." *International Migration Review* 41(1): 127-151.

World Bank. 2008. *World Development Indicators 2008*. World Bank Publications.

TABLES

Table 1. Predictions of Migration Theories about Remittance and Inequality Outcomes

	Migration Theories		
	Neoclassical	New Economics of Labor Migration	
Unit of analysis	Individual	Household	Household
Migration motive	Income maximization	Income maximization	Risk diversification
Origin characteristics of migrants	Low income/wealth	Low income/wealth	High income/wealth
Nature of remittance behavior	Altruistic	Altruistic	Contractual
Trends in within-community inequality	Decrease	Decrease	Increase

Table 2. Wealth and Income Measures by Migration Prevalence, Mexico

	Migration Prevalence		
	Low	Medium	High
Means			
Income (2000 US$)	3273	3685	4062
Value of land (2000 US$)	6702	9669	10757
Properties owned (number of rooms)	3.11	3.18	3.39
Income Inequality			
Gini	0.45	0.51	0.63
Coefficient of Variation	1.31	1.31	5.12
Std dev of logarithms	2.03	2.45	2.94
Land Inequality			
Gini	0.95	0.95	0.94
Coefficient of Variation	6.30	5.57	5.09
Std dev of logarithms	3.78	3.69	4.10
Property Inequality			
Gini	0.43	0.49	0.49
Coefficient of Variation	0.81	0.95	0.98
Std dev of logarithms	0.72	0.81	0.82
Number of individuals	3229	3172	3067

Source: Author's calculations from the Mexican Migration Project data from 92
communities observed in survey years (1987-2008).

Table 3. Sample Characteristics for the Overall Sample, Subset of Migrants and Subset of Remitters

Variable	All	Migrants [a]	Remitters [b]
Household wealth			
Value of household land in 2000 US$ (mean)	3774	5355	5400
Number of rooms in household properties (mean)	2.10	2.28	2.34
Demographic characteristics			
Age (mean)	37.6	33.9	34.1
Sex (Male=1) (%)	80.3	96.7	97.1
Primary education or less (%)	70.7	72.3	73.4
Some secondary education (%)	15.4	18.4	17.8
Complete secondary education (%)	8.0	6.7	6.4
Advanced education (%)	6.0	2.5	2.5
Unmarried (%)	36.9	25.1	23.9
Spouse in Mexico? (%)	62.9	69.4	71.1
Spouse in the U.S.? (%)	0.2	5.6	5.1
Number of children under 18 (mean)	2.1	2.4	2.4
Prior migration experience			
Trips by individual (mean)	0.0	2.9	2.9
Parents U.S. migrants? (%)	4.8	24.8	24.8
Proportion ever migrated in community (mean)	0.1	0.2	0.2
Community characteristics			
Average rainfall to state in past 3 years in mm (mean)	8.3	7.5	7.6
Kilometers to U.S. border (mean)	649	659	666
Migrant characteristics			
Family paid for coyote fees? (%)		13.4	13.6
Have documentation in the U.S.? (%)		28.2	27.1
Years since migrated (mean)		2.0	1.9
Monthly wages in destination in 2000 US$ (mean)		1573	1564
Monthly remittances sent in 2000 US$ (mean)		424	457
Monthly savings brought upon return in 2000 US$ (mean)		232	249
Migrant destination in the U.S.			
Northeast (%)		4	4
Midwest (%)		10	10
South (%)		24	24
West (%)		62	61
N (person-years)	366,309	3,101	2,850
n (persons)	16,269	3,101	2,850

[a] Means for migrants and nonmigrants (not shown) differ significantly (p<.05, two-tailed test) for all variables except the indicator for primary education or less.

Remitters include migrants who sent monthly remittances or brought back savings upon return. Means for remitter and non-remitter migrants (not shown) differ significantly (p<.05, two-tailed test)

[b] for all variables except the indicators for value of land, advanced education, prior migration experience (by individual, parents or community members), whether family paid for coyote, as well as wages and destination in the U.S.

Table 4. Estimated Marginal Effects of Community Distance to the U.S. Border on Migration and U.S. Wages [a]

Variable	Migration to the U.S.		Migration in Mexico		Wages in the U.S.
	(1)		(2)		(3)
Live far from the border (>750km)	-0.006	***	0.000		0.071
	(0.0016)		(0.000)		(0.063)
Proportion ever migrated in community	0.027	***	0.006	***	0.056
	(0.006)		(0.001)		(0.150)
Live far from the border * Proportion ever migrated in community	0.035	***	0.003		0.074
	(0.009)		(0.002)		(0.209)
N	366,309		366,309		3,059
Pseudo - R^2	0.185		0.048		0.198

***p<0.001, **p<.01, *p<.05 (two-tailed tests).

[a] All models include indicators for household wealth, demographic characteristics, prior migration experience, recent rainfall to state, as well as state and year dummies. Model 3 additionally includes indicators for migrant characteristics and destination. The dependent variable in column 1 is whether a person is a U.S. migrant in a given year, and the estimates are based on a probit model. The dependent variable in column 2 is whether a person is a domestic migrant in a given year, and the estimates are from a probit model. The dependent variable in column 2 is the logarithm of the wages in the U.S. in a given year, the estimates are OLS coefficients. Standard errors, adjusted for clustering at the individual level, are given in parentheses.

Table 5. Estimated Marginal Effects of Household Wealth on Migration and Remittances [a]

Variable	Migration (1)		Remittances (2)		(3) Selection bias corrected [b]	
Household wealth						
Logarithm of value of household land in 2000 US$	0.0011	***	0.05		0.07	*
	(0.0003)		(0.03)		(0.03)	
Logarithm of number of rooms in household properties	0.0007	**	0.13	**	0.13	***
	(0.0003)		(0.04)		(0.04)	
Demographic characteristics						
Age	0.0005	***	0.04	*	0.05	*
	(0.0003)		(0.02)		(0.02)	
Age squared/100	-0.0011	***	-0.06	*	-0.07	*
	(0.0001)		(0.02)		(0.03)	
Sex (Male=1)	0.0071	***	0.68	***	0.87	***
	(0.0018)		(0.19)		(0.26)	
Some secondary education	-0.0020	***	-0.26	**	-0.28	**
	(0.0007)		(0.10)		(0.10)	
Complete secondary education	-0.0044	***	-0.15		-0.22	
	(0.0012)		(0.14)		(0.17)	
Advanced education	-0.0066	***	-0.12		-0.28	
	(0.0017)		(0.22)		(0.24)	
Spouse in Mexico?	0.0003		0.12		0.13	
	(0.0005)		(0.10)		(0.10)	
Spouse in the U.S.?	0.2799	***	-0.67	***	-0.21	
	(0.0448)		(0.16)		(0.22)	
Number of children under 18	0.0001		0.04	*	0.04	*
	(0.0001)		(0.02)		(0.02)	
Prior migration experience						
Trips by individual [c]	-		0.01		0.01	
			(0.01)		(0.01)	
Parents U.S. migrants?	0.0247	***	0.07		0.22	*
	(0.0052)		(0.08)		(0.09)	
Proportion ever migrated in community	0.0272	***	-0.30		0.22	
	(0.0063)		(0.35)		(0.36)	
Community Characteristics						
Average rainfall to state in past 3 years in mm	0.0007	**	0.01		0.01	
	(0.0003)		(0.04)		(0.03)	
Live far from the border (>750km)?	-0.0063	***	-0.02		-0.08	
	(0.0016)		(0.15)		(0.14)	
Live far from the border * Proportion ever migrated	0.0346	***				
	(0.0092)					

(continued)

Variable	Migration	Remittances	
	(1)	(2)	(3) Selection bias corrected [b]
Migrant Characteristics			
Family paid for coyote fees?		0.14	0.14
		(0.11)	(0.10)
Have documentation in the U.S.?		-0.02	-0.01
		(0.09)	(0.09)
Years since migrated		-0.06 ***	-0.06 ***
		(0.01)	(0.02)
Monthly wages in destination in 2000 US$		0.40 ***	0.40 ***
		(0.06)	(0.07)
Migrant Destination in the U.S.			
Midwest		-0.13	-0.13
		(0.21)	(0.20)
South		-0.29	-0.28
		(0.20)	(0.18)
West		-0.29	-0.29
		(0.19)	(0.17)
Intercept	-3.67 ***	1.31	0.04
	(0.13)	(0.75)	(1.05)
ρ			0.17
			(0.05)
N	366,309	3,101	366,309
R^2	0.18	0.11	

***p<0.001, **p<0.01, *p<0.05 (two-tailed tests).

[a] The dependent variable in column 1 is whether a person is a U.S. migrant in a given year, and the estimates are based on a probit model. The dependent variable in columns 2 and 3 is the amount of monthly remittance migrant sent to his of her household, and the estimates are OLS coefficients. Standard errors, adjusted for clustering at the individual level, are given in parentheses. Wealth indicators are standardized to mean 0 and standard deviation 1. All models include state and year dummies.

[b] In column 3, the specification is a Heckman two-stage model of migration and remittances where the exclusion restriction is the interaction between living far from border and proportion ever migrated in a community. It is estimated via maximum likelihood.

[c] Individual trips predict migration perfectly (all individuals with prior trips migrate again), hence are not included in the migration model.

**Table 6. Estimated Marginal Effects of Household Wealth on First vs. Repeat Migration** [a]

Variable	First Migration		Repeat Migration	
	(1)		(2)	
Household wealth				
Logarithm of value of household land in 2000 US$	0.0001		0.0011	**
	(0.0001)		(0.0004)	
Logarithm of number of rooms in household properties	-0.0001	**	0.0013	**
	(0.0001)		(0.0005)	
Household wealth, demographic characteristics, prior migration experience, community characteristics	yes		yes	
State and year indicators	yes		yes	
N	366,309		366,309	
Pseudo-R ^{2}	0.11		0.25	

***p<0.001,**p<0.01, *p<0.05 (two-tailed tests).

[a] The dependent variable in column 1 is whether a person has migrated for the first time in a given year. The dependent variable in column 2 is whether a person has migrated again after his or her first trip in a given year. 38% of the migrants in the sample (n=1,180) are first-time migrants, 62% (n=1,921) are repeat migrants. Standard errors, adjusted for clustering at the individual level, are given in parentheses.
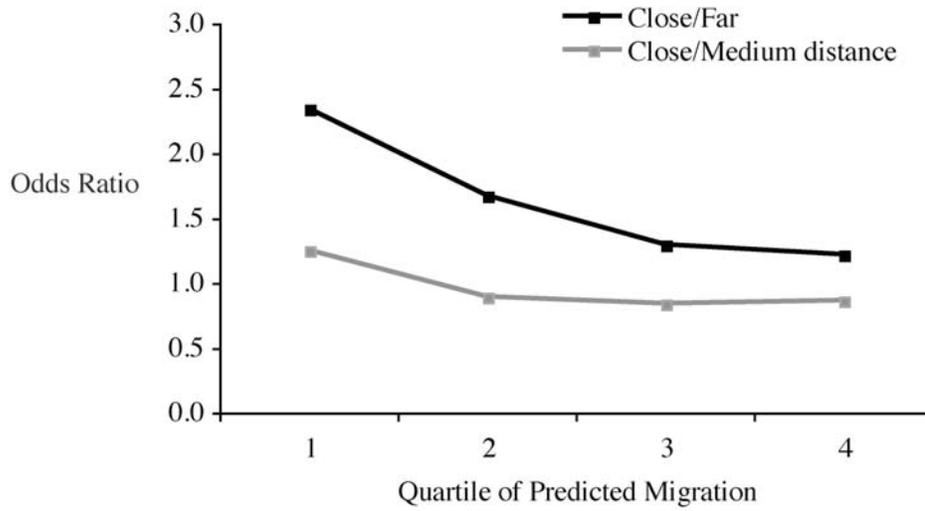
FIGURES

**Figure 1. Lorenz Curves for Household Income by Migration Prevalence, Mexico**
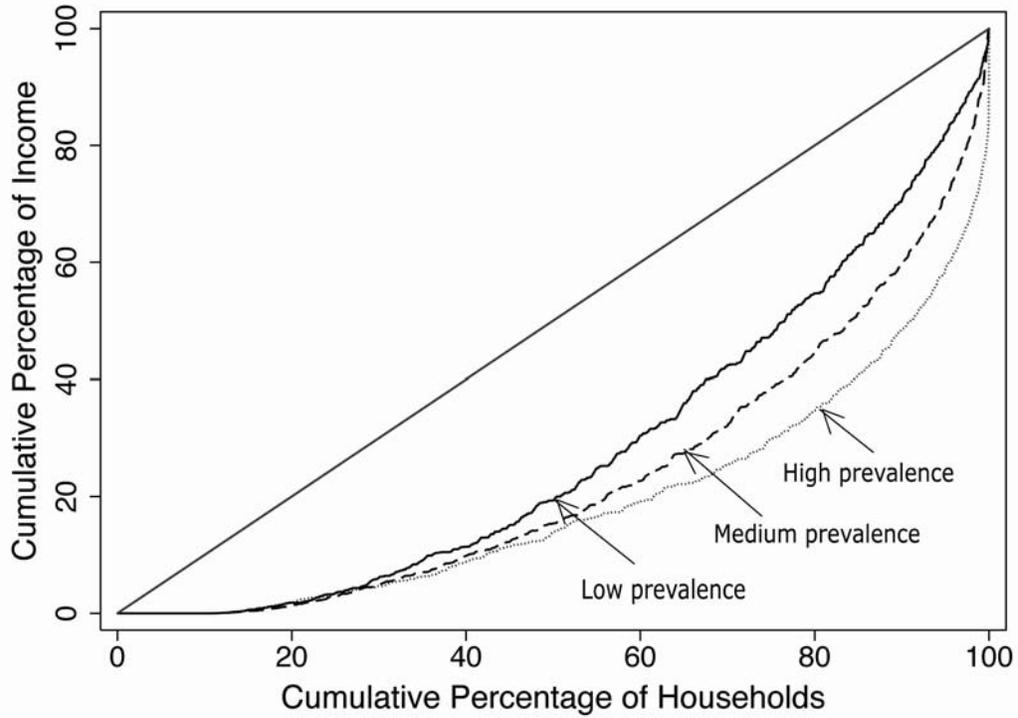
Source: Author's calculations from the Mexican Migration Project data from 90 communities observed in survey years (1987-2008).

Figure 2. Odds Ratios of Migration by Distance to the U.S. Border across Quartiles of Predicted Migration

Note: Communities (N=119) are classified as close (n=36) if distance to the U.S. border is less than 600 km, medium distance (n=35) if it is between 600 and 750 km, and far (n=48) if it is greater than 750 km. Prediction equation does not contain distance indicators and is fit to a sub-sample of individuals in far communities. Odds ratios are computed on the whole sample.
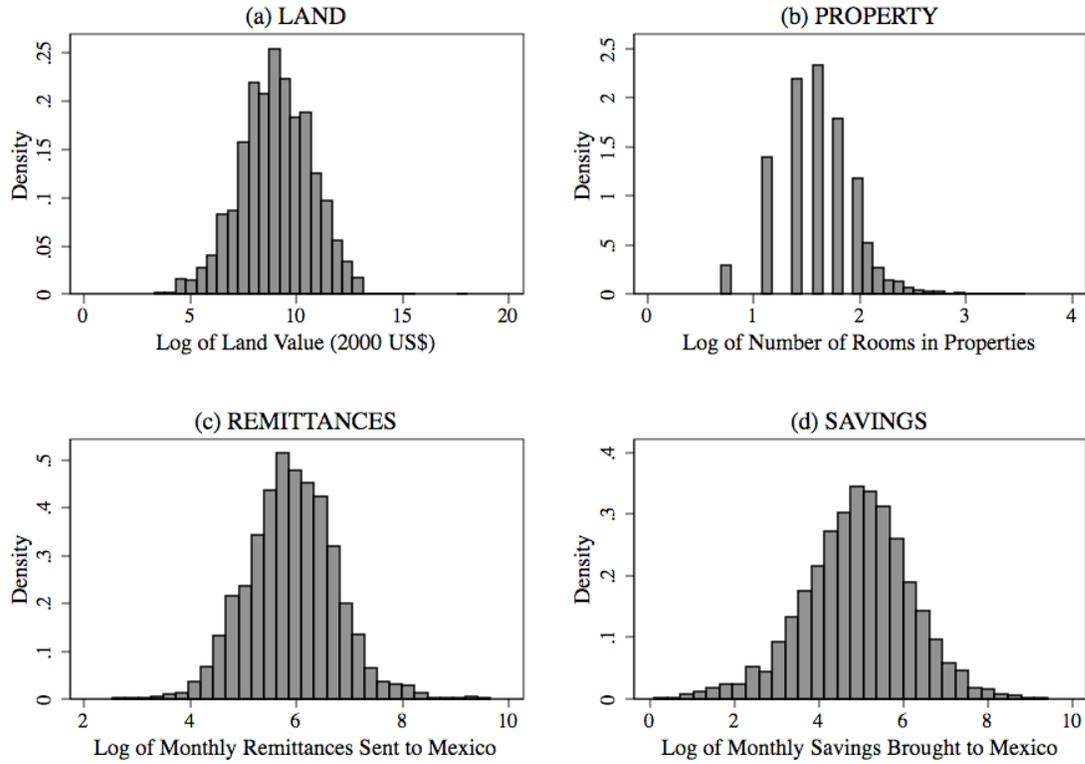
Figure 3. Changes in Migrant Composition, Remittance Patterns, Wealth Distribution and Inequality in High vs. Low Migration Communities in the MMP (1975-1995)
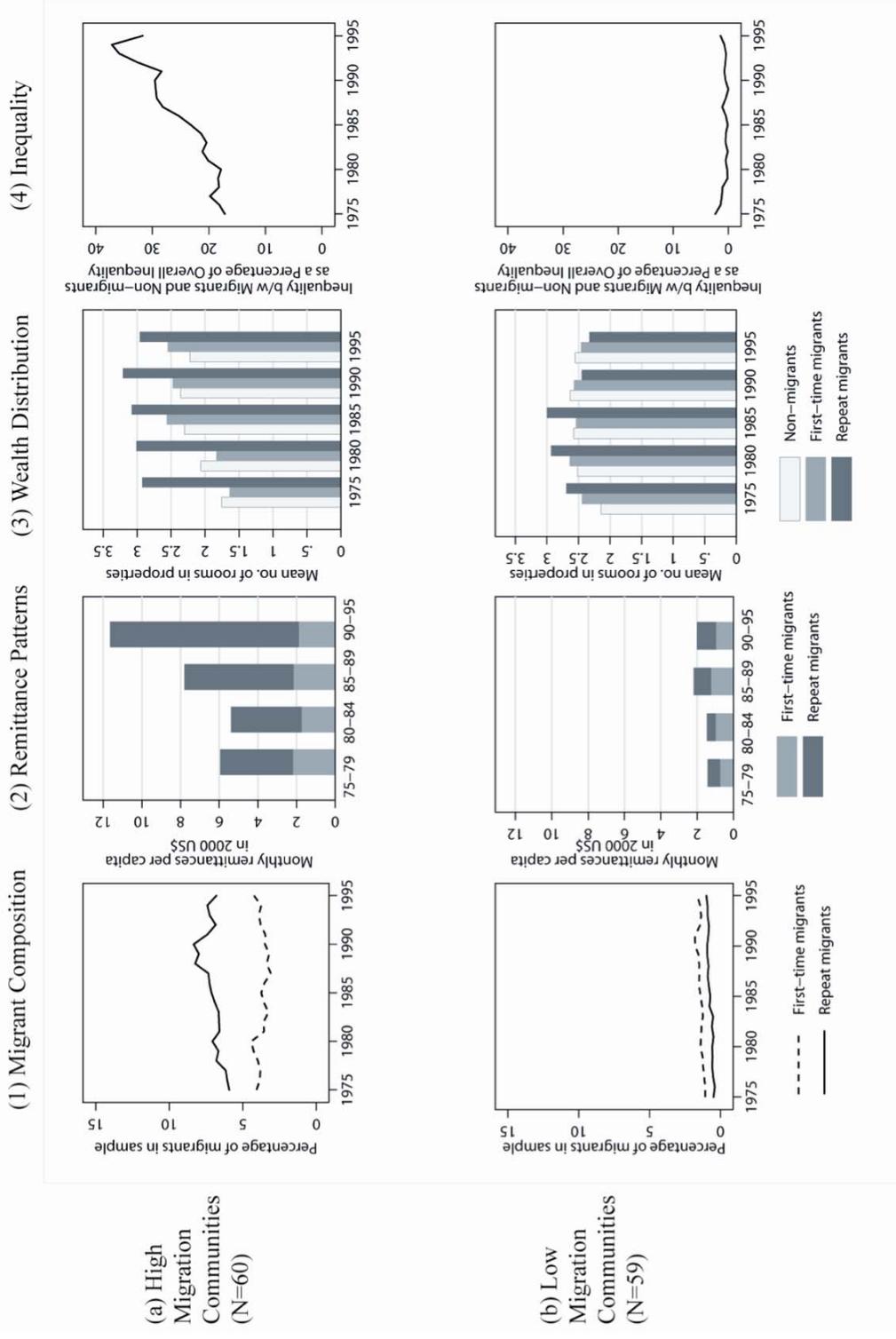
APPENDIX

Distribution of Household Wealth and Migration Prevalence in Mexico

Figure A1. Distribution of Household Assets and Funds from Migrants

Source: Author's calculations from the Mexican Migration Project data from 119 communities in 1965-2006. Households with no land (14%) and no property (50%) are excluded from the respective panels (a) and (b). Households with migrants that receive no remittances (21%) and no savings (22%) are excluded from panels (c) and (d).

Figure A2. Migration Prevalence in Mexico States

Migration prevelance in 1980

0-9%
10-20%
>20%

0   500   1,000 Km
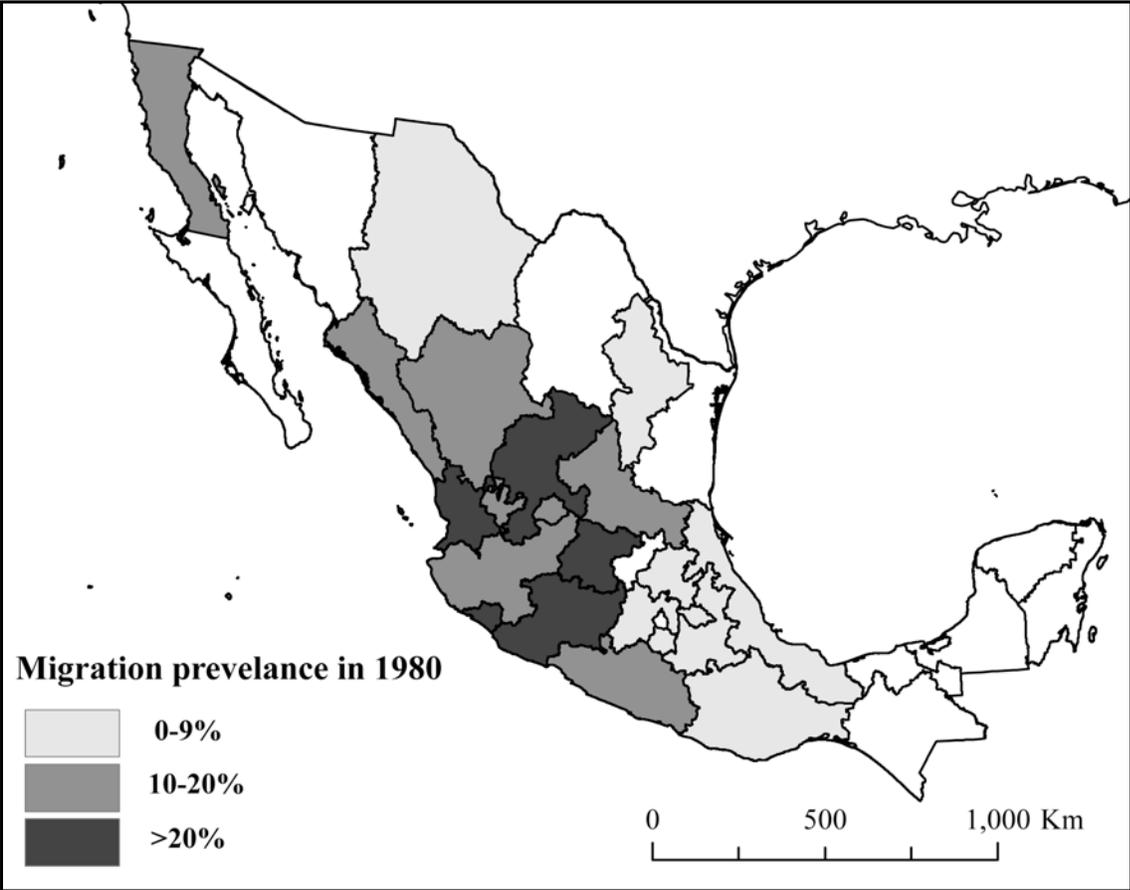
ENDNOTES

[1] Households may provide other rewards, such as child care, in exchange for migrants' remittances in which case remittances would be classified as contractual. Because the theoretical discussion focuses exclusively on how household wealth shapes remittance behavior, I do not explicitly state these possibilities. However they are taken into account in the empirical analysis.

[2] Detailed information about the MMP is available at http://mmp.opr.princeton.edu. The 4 communities surveyed as part of the pilot study in 1982 are excluded, as are the data collected non-randomly from a small number of migrants in the United States.

[3] 27 communities in metropolitan areas are not used in this analysis due to very low sample-to-population ratio. Migration prevalence is in the range of 1-10% in the low category, 11-24% in the medium category and 25-89% in the high category. Cut-points for categories are based on the tertiles of the migration prevalence distribution.