Strategic Interactions in Migration Decisions in Rural Mexico

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Strategic Interactions in Migration Decisions in Rural Mexico[*]

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Abstract

Given the economic significance of migration and its relevance for policy, it is important to understand the factors that cause people to migrate. We add to the literature on the determinants of migration by examining whether strategic interactions matter for migration decisions. There are several reasons why a household's migration decisions may depend on the migration decisions of its neighbors, including migration networks and information externalities. Using instrumental variables to address the endogeneity of neighbors' decisions, we empirically examine whether strategic interactions in migration decisions actually take place in rural Mexico, whether the interactions depend on the size of the village, and whether there are nonlinearities in the strategic interactions. Our results show that there is a significant and positive own migration strategic effect. In our base case specification, an increase of 0.1 in the fraction of neighbors with new migration to the US increases a household's probability of new migration to the US by around 13 percentage points, while an increase of 0.1 in the fraction of neighbors with new migration to other states within Mexico increases a household's probability of migration to other states within Mexico by around 9.5 percentage points. We also find that strategic interactions vary non-linearly with village size.

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1 Introduction

According to estimates from the World Bank (2010a), in 2010 around 3 percent of the world population lived in a country different from the one in which they were born. In absolute terms, the US is the country with the highest immigrant population in the world, with more than 46 million people who were foreign born (United Nations, 2013), out of which about 11 million are Mexicans (World Bank, 2010b). These trends are considerably changing demographic portraits, reshaping patterns of consumption, and altering the cultures of both sending and receiving countries.

The economic importance of migration from Mexico to the US is twofold. Since the mid-1980s, migration to the US has represented an employment opportunity for Mexicans during a period of economic instability and increasing inequality in Mexico. In addition, it has represented an important source of income via remittances, especially for rural households (Esquivel and Huerta-Pineda, 2007).[1] Annual remittances from the US to Mexico amount to 22,811 million dollars, according to estimates from the World Bank (2012). According to recent calculations, an average of 2,115 dollars is sent by each of the nearly 11 million Mexicans living in the US, which represents up to 2 percent of the Mexican GDP (D'Vera et al., 2013). Some authors estimate that 13 percent of household total income and 16 percent of per-capita income comes from migrant remittances (Taylor et al., 2008).[2]

With a border 3200 kilometers long, the largest migration flow between two countries, and a wage differential for low-skilled workers of 5 to 1 (Cornelious and Salehya, 2007), the US - Mexico migration relationship also imposes challenges to policy makers of both countries. Beginning in 2000, Mexico moved away from its previous so-called 'no policy policy', and has tried instead to pursue a more active policy, influence the US to agree to a workers program, and increase the number of visas issued for Mexicans, although its efforts

[1]Esquivel and Huerta-Pineda (2007) find that only 3 percent of urban households receive remittances versus up to 10 percent of rural households.

[2]Castelhano et al. (2016) find that migrant remittances do not increase rural investment in agricultural production, however.

got frustrated after the 9/11 attacks in September 2001. More recently, other domestic policies have included the programs Paisano and Tres Por Uno, which are aimed to facilitate the temporary return during holidays of Mexicans legally living in the US and to match the contributions of migrant clubs for the construction of facilities with social impact in Mexican communities, respectively. On the US side, several reforms have been attempted to both open a path for legalization while increasing the expenditure to discourage illegal immigration, both of which affects mostly Mexicans. The most recent, the Deferred Action for Childhood Arrivals, gives access to work permits to individuals who entered the country before they were 16 years of age.

Given the economic significance of migration and its relevance for policy, it is important to understand the factors that cause people to migrate. We add to the literature on the determinants of migration by examining whether strategic interactions matter for migration decisions. There are several reasons why a household's migration decisions may depend on the migration decisions of its neighbors, defined as all other households in the village, including migration networks and information externalities. Using instrumental variables to address the endogeneity of neighbors' decisions, we empirically examine whether strategic interactions in migration decisions actually take place in rural Mexico, whether the interactions depend on the size of the village, and whether there are nonlinearities in the strategic interactions.

Our results show that there is a significant and positive own migration strategic effect. In our base case specification, an increase of 0.1 in the fraction of neighbors with new migration to the US increases a household's probability of new migration to the US by around 13 percentage points, while an increase of 0.1 in the fraction of neighbors with new migration to other states in Mexico increases a household's probability of migration to other states in Mexico by around 9.5 percentage points. We also find that strategic interactions vary non-linearly with village size.

The balance of the paper proceeds as follows. We review the literature in Section 2. In

Section 3 we discuss sources of strategic interaction in migration. Section 4 presents the empirical strategy that allows us to identify the strategic interactions. Section 5 describes the data. Section 6 presents the empirical results. Finally, Section 7 concludes the paper and outlines our future research agenda to incorporate the strategic interactions in a dynamic framework in order to develop and estimate a structural econometric model of a dynamic game.

2 Literature Review

2.1 Determinants of Migration

The first strand of literature upon which our paper builds is the literature on determinants of migration. The new economics of labor migration posits the household as the relevant unit of analysis. Using the household as the relevant unit of analysis addresses several observed features of migration that are ignored by individualistic models such as the enormous flows of remittances and the existence of extended families which extend beyond national borders. Stark and Bloom (1985) assume that individuals with different preferences and income not only seek to maximize their utility but also act collectively to minimize risks and loosen constraints imposed by the imperfections in credit, insurance, and labor markets. This kind of model assume that there is an informal contract among members of a family in which members work as financial intermediaries in the form of migrants. The household acts collectively to pay the cost of migration by some of its members, and in turn migrants provide credit and liquidity (in form of remittances), and insurance (when the income of migrants is not correlated with the income generating activities of the household). In this setting, altruism is not a precondition for remittances and cooperation, but it reinforces the implicit contract among household members (Taylor and Martin, 2001). In most applications of the new economics of labor migration it is assumed that the preferences of the household can be represented by an aggregate utility function and that income is pooled and specified by the household budget constraint.

In the new economics of labor migration, individual characteristics and human capital variables are also very important because they influence not only the characteristics of the migrants but also the impacts that migration has on the productive activities of the remaining household. Migrants are not homogeneous nor are they a random sample from the population in the host country. Instead, individuals might be selected according to their characteristics and how these characteristics fit in the host country. A simple formulation as in Borjas (1987) presents wages in the source and host economy, as well as the migration costs with a known mean and a normally distributed random component. Under this simple formulation, the probability that an individual migrates increases when the mean income in the host country increases, when the mean income in the source country falls, or when the migration cost falls. Borjas (1987) presents a variation of the Roy (1951) model to explain why positive or negative selection of migrants might occur. The intuition is as follows. Positive selection occurs when migrants have (expected) earnings above the mean in both the host and the source economy and negative selection when they would have expected income below the average in both locations. Assuming constant costs, positive selection happens when the variance of the income in the host country is smaller than the variance in the source country, so it is as if the source country taxed highly skilled workers and insured less skilled workers. The opposite happens with negative selection.

The importance of migrant characteristics have been analyzed empirically with mixed results. Human capital theory à la Sjaastad (1962) suggests that migrants are younger than those who stay because younger migrants would capture the returns from migration over a longer time horizon. The role of education depends on the characteristics of the host and the source economy. Education is positively related to rural-urban migration but has a negative effect on international migration (Taylor, 1987). The reason is that education is not equally rewarded across different host economies. For example, agricultural work in the United States requires only low-skilled labor, so education has a negative effect on the selection of migrants for this type of work.

Changes in labor demand in the United States has modified the role of migrant characteristics in determining who migrates. Migrants from rural Mexico, once mainly poorly educated men, more recently have included female, married, and better educated individuals relative to the average rural Mexican population (Taylor and Martin, 2001). Borjas (2008) finds evidence that supports the negative selection of Puerto Rico emigrants to the United States (consistent with Borjas' (1987) model of negative selection of workers when the source economy has low mean wages and high inequality). On the other hand, Feliciano (2001), Chiquiar and Hanson (2005), Orrenius and Zavodny (2005), McKenzie and Rapoport (2010), Cuecuecha (2005), and Rubalcaba et al. (2008) find that the selection of Mexican migrants occurs from the middle of the wage or education distribution.

Migration costs reflect in part the efforts of the host country to impede migration, which might explain why migration flows continue over time and why we do not observe enormous flows of migrants (Hanson, 2010). Migration costs for illegal crossing from Mexico to the United States are estimated to be 2,750 to 3,000 dollars (Mexican Migration Program, 2014). Estimates reported in Hanson (2010) suggest that the cost of the "coyote" increased by 37 percent between 1996-1998 and 2002-2004, mainly due to the increase of border enforcement due to the terrorist attacks of 9/11. Nevertheless, Gathmann (2008) estimates that even when the border enforcement expenditure in the Mexico - United States border almost quadrupled between 1986 and 2004, the increase in expenditure produced an increase the cost of the coyote of only 17 percent, with almost zero effect on coyote demand.

If we had to summarize the previous literature on the determinants of migration for the case of Mexico, we would argue that young and relatively highly educated and wealthier men appear to be more likely to migrate than the rest of the population. The role of wealth is important since the financial costs of migration can be considerable relative to the income of the poorest households in Mexico.[3]

[3]Data from the National Council for the Evaluation of the Social Policy in Mexico (CONEVAL) show that the average income of the poorest 20 per cent of rural Mexican households was only 456 dollars a year

2.2 Reduced-form models of strategic interactions

In addition to the literature on migration, our paper also builds on previous literature using reduced-form models of strategic interaction. We define 'strategic interactions' as arising whenever the actions of others affects the payoffs of a decision-maker and therefore the decision-maker's actions.

We build on the work of Lin (2009), who analyzes the strategic interactions among firms in offshore petroleum production. When individual petroleum-producing firms make their exploration decisions, positive information externalities and negative extraction externalities may lead them to interact strategically with their neighbors. If they do occur, strategic interactions in petroleum production would lead to a loss in both firm profit and government royalty revenue. Lin (2009) examines whether these inefficient strategic interactions take place on U.S. federal lands in the Gulf of Mexico. In particular, she analyzes whether a firm's exploration decisions depend on the decisions of firms owning neighboring tracts of land. To address the endogenity of neighbors' exploration decisions, she uses variables based on the timing of a neighbor's lease term as instruments for the neighbor's decision. The results suggest that strategic interactions do not actually take place, at least not in exploration, and therefore that the current parameters of the government offshore leasing policy do not lead to inefficient petroleum exploration.

Pfeiffer and Lin (2012) use a unique spatial data set of groundwater users in western Kansas to empirically measure the physical and behavioral effects of groundwater pumping by neighbors on a farmer's groundwater extraction. To address the simultaneity of neighbors's pumping, they use the neighbors' permitted water allocation as an instrument for their pumping.

Robalino and Pfaff (2012) estimate neighbor interactions in deforestation in Costa Rica. To address simultaneity and the presence of spatially correlated unobservables, they instrument for neighbors' deforestation using the slopes of neighbors' and neighbors' neighbors'

in 2012.

parcels. They find that neighboring deforestation significantly raises the probability of deforestation. Policies for agricultural development or forest conservation in one area will affect deforestation rates in non-targeted neighboring areas. Correct estimation of the interaction reverses the naive estimate's prediction of multiple equilibria.

Similarly, Irwin and Bockstael (2002) investigate strategic interactions among neighbors in land use change using physical attributes of neighboring parcels as instruments to identify the effect of neighbors's behavior.

Morrison and Lin Lawell (2016) investigate the role of social influence in the commute to work. Using instruments to address the endogeneity of commute decisions and a dataset of U.S. military commuters on 100 military bases over the period 2006 to 2013, they show that workplace peers positively influence one anothers decisions to drive alone to work and carpool to work. All else equal, an increase in the fraction of peers who drive alone of 10 percentage points increases the probability of driving alone by 6.05 percentage points. An increase in the fraction of peers who carpool of 10 percentage points increases the probability of carpooling by 5.14 percentage points. To examine whether conventional measures of social status and seniority predict who exerts the strongest influence on others, they disaggregate the dataset into subgroups and identify which subgroups have the greatest influence and which are most susceptible to influence. Results show that in commute decisions, intra-group influence can be more important than inter-group influence. This suggests that workplace travel interventions that seek to shift employees away from driving alone or toward carpooling may be most effective if communicated by ones own peer group.

Munshi (2003) identifies job networks among Mexican immigrants in the United States's labor market. The network of each origin-community in Mexico is measured by the proportion of the sampled individuals who are located at the destination (the US) in any year. He uses rainfall in the origin-community as an instrument for the size of the network at the destination. Results show that the same individual is more likely to be employed and to hold a higher paying nonagricultural job when his network is exogenously higher.

3 Sources of Strategic Interactions

In this paper we build upon the literature on the determinants of migration by examining whether strategic interactions are a determinant of migration decisions as well. We define 'strategic interactions' as arising whenever the migration decisions of other households in their village affect a household's payoffs from migration and therefore their decisions to migrate. When households decide to have a member of their household migrate, the migration decisions of other households in their village may affect their payoffs from migrating and therefore their decisions to migrate.

There are several reasons why households make take into the account the actions of other households in their village when making their migration decisions.

The first source of strategic interactions are migration networks. Migration networks play a considerable role in the costs considerations for migration because they may reduce the financial, psychological, and informational costs of moving out of the community. The role of migration networks has been studied by Du, Park and Wang (2005) on China; Bauer and Gang (1998) on Egypt; and several others on Mexico, including Massey and Espinosa (1997) and Massey, Goldring and Durand (1994). These papers find a positive effect of migration networks on the probability of migration. In his analysis of job networks among Mexican immigrants in the U.S. labor market, Munshi (2003) finds that the same individual is more likely to be employed and to hold a higher paying nonagricultural job when his network is exogenously higher. Orrenius and Zavodny (2005) show that the probability of migrating for young males in Mexico increases when their father or siblings have already migrated. McKenzie and Rapoport (2010) find that the average schooling of migrants from Mexican communities with a larger presence in the United States is lower. McKenzie and Rapoport (2007) show that migrants from regions with communities of moderate size in the United States are selected from the middle of the wealth distribution, while migrants from regions with bigger communities in the United States come from the bottom of the wealth distribution. Networks and the presence of relatives or friends in the host country are consistently found to be significant in studies such as those of Greenwood (1971) and Nelson (1976), among others. Contacts in the source economy lower financial or information costs and reduce the utility loss coming from living and working away from home.

A second source of strategic interactions are information externalities between households in the same village that may have a positive effect on migration decisions. When a households decides to send a migrant outside the village and other households in the village may benefit from learning from their neighbor.

A third source of strategic interactions may be relative deprivation (Stark and Taylor, 1989; Stark and Taylor, 1991). Models of relative deprivation consider that a household's utility is a function of its relative position in the wealth distribution of all the households in the community. Individuals who migrate remain attached to their household and remit in order to improve the position of their household with respect the reference group. For this concept to be a valid motive for migration, the migrants must still consider their source country as their reference group, which is likely to happen when the source and the host countries are very different, so migrants do not choose the host country as a reference group. The relative deprivation motive also helps to explain why local migration is different from international migration because when a migrant moves within the same country it is more likely that she changes her relative group since it is easier to adapt in the host economy (where maybe the same language is spoken and the cultural differences are not as dramatic as in the case of international migration). Also, the relative deprivation concept would predict that those individuals from a household that is relatively deprived might decide to engage in international migration rather than domestic migration even though the former is more costly because by migrating locally her position in the most likely new reference group would be even worse than the position she would have if she did not migrate.

Taylor (1987) and Stark and Taylor (1989) empirically test the relative deprivation hypothesis controlling for the household relative position in the village's wealth distribution in Mexico. The results show that relative deprivation increases the probability of migration to the United States, but has no effect on internal migration, which supports the idea that when it is easy to change the reference group, migration might not occur if the position within the new reference group would be worse than the position in the original distribution.

Some behavioral explanations may add to our understanding of social comparisons and reference group formation that explain, for example, the relative deprivation hypothesis. McDonald et al. (2013) use a controlled experiment in which people play a modification of a three-player ultimatum game in which one of the players is given an exogenous amount of money that the other two consider as reference "group". They show that differences in the wealth level of the reference player matters for the bargaining process in the game because it varies the level of payoff to which players might consider to be entitled.

A fourth source of strategic interactions is risk sharing. Chen, Szolnoki and Perc (2012) argue that migration can occur in a setting when individuals share collective risk. Each individual in a group decides her amount of contribution for a collective good. If the amount required for the transformation of the private good into the public is not achieved, all the contributions are lost with a certain probability. They use computer simulations on a grid with randomly seeded "players" that follow simple behavior rules for learning and moving all over the grid. They analyze the emerging patterns after several simulations and find evidence for risk-driven migration, whereby individuals move to another location when the perceived risk of not attaining the amount needed for the public good is higher. Their simulations also show that migration might also promote cooperation, creating spatially diluted groups of "cooperators" who mantain the group from the invasion of free-riders ("defectors"). In a similar fashion, Cheng et al. (2011) use simulations to study the behavior that arises when migration is positively related to wealth. They use a grid to simulate an evolutionary prisoner's dilemma which determines the mobility of players across the grid according to simple behavioral rules. They show that migration might promote cooperation in the prisoner's dilemma game. Lin et al. (2011) use a grid and an evolutionary prisioner's dilemma game in which migration is determined by aspirations, defined as a threshold payoff level of a selected neighbor. Migration occurs with a certain probability if the aspired level of payoffs is greater than the own payoff. They show that aspirations also promote cooperation in the prisoner's dilemma game. Morten (2016) develops a dynamic model to understand the joint determination of migration and endogenous temporary migration in rural India, and finds that improving access to risk sharing reduces migration.

A fifth source of strategic interactions is a negative competition effect whereby the benefits of migrating to the US or within Mexico would be reduced if others from the same village also migrate to the US or within Mexcico. Negative competition effects are less likely to explain strategic interactions in migration decisions to the US, however, since the labor market in the US is large relative to the number of migrants from a particular village.

Owing to migration networks, information externalities, relative deprivation, risk sharing, and competition effects, households may take into account the migration decisions of neighboring households when making their migration decisions.

4 Empirical Strategy

We estimate reduced-form models of a household's decision to have a member engage in new migration to the US, and also of its decision to have a member engage in new migration within Mexico. In particular, our dependent variable y_{ikt} is an indicator variable of whether household i has new migration of type $k \in [USA, Mexico]$ in time t, which is equal to 1 for household i in year t if a household has a member migrating to/within k in year t and did not have a member migrating to/within k last year.

To analyze strategic interactions in migration, we regress household i's decision y_{ikt} to engage in new migration on the fraction s_{ikt} of the sampled households in the same village household i, excluding i, that engage in new migration of type k.

We estimate the following econometric model:

$$y_{ikt} = \alpha + \sum_k \beta_{sk} s_{ikt} + x'_{it}\beta_x + \mu_i + \tau_t + \varepsilon_{ikt}, \tag{1}$$

where the vector x_{it} includes covariates at the household, village, municipality, state, and national level as well as border crossing variables; μ_i is a village fixed effect; and τ_t is a year effect. We also run a set of specifications using a time trend instead of year effects.

The regressors at the household level in x_{it} include the household size; the age of the household head; the schooling of the household head; the maximum level of schooling achieved by any of the household members; the average level of schooling, measured as the completed years of education of members older than 18, divided by the number of members in this age range; a dummy if the household's first born was a male; the weighted average slope of the household's plots of land, interacted with village precipitation; and the weighted average quality of the household's plots of land, interacted with village precipitation.

The regressors at the municipality level in x_{it} include the number of schools in the basic system, the number of schools for indigenous people, the number of cars, and the number of buses.

The state-level variables in x_{it} are include employment by sector.

The national variables in x_{it} are aggregate variables that represent the broad state of the institutional and economic environment relevant for migration, including the mean hourly wage, and wage by sector.

The border crossing variables in x_{it} includes variables that measure crime, deaths, and border enforcement at nearby border crossing points.

Measuring neighbors' effects is difficult owing to two sources of endogeneity. One source is the simultaneity of the strategic interaction: if household i is affected by its neighbor j, then houshold j is affected by its neighbor i. The other arises from spatially correlated unobservable variables (Manski, 1993; Manski, 1995; Brock and Durlauf, 2001; Conley and

Topa, 2002; Glaeser, Sacerdote and Scheinkman, 1996; Moffitt, 2001; Lin, 2009; Robalino and Pfaff, 2012; Pfeiffer and Lin, 2012). It is therefore important to address these endogeneity problems in order to measure strategic interactions.

To address the endogeneity of neighbors' migration decisions s_{ikt}, we use the following instruments for the fraction of neighbors that engage in new migration.

One instrument we use for the fraction of neighbors that engage in new migration is the average number of males in the household of other households in the same village as i, but not including i, at time t. The idea behind this instrument is that households do not decide strategically the sex of its members. However, households with different composition of males may have different strategies regarding migration and local work. The number of males in the families of neighboring households is a good instrument because it is likely to affect the migration decisions of neighboring households, but it does not affect the decisions of a household except through its effect on the decisions of neighboring households.

A second instrument we use for the fraction of neighbors that engage in new migration is the fraction of other households in the village of i, not including i, at time t in which the first born was a male. The intuition is similar to the previous instrument. Whether the first born was a male is exogenous. The fraction of neighboring households where the first born is a male is a good instrument because it is likely to affect the migration decisions of neighboring households, but it does not affect the decisions of a household except through its effect on the decisions of neighboring households.

A third instrument we use instrument we use for the fraction of neighbors that engage in new migration is the average of the household head schooling of other households in the village of i, but not including i, at time t. The intuition why this is a good instrument is that household head's schooling affects the productivity of other households, the schooling and employment decisions of its memebers, and thus their likelihood to migrate, but does not affect other households' migration decisions directly.

A fourth instrument we use for the fraction of neighbors that engage in new migration is the average of the mean household schooling of other households in the village of i, but not including i, at time t. This is a good instrument because schooling affects the productivity of other households and thus their likelihood to migrate but does not affect other households' migration decisions directly.[4]

A fifth instrument we use for the fraction of neighbors that engage in new migration is the average of the maximum schooling of any individual in other households in the village of i, but not including i, at time t. The intuition why this is a good instrument is that household head's schooling affects the productivity of other households, the schooling and employment decisions of its memebers, and thus their likelihood to migrate, but does not affect other households' migration decisions directly.

A sixth instrument we use for the fraction of neighbors that engage in new migration is the fraction of other households in the village of i, but not including i, which had a migrant to the US in the five previous years to t in the same village as i, but not including i. This is a good instrument because it affects the migration decisions of other households in the same village as i, but not those of household i directly.[5]

A seventh instrument we use for the fraction of neighbors that engage in new migration is the fraction of other households in the village of i, but not including i, which had a migrant within Mexico in the five previous years to t in the same village as i, but not including i. The rationale of using this instrument is analogous to its US counterpart: it affects the migration decisions of other households in the same village as i, but not those of household i directly.

As we show below, the first stage F-statistic is greater than 10 in almost all specifications. To test the validity of our instruments, we also conduct an under-identification test, a weak-

[4]The mean schooling in each household was constructed using the years of schooling of individuals over 15 years old.

[5]When we include the fraction of other households in the village of i, but not including i, which had a migrant to the US in the five previous years and the fraction of other households in the village of i, but not including i, which had a migrant within Mexico as regressors in the second-stage regression of household i's new migration decision rather than as instruments for the neighbors' new migration decisions, they are statistically insignificant, thus lending support to our claim that they do not affect the decisions of household i directly. Thus the neighbors' past migration decision does not directly affect a household's decisions and therefore serves as a good instrument for neighbors' new migration.

instrument-robust inference test, and a Sargan-Hansen test of over-identifying restrictions. In all the specifications, we reject under-identification as well as weak instruments. We also pass the Sargan-Hansen test of over-identifying restrictions in all specifications, since in each of these regressions we fail to reject joint null hypothesis that the instruments are uncorrelated with the error term and that the excluded instruments are correctly excluded from the estimated equation.

5 Data

We use data from the National Survey of Rural Households in Mexico (ENHRUM) in its three rounds (2002, 2007 and 2010[6]). The survey is a nationally representative sample of Mexican rural households across 80 villages and includes information on the household characteristics such as productive assets and production decisions. It also includes employment information in a retrospective way, so individuals report their job history back to 1980. With this information, we construct a panel that runs from 1990 to 2010[7] including household composition variables such as household size, household-head age, number of males in the household, and number of males in the family.[8] We can also track the location of employment of each individual into three broad categories: work at the same village, work in some other state within Mexico (internal migration), and work in the United States.

The survey also includes information about the households' plots chracteristics such as slope (flat, inclined, or very inclined), quality (good, regular, or bad), irrigation status, and area of plots of land that are owned by the household. We use information on plots which are owned by the household (rented or lent plots do not include comparable information). We reconstruct the information for the complete panel using the date at which each plot was acquired. Since a plot's slope and quality are unlikely to change over time (unless investments

[6]The sample of 2010 is smaller than the sample of the two previous rounds because it was impossible to access some villages due to violence and budget constraints.

[7]Retrospective data from 1980 to 1989 included only some randomly selected individuals who reported their work history.

[8]A household includes all members living in the same house. A family includes only parents and siblings.

were taken to considerably change the characteristics of the plots, which we do not observe very often in the data), we interact the plots variables with a measure precipitation at the village level (Jessoe, Manning and Taylor, 2015) so the characteristics vary across households and along time. Rain data is available only for the subperiod of 1990 to 2007.

Because information on the slope and the quality of a household's plots of land is only available for the plots owned by the household, all those households with no plots of land have missing observations for these two variables. We therefore also try estimating the models without using the plot-related slope and quality variables.

We use information from the National Statistics Institute (INEGI) to control for the urbanization and education infrastructure at the municipality level, including the number of basic schools and the number of indigenous schools. We also include the number of registered cars and buses. These data cover the period 1990 to 2010.

We also include aggregate variables that represent the broad state of the institutional and economic environment relevant for migration. We use data from the INEGI on the fraction of the labor force employed in each of the three productive sectors (primary, secondary, and tertiary[9]) at the state level, from 1995 to 2010. We use INEGI's National Survey of Employment and the methodology used in Campos-Vazquez, Hincapie and Rojas-Valdes (2012) to calculate the hourly wage at the national level from 1990 to 2010 in each of the three productive sectors and the average wage across all three sectors.

We use two sets of border crossing variables that measure the costs of migration. On the Mexican side, we use INEGI's data on crime to compute the homicide rate per 10,000 inhabitants at each of the 37 the Mexican border municipalities. On the United States' side, we use data from the Border Patrol that include the number of border patrol agents, apprehensions, and deaths of migrants at each of the nine border sectors, and match each sector to its corresponding Mexican municipality.

[9]The primary sector includes agriculture, livestock, forestry, hunting, and fisheries. The secondary includes the extraction industry and electricity, manufacturing, and construction. The tertiary sector includes commerce, restaurants and hotels, transportation, communication and storage, professional services, financial services, corporative services, social services, and government and international organizations.

We interact these border crossing variables (which are time-variant, but the same for all villages at a given point in time) with measures of distance from the villages to the border (which are time-invariant for each village, but variant for each village-border location pair).

We use a map from the International Boundary and Water Commission (2013) to obtain the location of the 26 crossing-points from Mexico to the United States. Using the Google Distance Matrix API, we obtain the shortest driving route from each of the 80 villages in the sample to each of the 26 crossing-points, and match the corresponding municipality at which these crossing-points are located.

This procedure allows us to categorize the border municipalities in one of the following categories: less than 1,000 kilometers from the village; between 1,000 and 1,999 kilometers; between 2,000 and 2,999; between 3,000 and 3,999; and more than 5,000 kilometers.

Interacting the distances to the border crossing points and the border crossing variables we obtain the mean and minimum of each border crossing variable at the five closest crossing points, and the mean and the minimum of each border crossing variable within the municipalities that are in each of the five distance categories defined above. We also compute the mean and the minimum of each border crossing variable among all the border municipalities.

Figure 1 presents a map of the villages in our sample (denoted with a filled black circle) and the US-Mexico border crossing points (denoted with a red X).

Table 1 presents the summary statistics for the variables in our data set.

6 Results

In this section we present the results of the reduced-form models we run to analyze the effects of strategic interactions on household's decisions regarding migration. We have two sets of regressions, one for each dependent variable: a dummy indicator if the household has new migration to the US, and a dummy indicator if the household has new migration to other state of Mexico. The strategic variables are the fraction of households in the same village as household i, excluding i, with new migration to the US; and the fraction of households in the same village as i, excluding i, with new migration to other states of Mexico.

6.1 Strategic Interactions

Table 2 presents the first-stage regressions.[10] The first stage F-statistic is greater than 10 in almost all specifications. To test the validity of our instruments, we also conduct an under-identification test, a weak-instrument-robust inference test, and a Sargan-Hansen test of over-identifying restrictions. In all the specifications, we reject under-identification as well as weak instruments. We also pass the Sargan-Hansen test of over-identifying restrictions in all specifications, since in each of these regressions we fail to reject joint null hypothesis that the instruments are uncorrelated with the error term and that the excluded instruments are correctly excluded from the estimated equation.

Tables 3 and 4 present the main results of our paper for migration to the US and migration with Mexico, respectively. For each specification in Tables 3 and 4, version 'a' of the specification includes year effects, while version 'b' uses a time trend instead. Specification 1a is our base case specification. Specification 2 excludes the plot-related variables (which are interacted with rain), so the sample size increases. Specification 3 estimates the model using only the three survey years, so the information used is as accurate as possible since we do not fill in the household composition, education, and working variables using retrospective data. Specification 4 is analogous to the base case specification but restricts the sample to households that were survey in the three rounds. Finally, Specification 5 is analogous to the base case but instead of using a variable for the household head schooling, we use a dummy for the household head being the household member with the most schooling.

According to the results for the US migration regressions in Table 3, there is a positive and significant own migration strategic effect that is robust across specifications. In the base case Specification 1a, an increase of 0.1 in the fraction of neighbors with new migration to the

[10] The results of the first-stage regressions for all the US and the within-Mexico migration specifications are available with the authors upon request.

US increases a household's probability of new migration to the US by around 13 percentage points. The result is robust across specifications; an increase of 0.1 in the fraction of neighbors with new migration to the US increase a household's probability of new migration to the US by 11 to 15 percentage points in the specifications using year effects (2a, 3, 4a, and 5a), and by 10 to 13 percentage points in the specifications that employ time trend (1b, 2b, 4b, and 5b). In contrast, the other migration strategic effect is not significant at a 5% level: the fraction of neighbors with new migration within Mexico has no significant effect on a household's probability of new migration to the US.

Table 4 presents the results for the migration to other states within Mexico. Once again, there is a positive and significant own migration strategic effect that is robust across specifications. In the base case specification, an increase of 0.1 in the fraction of neighbors with new migration to other states within Mexico increases a household's probability of migration to other states within Mexico by around 9.5 percentage points. The result is robust across specifications; an increase of 0.1 in the fraction of neighbors with new migration to other states within Mexico increases a household's probability of migration to other states in Mexico by 9 to 12 percentage points in the specifications using year effects (2a, 3, 4a, and 5a), and by 10 to 11 percentage points in the specifications that employ time trend (1b, 2b, 4b, and 5b). In contrast, the other migration strategic effect is not significant at a 5% level: the fraction of neighbors with new migration to the US has no significant effect on a household's probability of new migration to other states within Mexico.

6.2 Other Determinants of Migration

Table 3 also presents the results of other characteristics that may explain new migration to the US. The number of indigenous schools has a significant negative effect in one specification, which might reflect a competition effect between schooling and migration since the availability of schools prevent young people to leave their villages. The number of males in household has a positive effect that is significant in some specifications, which is consistent with previous work on migration determinants because men are more capable of performing the type of activities in which migrants from Mexico are typically envolved. Whether the first born is male is significant and positive in one specification. Household average schooling has a significant positive effect in some specifications, which is consistent with recent literature finding that migrants come from the middle of the education distribution rather than the lower tail (Feliciano, 2001; Chiquiar and Hanson, 2005; Orrenius and Zavodny, 2005; McKenzie and Rapoport, 2010; Cuecuecha, 2005; Rubalcaba et al., 2008). Whether the household has a member who had same type of migration within the past five years has positive effect that is significant in most specifications, which reflects the persistance of migration and role of communities and networks in the migration decisions. In contrast, whether the household has a member who had the other type of migration within the past five years has no significant effect.

Table 4 also presents the results of other characteristics that may explain new migration to other states within Mexico. The age of the household head has a significant negative effect on the probability of migrating within Mexico in some specifications, which can be interpreted as lower chances of opportunities for older people given the types of work that migrants from rural areas can perform. Household head schooling has a negative effect that is sometimes significant; to examine this further we try using a dummy for whether the household head is the most educated in household instead of household head schooling, and find a significant negative coefficient on the dummy for whether the household head is the most educated in household as well. Household maximum schooling has a positive effect that is significant in some specifications. Thus, while the household maximum schooling increases the probability of new migration within Mexico, having the household head be the one with the most education in the household decreases the probability of new migration within Mexico. Whether the household has a member who migrated to US within the past five years has negative effect that is significant in some specifications, possibly reflecting a competition effect within the household. Whether the household has a member who migrated within Mexico within the past five years has a significant positive effect. The plots' slope interacted with rain sometimes has significant positive effect, suggesting that if it rains a lot and a household's plot is steep, it is more likely to have a member migrate within Mexico. Plots' quality interacted with rain sometimes has significant negative effect, suggesting that if it rains a lot and a household's plot is of high quality, it is more likely to have a member migrate within Mexico.

It is important to note that our main results suggest that after controlling for the strategic interactions - that is – after controlling for the fraction of neighbors that have a migrant to the US or within Mexico in the same village – many of the household characteristics that are significant in the literature of migration are no longer significant in our estimations. This suggests that strategic interactions have an important role neglected in previous literature, although more research needs to be done to study how specific household characteristics interact with the number of neighbors that embark in different types of migration. Also, the previous analysis shows that the characteristics that affect the migration decision within Mexico are quite different than those that affect the migration decision to the US. Specifically, we find that migration to other states within Mexico is affected by the schooling and age profile of the household head, whereas migration to the US is affected by the number of males in the household, after controlling for the strategic effect.

6.3 Robustness

We check the robustness of our results in the main specification in Specification 1a of Table 3 for the US analysis, and in Specification 1a of Table 4 for the case of Mexico. In Tables 5 and 6 we make the following specification changes, one at a time, with respect to our base case specification. Specification 6 uses the employment in the tertiary sector instead of employment in the primary sector, and the hourly wages in the primary, secondary, and tertiary sectors instead of the mean hourly wage. Specification 7 includes the average crime rate, number of apprehensions, number of border patrol agents, and number of reported migrant deaths at the three closest border points, instead of the average of each variable at three concentric circles centered at the village of household i. Specification 8 uses only the average border crossing variable (crime, apprehensions, deaths and agents) at the first concentric circle instead of at the two concentric circles centered at the village of household h. Specification 9 adds to the same base case specification the average border crossing variable (crime, apprehensions, deaths and agents) along the municipalities at the border. Specification 10 includes the average and minimum border crossing variables at the municipalities at the five closest border crossing points. Finally, Specification 11 uses alternative ways to measure the muncipality and border enforcement variables. In particular, we normalize the municipality characteristics using the municipality population, and we normalize the border enforcement variables using the length of the border that each border municipality shares with the US.

In all the specifications of the corresponding first stage (available upon request), we reject under-identification as well as weak instruments. We also pass the Sargan-Hansen test of over-identifying restrictions in all specifications, since in each of these regressions we fail to reject joint null hypothesis that the instruments are uncorrelated with the error term and that the excluded instruments are correctly excluded from the estimated equation.

The main results from our base case specification are robust to changes in the wage, employment and border crossing variables. In the US migration results in Table 5, the fraction of neighbors with new migrants to the US has an estimated coefficient of 1.3 to 1.5 that is robust across specifications. In addition, the number of males in the household and the dummy for migration in the last five years have a positive and statistically significant effect (some of them at the 10% level of significance) on the probability of having a new migrant to the US. In Figure 2 we summarize our findings from specifications 1a-5a of Table 3 and from specifications 6-11 of Table 5.

Similarly, Table 6 shows that the main results from our base case specification for the Mexico migration analysis are robust to changes in the wage, employment and border crossing variables. The strategic coefficient is positive, in line with the results of Table 4, and in a range of 0.1 to 0.23. Household head age has a negative effect (not statistically significant in all the specifications). The schooling of the household head has a negative effect on the probability of migration but the maximum level of any of the household members has a positive effect. Having a migrant to the US in the past five years reduces the probability of new migration within Mexico and having a migrant to other states within Mexico in the past five years increases it. In Figure 3 we summarize the findings of our results regarding migration within Mexico coming from specifications 1a-5a of Table 4 and from specifications 6-11 of Table 6.

6.4 Results by Village Size

It is possible that differences in the sizes of the host economies might affect the extent of the strategic interactions. The reason is that the size of the village might affect how well the information is spread, how reliable the information is, the costs of information sharing, and possibly also the (perceived or actual) competition effect. Furthermore, the relationship between village size and the extent of the strategic interactions might not be linear or monotonically increasing.

To formally analyze the relationship between the village size and the strategic effects we employ our base case specification in Specification 1a of Tables 7 and 8 and interact the strategic variables with village size quartile dummies using the village size as in 1990. We interact the instruments with village size quartile dummies as well in order to have identification.

In all the specifications of the first-stage analysis by village size, we reject under-identification as well as weak instruments. We also pass the Sargan-Hansen test of over-identifying restrictions in all specifications, since in each of these regressions we fail to reject joint null hypothesis that the instruments are uncorrelated with the error term and that the excluded instruments are correctly excluded from the estimated equation. The first-stage resulst are available upon request.

Table 7 presents the results of the village size analysis for the US migration. Specification 12a uses the same specification as Specification 1a of Table 3 whereas Specification 13a is the same specification as Specification 2a of the same table. Specifications 12b and 13b use time trends instead of year effects. The results are robust and show a positive coefficient on the fraction of neighbors with new migrants to the US in villages that is significant for the first village size quartile and the third village size quartile. The magnitude of the coefficient is almost the same as the estimated coefficient in Table 3 (ranging from 1.4 to 1.6 in villages in quartile 1 and from 1.3 to 1.4 in villages of quartile 3). Figure 4 presents a graphical summary of the results.

A possible reason why the strategic interactions vary non-linearly with village size is that the information externalities vary with village size. The spread of information and information spillovers is facilitated in small communities where people tend to know each other, and where actions of other players are easily inferred or observed. Strategic interactions diminish in importance as the community size increases, but eventually become important again as the channels of information transmition are no longer face-to-face interactions but more formal channels such as schools and social centers, which are more likely to be located in bigger communities. Finally, for villages that are extremely large, strategic interactions become irrelevant because even when information can be spread with social interaction, the lack of face-to-face interaction decreases the value of the information.

Another possible explanation why the strategic interactions vary non-linearly with village size is that competition effects varies with village size. In small villages, individuals do not perceive others as competing for jobs in the United States. Nevertheless, as the village size grows, individuals perceive a bigger pool of migrants which might affect their chances of getting a job. Competition effects are less likely to explain strategic interactions in migration decisions to the US, however, since the labor market in the US is large relative to the number of migrants from a particular village.

Our results show that the variables that are important in explaining the migration to the

US decision are the number of males in the household (though only at the 10% level of significance and using the specification that includes plot variables), household head schooling, and the household stock of education measured in schooling years (only in the specification using the plot variables). A household with more educated household head is less likely to migrate, but the total stock of education is positively related to the probability of migration (in the specifications with plot variables). We think these results together provide evidence in favor of a positive selection of migrants, since although household head schooling negatively affects the probability of migration, the average migrant is expected to be more educated. Migration to the US in the past five years is consistently estimated as positive and significant across specifications, in support of migration networks and learning.

Table 8 presents the same analysis for the migration within Mexico. In this case, only the strategic variable when interacted with the fourth village size quartile results are statistically significant and the estimated parameter is robust across specifications. The reason why this could be the case is that for local migration the information needs to come from face-to-face interaction since potential migrants might be more familiar with the economic conditions in other states of Mexico. Given that language and culture in general are more homogeneous within Mexico, the information flowing through more formal channels becomes more relevant. Figure 5 summarizes the findings in Table 8 .

Regarding the variables explaining migration within Mexico, the age of the head of the household is estimated to have a significant negative effect on the probability of having new migration. This is consistent with the concept of extended household and the new economics of labor migration: an older household head might be less productive so another member of the household would have to get involved in the tasks the household head does in the village and, thus, be less likely to migrate. Similarly, the schooling of the household head turns out to be negative, meaning that a qualified household head is able to reatain more likely the household members because he can provide better income opportunities for the entire household. Finally, the presence of a migrant in the previous five years makes migration to other states of Mexico less likely, showing a competition effect for labor. Furthermore, having a migrant to other states of Mexico makes new migration within Mexico more likely, which supports the presence of migration networks and learning even within the country.

6.5 Nonlinearities in the Strategic Interaction

The previous analysis provides strong evidence that strategic considerations are important in shaping the probabilities of a household for having new migrants to the US and within Mexico. Also, we find that the strategic effects depend on village size. But the theory also suggests that also another type of nonlinearity in the strategic interactions may be present: the effect of the fraction of neighbor households with new migration on a household's migration decision may be a nonlinear function of the fraction of neighbor households with new migrants.

To formally test for nonlinearities in the strategic interaction in the most flexible way, we estimate a semiparametric partially linear IV model using Robinson's (1988) double residual estimator to semi-parametrically identify non-linearities in the own migration strategic effect. We use a two-step procedure to account for the endogeneity of the strategic variables with a control function approach (Verardi, 2013). In the first stage, we estimate two panel fixed effects models regressing the fraction of households with new migrants to the US and within Mexico, respectively, on the same controls as the second stage as our baseline specification (Specification 1a in Table 3 and Specification 1a in Table 4, respectively) and the same set of instruments, to estimate the residuals. In the second stage, we run a semi-parametric estimation where the dependent variable is the new migration dummy, controlling for the same controls as in Table 3 (Table 4), and adding the first-stage residuals as additional regressors. The controls, the residual estimated in the first stage, and village and year fixed effects are estimated parametrically, while the endogenous regressor – the fraction of households with a new migrant to the US (Mexico) – is allowed to vary non-parametrically.

Figure 6 shows the nonlinear effect of the fraction of neighbors with a new migrant to the

US on the probability of new migration to the US. In general we seem to find a linear effect. However, there appears to be a separate subset of residuals with a large effect when the strategic variable is small (they are in the upper left of the graph). The subset of residuals with a large effect when the strategic variable is small are those who actually migrate; all others are those who do not. Thus, our results show that an increase in the fraction of neighbors with new migration increases a household's probability of having new migration for both for those households who do have new migration and those that do not have new migration; and that the effect is linear.

Figure 7 shows the nonlinear effect of the fraction of neighbors with a new migrant within Mexico on the probability of new migration within Mexico. Again, the subset of residuals with a large effect when the strategic variable is small are those who actually migrate; all others are those who do not. Thus, our results show that an increase in the fraction of neighbors with new migration increases a household's probability of having new migration for both for those households who do have new migration and those that do not have new migration; and that the effect is linear.

We also run two additional alternative specifications of the semiparametric partially linear IV model. In one alternative specification, we run the semiparametric partially linear IV model without instrumenting for the other migration strategic effect. In the other alternative specification, we run the semiparametric partially linear IV model without including the other migration strategic effect as a regressor. Our results are robust across all specifications.

7 Conclusion

We contribute to the literature on the determinants of migration by examining whether strategic interactions matter for migration decisions. There are several reasons why a household's migration decisions may depend on the migration decisions of its neighbors, including migration networks and information externalities. Using instrumental variables to address the endogeneity of neighbors' decisions, we empirically examine whether strategic interactions in migration decisions actually take place in rural Mexico, whether the interactions depend on the size of the village, and whether there are nonlinearities in the strategic interactions. Our results show that there is a significant and positive own migration strategic effect. In our base case specification, an increase of 0.1 in the fraction of neighbors with new migration to the US increases a household's probability of new migration to the US by around 13 percentage points, while an increase of 0.1 in the fraction of neighbors with new migration to other states within Mexico increases a household's probability of migration to other states withinin Mexico by around 9.5 percentage points.

We study the relationship between the extent of the strategic interactions and village size, and find evidence that the strategic interactions vary by village size, likely because the information externalities vary with village size. For the case of migration to the United States, we find that strategic interactions occur in villages in village size quartiles 1 and 3, while they are absent in villages of village size quartiles 2 and 4. On the other hand, in the case of migration to other states within Mexico, results show that the strategic interactions actually take place in those villages in quartile 4 (the largest villages). These results together with the differences in magnitudes of the estimated coefficients imply that the strategic motivations behind international and domestic migration are different.

We show that accounting for the strategic interactions of neighbors in migration, the explanatory power of household characteristics that is usually found to be significant in the migration literature vanishes. Thus, more research is needed to understand how the fraction of neighbors migrating in a given village interacts also with the socio-demographic characteristics of the households. Furthermore, we find that the socio-demographic profiles of the households affect the two types of migration differently: whereas schooling and age of the household head are important in explaining local migration, migration to the US is affected by the number of males in the household, which is consistent with the type of work that migrants from rural Mexico – typically illegal – perform.

The analysis in this paper was based on reduced-form regressions of migration. In future work, we hope to further analyze strategic interactions in migration by developing and estimating a structural econometric model of the dynamic game between households deciding whether or not to engage in migration to the US and within Mexico.

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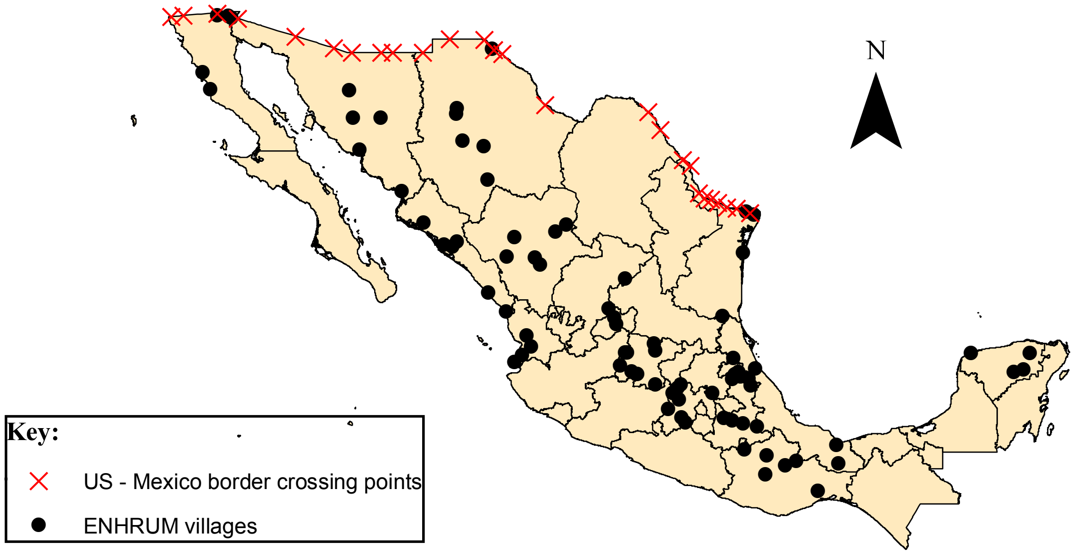

Figure 1: Location of sampled villages in the ENHRUM survey and the border crossing municipalities

Table 1: Summary statistics

Variable	Mean	Std.Dev.	Min	Max	# Obs
Household characteristics					
Number of household members	5.9	3.2	1.0	24.0	25800
Number of family members	5.5	2.8	1.0	17.0	25800
Number of children in household	2.2	1.9	0.0	12.0	25800
Number of children in family	1.8	1.9	0.0	11.0	25800
Number of males in household	2.9	1.8	0.0	17.0	25800
Number of males in family	2.7	1.7	0.0	12.0	25800
First born is male (dummy)	0.5	0.5	0.0	1.0	25800
Household head age (years)	45.2	16.3	3.0	100.0	25764
Household head schooling (years)	4.7	3.8	0.0	23.0	25764
Household average schooling (years) (>=18)	6.1	3.1	0.0	20.5	25282
Household average schooling (years) (>=15)	6.2	3.0	0.0	20.5	25593
Household maximum schooling (yeras)	9.0	3.9	0.0	23.0	25800
Household head is the most educated (dummy)	0.2	0.4	0.0	1.0	33936
Irrigated area	0.2	3.4	0.0	426.0	21260
Plots' slope (1 = flat)	3.4	0.8	1.0	4.0	23875
Plots' quality (1 = good)	3.3	0.9	1.0	4.0	23850
Household has a migrant to the US (dummy)	0.2	0.4	0.0	1.0	25800
Household has a migrant within Mexico (dummy)	0.2	0.4	0.0	1.0	25800
Household has a migrant within same village (dummy)	0.9	0.4	0.0	1.0	25800
Household has new migration to the US (dummy)	0.0	0.2	0.0	1.0	19526
Household has new migration within Mexico (dummy)	0.0	0.2	0.0	1.0	18963
Neighbor characteristics					
Fraction of neighbors with migrants to US	0.2	0.2	0.0	0.9	25800
Fraction of neighbors with migrants to Mexico	0.2	0.2	0.0	0.8	25800
Fraction of neighbors with new migration to US	0.0	0.1	0.0	0.5	19526
Fraction of neighbors with new migration to Mexico	0.0	0.1	0.0	0.6	18963
Municipality characteristics					
Number of basic schools	285.2	332.5	0.0	1762.0	22790

Table 1: (continued)

Variable	Mean	Std.Dev.	Min	Max	# Obs
Number of indigenous schools	6.1	12.8	0.0	72.0	23337
Number of schools	238.9	301.2	0.0	1603.0	13114
Number of classrooms	1399.9	2237.3	0.0	12707.0	13329
Number of public libraries	20.1	34.8	0.0	327.0	11529
Number of labs	47.9	82.7	0.0	482.0	12994
Number of workshops	42.8	69.6	0.0	424.0	12994
Number of public libraries	4.9	5.7	0.0	28.0	19183
Number of students	42341.5	70078.4	0.0	372625.0	22790
Number of vehicles	44672.0	88705.3	0.0	502836.0	24259
Number of cars	29478.3	64324.4	0.0	383512.0	24259
Number of buses	371.2	840.6	0.0	5355.0	24259
Number of trucks	14236.5	23786.2	0.0	113819.0	24259
Number of motos	586.0	1685.1	0.0	18650.0	24259
Instruments					
Fraction of males in neighbor households	2.7	0.7	1.0	6.0	25800
Fraction of males in neighbor families	2.6	0.6	0.8	5.3	25800
Fraction of neighbor households who had a first born male	0.5	0.1	0.0	0.9	25800
Average head's schooling in neighbor households (years)	4.5	1.4	0.6	9.4	25764
Average schooling in neighbor households (years) (>$\bar{1}$8)	5.8	1.4	2.0	10.9	25593
Average schooling in neighbor households (years) (>$\bar{1}$5)	5.7	1.5	1.5	11.0	25282
Maximum schooling in neighbor households (years)	8.4	1.8	3.0	15.3	25800
Fraction of neighbor households where head is the most educated	0.2	0.1	0.0	0.7	31686
Plots' slope of neighbor households interacted with rain	1905.7	1182.3	0.0	8185.0	18752
Plots' quality of neighbor households interacted with rain	1879.6	1193.9	0.0	8185.0	18752
Fraction of neighbor households with migrants to US in past 5 years	0.3	0.3	0.0	1.3	18845
Fraction of neighbor households with migrants within Mexico in past 5 years	0.3	0.2	0.0	1.3	19298
State-level variables					
Employment in primary sector (% working population)	20.3	10.4	4.3	52.0	20656
Employment in secondary sector (% working population)	26.6	6.0	15.1	40.7	20656

Table 1: (continued)

Variable	Mean	Std.Dev.	Min	Max	# Obs
Employment in tertiaty sector (% working population)	52.8	7.1	31.6	68.1	20656
National variables					
Hourly wage in primary sector	29.5	5.3	21.9	39.5	30352
Hourly wage in secondary sector	31.8	3.4	24.9	36.0	30352
Hourly wage in tertiary sector	37.8	4.2	30.3	43.5	30352
Mean hourly wage	36.0	3.3	29.6	41.4	33936
Border crossing variables					
Distance to the closest border crossing point	847.4	474.1	7.0	2178.3	30352
Number of border crossing points > 1000 km	6.3	5.4	0.0	17.0	30352
Number of border crossing points 1000-2000 km	12.4	6.0	0.0	26.0	30352
Number of border crossing points 2000-3000 km	5.9	4.6	0.0	14.0	30352
Number of border crossing points 3000-4000 km	1.2	2.7	0.0	12.0	30352
Number of border crossing points > 4000	0.2	0.8	0.0	4.0	30352
Average crime rate in crossing municipalities > 1000 km	11.5	8.8	1.9	83.7	12166
Average crime rate in crossing municipalities 1000-2000 km	12.2	7.4	2.9	52.3	16612
Average crime rate in crossing municipalities 2000-3000 km	15.9	9.7	2.7	57.8	13050
Average crime rate in crossing municipalities 3000-4000 km	13.1	6.6	5.4	45.8	4053
Average crime rate in crossing municipalities > 4000 km	11.0	2.4	5.4	15.6	984
Minimum crime rate in crossing municipalities > 1000 km	1.9	4.0	0.0	23.8	12166
Minimum crime rate in crossing municipalities 1000-2000 km	0.5	1.6	0.0	8.0	16612
Minimum crime rate in crossing municipalities 2000-3000 km	3.3	3.7	0.0	11.9	13050
Minimum crime rate in crossing municipalities 3000-4000 km	5.6	3.5	0.0	11.9	4053
Minimum crime rate in crossing municipalities > 4000 km	7.0	2.1	1.5	11.9	984
Average crime rate along border municipalities	14.3	2.5	9.9	18.4	17554
Minimum crime rate of border municipalities	0.0	0.0	0.0	0.0	17554
Crime rate at the closest crossing point	8.7	6.6	0.0	38.2	17554
Crime rate at the second closest crossing point	13.8	26.3	0.0	217.4	17554
Crime rate at the third closest crossing point	9.6	19.2	0.0	144.2	17554
Crime rate at the fourth closest crossing point	9.5	12.3	0.0	217.4	17554

Table 1: (continued)

Variable	Mean	Std.Dev.	Min	Max	# Obs
Crime rate at the fifth closest crossing point	13.4	16.3	0.0	79.9	17554
Average crime rate at the five closest border municipalities	11.0	11.1	1.6	83.7	17554
Minimum crime rate of the five closest border municipalities	2.2	3.6	0.0	16.7	17554
Average apprehensions in crossing municipalities > 1000 km	139460.2	77498.3	44895.0	616346.0	21018
Average apprehensions in crossing municipalities 1000-2000 km	117863.6	52672.6	9964.9	359035.0	28716
Average apprehensions in crossing municipalities 2000-3000 km	186896.2	88800.7	41594.4	565581.0	22630
Average apprehensions in crossing municipalities 3000-4000 km	202515.9	116336.5	44202.0	565581.0	7054
Average apprehensions in crossing municipalities > 4000 km	204002.6	125336.7	44202.0	565581.0	1722
Minimum apprehensions in crossing municipalities > 1000 km	67900.3	77146.6	5288.0	616346.0	21018
Minimum apprehensions in crossing municipalities 1000-2000 km	22313.8	25561.0	5288.0	141893.0	28716
Minimum apprehensions in crossing municipalities 2000-3000 km	59134.5	92055.1	5288.0	565581.0	22630
Minimum apprehensions in crossing municipalities 3000-4000 km	93220.7	132187.5	5288.0	565581.0	7054
Minimum apprehensions in crossing municipalities > 4000 km	107290.5	132537.8	6951.0	565581.0	1722
Average apprehensions along border municipalities	148002.3	41312.4	74483.2	235178.7	30352
Minimum apprehensions of border municipalities	11170.0	3052.6	5288.0	15486.0	30352
Apprehensions at the closest crossing point	135340.4	99736.0	5536.0	616346.0	30352
Apprehensions at the second closest crossing point	138760.5	99130.0	5536.0	616346.0	30352
Apprehensions at the third closest crossing point	134691.0	107369.9	5288.0	616346.0	30352
Apprehensions at the fourth closest crossing point	122513.6	77592.0	5536.0	616346.0	30352
Apprehensions at the fifth closest crossing point	139465.9	106974.1	5288.0	616346.0	33936
Average apprehensions at the five closest border municipalities	135078.8	78337.2	33507.2	516216.0	30352
Minimum apprehensions of the five closest border municipalities	84687.9	53929.2	5288.0	243793.0	30352
Average deaths in crossing municipalities > 1000 km	48.4	29.8	11.0	219.0	11866
Average deaths in crossing municipalities 1000-2000 km	37.8	18.0	7.7	114.7	16444
Average deaths in crossing municipalities 2000-3000 km	52.7	25.7	7.8	129.4	13238
Average deaths in crossing municipalities 3000-4000 km	37.5	20.5	7.8	102.0	4214
Average deaths in crossing municipalities > 4000 km	28.8	12.1	7.8	59.3	1066
Minimum deaths in crossing municipalities > 1000 km	25.4	30.7	0.0	219.0	11866
Minimum deaths in crossing municipalities 1000-2000 km	6.6	9.2	0.0	40.0	16444

Table 1: (continued)

Variable	Mean	Std.Dev.	Min	Max	# Obs
Minimum deaths in crossing municipalities 2000-3000 km	14.2	12.5	0.0	92.0	13238
Minimum deaths in crossing municipalities 3000-4000 km	16.2	11.6	0.0	44.0	4214
Minimum deaths in crossing municipalities > 4000 km	19.7	10.0	1.0	44.0	1066
Average deaths along border municipalities	52.1	18.8	20.9	79.4	17424
Minimum deaths of border municipalities	2.1	1.7	0.0	4.0	17424
Deaths at the closest crossing point	49.0	39.0	0.0	251.0	17424
Deaths at the second closest crossing point	49.8	39.3	0.0	251.0	17424
Deaths at the third closest crossing point	48.0	41.1	0.0	251.0	17424
Deaths at the fourth closest crossing point	38.9	23.5	0.0	219.0	17424
Deaths at the fifth closest crossing point	55.0	47.1	0.0	251.0	17424
Average deaths at the five closest border municipalities	48.1	31.8	4.0	201.6	17424
Minimum deaths of the five closest border municipalities	30.3	21.6	0.0	92.0	17424
Average agents in crossing municipalities within > 1000 km	1087.2	547.3	282.0	2806.0	17586
Average agents in crossing municipalities within 1000-2000 km	957.5	476.2	219.8	2403.3	24114
Average agents in crossing municipalities within 2000-3000 km	1265.3	557.7	340.8	2823.0	19108
Average agents in crossing municipalities within 3000-4000 km	1390.9	527.1	352.3	2594.0	5989
Average agents in crossing municipalities within > 4000 km	1460.0	455.0	591.0	2594.0	1476
Minimum agents in crossing municipalities within > 1000 km	639.3	522.6	128.0	2806.0	17586
Minimum agents in crossing municipalities within 1000-2000 km	311.2	266.0	128.0	1682.0	24114
Minimum agents in crossing municipalities within 2000-3000 km	520.0	515.6	128.0	2594.0	19108
Minimum agents in crossing municipalities within 3000-4000 km	730.7	708.7	128.0	2594.0	5989
Minimum agents in crossing municipalities within > 4000 km	844.5	702.0	174.0	2594.0	1476
Average agents along border municipalities	1055.3	502.0	361.1	2228.0	25504
Minimum agents of border municipalities	225.0	131.4	128.0	682.0	25504
Agents at the closest crossing point	1159.1	669.7	128.0	3353.0	25504
Agents at the second closest crossing point	1152.5	632.7	128.0	3353.0	25504
Agents at the third closest crossing point	1129.3	683.6	128.0	3353.0	25504
Agents at the fourth closest crossing point	1127.0	608.1	128.0	2806.0	25504
Agents at the fifth closest crossing point	1152.9	651.4	128.0	3353.0	25504

Table 1: (continued)

Variable	Mean	Std.Dev.	Min	Max	# Obs
Average agents at the five closest border municipalities	1144.2	588.0	317.2	3232.8	25504
Minimum agents of the five closest border municipalities	874.7	611.0	128.0	2752.0	25504

Table 2: First-stage regressions

	Dependent variable is fraction of neighbors with new migration to/within:							
	(A)		(B)		(C)		(D)	
	US	Mexico	US	Mexico	US	Mexico	US	Mexico
Instruments:								
Neighbors' average number of males in household	0.0163***	0.0126**	0.0121**	0.0037	0.0163***	0.0126**	0.0119**	0.0036
	(0.0040)	(0.0049)	(0.0055)	(0.0051)	(0.0040)	(0.0049)	(0.0055)	(0.0051)
Fraction of neighbors whose first born is male	-0.0051	-0.0685***	-0.0182	-0.0755***	-0.0051	-0.0685***	-0.0187	-0.0755***
	(0.0160)	(0.0187)	(0.0249)	(0.0214)	(0.0160)	(0.0187)	(0.0248)	(0.0213)
Neighbors' average household head schooling	-0.0017	0.0019	-0.0109**	-0.0004	-0.0010	0.0058	-0.0111**	-0.0006
	(0.0025)	(0.0026)	(0.0049)	(0.0046)	(0.0044)	(0.0045)	(0.0049)	(0.0046)
Neighbors' average household average schooling	-0.0010	0.0058			-0.0017	0.0019		
	(0.0044)	(0.0045)			(0.0025)	(0.0026)		
Neighbors' average household maximum schooling	-0.0037	0.0050	-0.0041	0.0088*	-0.0037	0.0050	-0.0039	0.0089*
	(0.0031)	(0.0035)	(0.0042)	(0.0050)	(0.0031)	(0.0035)	(0.0042)	(0.0050)
Fraction of neighbors with US migration in past 5 years	-0.1027***	0.0053	-0.1073***	0.0314*	-0.1027***	0.0053	-0.1084***	0.0310*
	(0.0121)	(0.0121)	(0.0146)	(0.0180)	(0.0121)	(0.0121)	(0.0146)	(0.0180)
Fraction of neighbors with Mexico migration in past 5 years	-0.0225*	-0.1131***	-0.0354*	-0.2466***	-0.0225*	-0.1131***	-0.0342	-0.2460***
	(0.0131)	(0.0164)	(0.0214)	(0.0209)	(0.0131)	(0.0164)	(0.0213)	(0.0208)
Controls:								
Number of basic schools	0.0001***	-0.0003***	-0.0000	-0.0002***	0.0001***	-0.0003***	-0.0000	-0.0002***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Number of indigenous schools	0.0035***	0.0011	0.0051***	0.0018	0.0035***	0.0011	0.0050***	0.0018
	(0.0007)	(0.0010)	(0.0011)	(0.0014)	(0.0007)	(0.0010)	(0.0011)	(0.0014)
Number of cars	0.0000***	0.0000***	0.0000	-0.0000	0.0000***	0.0000***	0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Number of buses	-0.0000	-0.0000*	-0.0000	-0.0000**	-0.0000	-0.0000*	-0.0000	-0.0000**
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Number of males in household	0.0001	0.0017*	0.0004	0.0012	0.0001	0.0017*	0.0002	0.0011
	(0.0008)	(0.0009)	(0.0011)	(0.0011)	(0.0008)	(0.0009)	(0.0011)	(0.0011)
Household head age (years)	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0001	0.0000
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)

Table 2: (continued)

	(A)		(B)		(C)		(D)	
First born is male (dummy)	-0.0002	-0.0049***	-0.0011	-0.0053**	-0.0002	-0.0049***	-0.0009	-0.0052**
	(0.0018)	(0.0019)	(0.0024)	(0.0022)	(0.0018)	(0.0019)	(0.0024)	(0.0022)
Household head schooling (years)	0.0002	0.0004	0.0004	0.0003	0.0002	0.0004		
	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)		
Household head is the most educated (dummy)							0.0044**	0.0018
							(0.0021)	(0.0020)
Household average schooling (years)	0.0000	0.0005	-0.0012*	0.0002	0.0000	0.0005	-0.0012*	0.0003
	(0.0005)	(0.0006)	(0.0007)	(0.0007)	(0.0005)	(0.0006)	(0.0006)	(0.0006)
Household maximum schooling (yeras)	-0.0007*	-0.0000	-0.0003	0.0001	-0.0007*	-0.0000	-0.0001	0.0001
	(0.0004)	(0.0004)	(0.0005)	(0.0005)	(0.0004)	(0.0004)	(0.0005)	(0.0006)
Household size (members)	0.0003	-0.0006	-0.0001	-0.0002	0.0003	-0.0006	0.0001	-0.0001
	(0.0005)	(0.0005)	(0.0006)	(0.0006)	(0.0005)	(0.0005)	(0.0006)	(0.0006)
US migration in past 5 years (dummy)	-0.0080*	0.0056*	-0.0034	0.0057	-0.0080*	0.0056*	-0.0036	0.0056
	(0.0043)	(0.0031)	(0.0070)	(0.0039)	(0.0043)	(0.0031)	(0.0070)	(0.0040)
Mexico migration in past 5 years (dummy)	0.0003	-0.0172***	0.0042	-0.0291***	0.0003	-0.0172***	0.0043	-0.0291***
	(0.0030)	(0.0038)	(0.0040)	(0.0042)	(0.0030)	(0.0038)	(0.0040)	(0.0042)
Plots' slope interacted with rain			-0.0000	-0.0000			-0.0000	-0.0000
			(0.0000)	(0.0000)			(0.0000)	(0.0000)
Plots' quality interacted with rain			-0.0000	0.0000			-0.0000	0.0000
			(0.0000)	(0.0000)			(0.0000)	(0.0000)
Employment in tertiary sector (% working population)	-0.0017***	0.0004	-0.0015***	0.0015***	-0.0017***	0.0004	-0.0015***	0.0015***
	(0.0004)	(0.0004)	(0.0005)	(0.0005)	(0.0004)	(0.0004)	(0.0005)	(0.0005)
Avg. hourly wage (pesos)	0.0054***	-0.0035**	0.0146***	0.0005	0.0054***	-0.0035**	0.0147***	0.0005
	(0.0011)	(0.0014)	(0.0021)	(0.0029)	(0.0011)	(0.0014)	(0.0021)	(0.0029)
Avg. crime in circle 1 (murders per 10,000 inhabitants)	-0.0003***	0.0008***	-0.0006***	-0.0002	-0.0003***	0.0008***	-0.0006***	-0.0002
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Avg. crime in circle 2 (murders per 10,000 inhabitants)	-0.0002***	0.0000	-0.0001	0.0002	-0.0002***	0.0000	-0.0001	0.0002
	(0.0000)	(0.0001)	(0.0002)	(0.0002)	(0.0000)	(0.0001)	(0.0002)	(0.0002)
Avg. number of apprehensions in circle 1	-0.0000**	-0.0000	-0.0000	-0.0000	-0.0000**	-0.0000	-0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Avg. number of apprehensions in circle 2	0.0000	-0.0000	0.0000**	-0.0000	0.0000	-0.0000	0.0000**	-0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)

Table 2: (continued)

	(A)		(B)		(C)		(D)	
Avg. number of deaths in circle 1	0.0000	-0.0003***	0.0000	-0.0004***	0.0000	-0.0003***	0.0000	-0.0004***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Avg. number of deaths in circle 2	-0.0002*	-0.0008***	0.0000	-0.0005***	-0.0002*	-0.0008***	0.0000	-0.0005***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Avg. number of agents in circle 1	-0.0000**	0.0000**	-0.0000	0.0001***	-0.0000**	0.0000**	-0.0000	0.0001***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Avg. number of agents in circle 2	-0.0001***	0.0001***	-0.0001***	0.0000	-0.0001***	0.0001***	-0.0001***	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Village fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Year effects	Y	Y	Y	Y	Y	Y	Y	Y
First-stage F-statistic	16.1894	17.7977	15.3834	31.0958	16.1894	17.7977	15.5376	31.0997
Underidentification, Kleibergen p-value	0.0000		0.0000		0.0000		0.0000	
Weak instrument-robust inference, Anderson F p-value	0.0134		0.0306		0.0148		0.0305	
Weak instrument-robust inference, Anderson Chi p-value	0.0126		0.0284		0.0139		0.0283	
Overidentification, J p-value	0.8682		0.8507		0.9785		0.8650	
p-value (Pr>F)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
adjusted R-squared	0.0751	0.1402	0.0867	0.1470	0.0751	0.1402	0.0876	0.1470
# observations	5103		3174		5103		3174	

Notes: Standard errors in parentheses. Significance codes: * p<0.05, ** p<0.01, *** p<0.001.

Table 3: IV results for migration to the US

	Dependent variable is probability of new migration to the U.S.								
	(1a)	(1b)	(2a)	(2b)	(3)	(4a)	(4b)	(5a)	(5b)
Fraction of neighbors with new migration to US	1.3180***	1.3216***	1.0715***	1.0245***	1.4450**	1.5238**	1.2990**	1.3031***	1.2433***
	(0.4183)	(0.4366)	(0.3265)	(0.3335)	(0.5867)	(0.7210)	(0.5110)	(0.4133)	(0.4013)
Fraction of neighbors with new migration within Mexico	-0.2432	-0.3986	0.0620	0.0097	0.0230	0.8645	0.3117	-0.0410	-0.2300
	(0.6934)	(0.4977)	(0.2711)	(0.2453)	(0.4754)	(1.3700)	(0.7132)	(0.4988)	(0.3468)
Number of basic schools	-0.0001	-0.0002	0.0000	-0.0000	0.0000	0.0001	-0.0002	-0.0001	-0.0001
	(0.0002)	(0.0001)	(0.0001)	(0.0001)	(0.0004)	(0.0006)	(0.0004)	(0.0001)	(0.0001)
Number of indigenous schools	-0.0051	-0.0056	-0.0022	-0.0021	0.0058	-0.0152	-0.0160*	-0.0054	-0.0056
	(0.0038)	(0.0036)	(0.0023)	(0.0023)	(0.0153)	(0.0103)	(0.0094)	(0.0037)	(0.0035)
Number of cars	0.0000	0.0000	0.0000	0.0000	-0.0000	-0.0000	-0.0000	-0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Number of buses	0.0000	0.0000	-0.0000	0.0000	-0.0000	0.0000	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0001)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Number of males in household	0.0087*	0.0088*	0.0059	0.0058	0.0014	0.0115*	0.0118*	0.0088*	0.0088*
	(0.0050)	(0.0050)	(0.0039)	(0.0039)	(0.0133)	(0.0068)	(0.0066)	(0.0050)	(0.0049)
Household head age (years)	-0.0001	-0.0001	-0.0000	-0.0000	0.0009	0.0005	0.0005	-0.0001	-0.0001
	(0.0003)	(0.0003)	(0.0002)	(0.0002)	(0.0008)	(0.0006)	(0.0006)	(0.0003)	(0.0003)
First born is male (dummy)	0.0045	0.0042	0.0047	0.0045	0.0462**	0.0072	0.0072	0.0046	0.0044
	(0.0082)	(0.0083)	(0.0063)	(0.0063)	(0.0216)	(0.0116)	(0.0113)	(0.0083)	(0.0083)
Household head schooling (years)	-0.0017	-0.0016	-0.0015	-0.0015	0.0010	-0.0030	-0.0028		
	(0.0013)	(0.0013)	(0.0009)	(0.0009)	(0.0025)	(0.0019)	(0.0019)		
Household head is the most educated (dummy)								-0.0082	-0.0073
								(0.0084)	(0.0083)
Household average schooling (years)	0.0030	0.0030	0.0022	0.0022	-0.0015	0.0100**	0.0097**	0.0016	0.0015
	(0.0030)	(0.0030)	(0.0021)	(0.0021)	(0.0066)	(0.0040)	(0.0039)	(0.0024)	(0.0024)
Household maximum schooling (yeras)	-0.0008	-0.0009	0.0006	0.0005	0.0032	-0.0037	-0.0037	-0.0008	-0.0008
	(0.0018)	(0.0018)	(0.0014)	(0.0014)	(0.0043)	(0.0028)	(0.0027)	(0.0018)	(0.0018)
Household size (members)	-0.0004	-0.0004	0.0018	0.0018	-0.0033	-0.0036	-0.0034	-0.0007	-0.0006
	(0.0027)	(0.0027)	(0.0021)	(0.0021)	(0.0066)	(0.0040)	(0.0039)	(0.0027)	(0.0027)
US migration in past 5 years (dummy)	0.1445***	0.1449***	0.0835***	0.0829***	0.1164*	0.1179***	0.1193***	0.1444***	0.1449***
	(0.0343)	(0.0344)	(0.0205)	(0.0205)	(0.0705)	(0.0448)	(0.0440)	(0.0342)	(0.0341)

Table 3: (continued)

	(1a)	(1b)	(2a)	(2b)	(3)	(4a)	(4b)	(5a)	(5b)
Mexico migration in past 5 years (dummy)	0.0109	0.0078	0.0136	0.0118	0.0850*	0.0350	0.0291	0.0150	0.0116
	(0.0210)	(0.0202)	(0.0127)	(0.0128)	(0.0488)	(0.0283)	(0.0264)	(0.0189)	(0.0187)
Plots' slope interacted with rain	-0.0000	-0.0000			-0.0001*	0.0000	0.0000	-0.0000	-0.0000
	(0.0000)	(0.0000)			(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Plots' quality interacted with rain	0.0000	0.0000			0.0000	-0.0000	-0.0000	0.0000	0.0000
	(0.0000)	(0.0000)			(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Employment in tertiary sector (% working population)	0.0006	0.0004	-0.0002	-0.0004	0.0002	-0.0008	-0.0012	0.0003	0.0001
	(0.0021)	(0.0021)	(0.0016)	(0.0015)	(0.0201)	(0.0031)	(0.0030)	(0.0020)	(0.0021)
Avg. hourly wage (pesos)	-0.0128	-0.0034	-0.0005	-0.0001	-0.1299	-0.0120	-0.0049	-0.0124	-0.0030
	(0.0087)	(0.0030)	(0.0040)	(0.0019)	(0.1305)	(0.0142)	(0.0041)	(0.0087)	(0.0029)
Avg. crime in circle 1 (murders per 10,000 inhabitants)	0.0003	0.0002	0.0002	0.0001	0.0003	0.0000	0.0001	0.0003	0.0002
	(0.0005)	(0.0005)	(0.0003)	(0.0003)	(0.0013)	(0.0007)	(0.0007)	(0.0005)	(0.0005)
Avg. crime in circle 2 (murders per 10,000 inhabitants)	-0.0003	-0.0003	0.0001	-0.0001	-0.0011	-0.0008	-0.0002	-0.0003	-0.0004
	(0.0009)	(0.0007)	(0.0001)	(0.0001)	(0.0052)	(0.0013)	(0.0009)	(0.0009)	(0.0007)
Avg. number of apprehensions in circle 1	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	0.0000	-0.0000	-0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Avg. number of apprehensions in circle 2	-0.0000	-0.0000	0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Avg. number of deaths in circle 1	-0.0001	0.0002	0.0001	0.0001	-0.0003	0.0006	0.0004	0.0001	0.0002
	(0.0005)	(0.0003)	(0.0002)	(0.0002)	(0.0054)	(0.0011)	(0.0004)	(0.0004)	(0.0003)
Avg. number of deaths in circle 2	-0.0007	-0.0003	-0.0002	-0.0001	0.0024	0.0000	-0.0003	-0.0006	-0.0003
	(0.0008)	(0.0005)	(0.0004)	(0.0004)	(0.0061)	(0.0015)	(0.0007)	(0.0007)	(0.0005)
Avg. number of agents in circle 1	0.0000	-0.0000	0.0000	-0.0000	0.0003	-0.0000	-0.0000	0.0000	-0.0000
	(0.0001)	(0.0000)	(0.0000)	(0.0000)	(0.0006)	(0.0001)	(0.0001)	(0.0001)	(0.0000)
Avg. number of agents in circle 2	0.0001	0.0001	0.0000	-0.0000	0.0003	0.0001	0.0000	0.0001	0.0000
	(0.0001)	(0.0001)	(0.0001)	(0.0000)	(0.0003)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Year		-0.0012		0.0001			0.0038		-0.0008
		(0.0055)		(0.0037)			(0.0080)		(0.0054)
Village fixed effects	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year effects	Y	N	Y	N	Y	Y	N	Y	N

Table 3: (continued)

	(1a)	(1b)	(2a)	(2b)	(3)	(4a)	(4b)	(5a)	(5b)
p-value (Pr>F)	0.0505	0.0139	0.0001	0.0000	0.8190	0.5392	0.1810	0.0566	0.0185
adjusted R-squared	-0.1840	-0.1911	-0.1280	-0.1162	-0.3272	-0.2680	-0.1646	-0.1766	-0.1639
# observations	3174	3174	5103	5103	693	1707	1707	3174	3174

Notes: Standard errors in parentheses. Significance codes: * p<0.05, ** p<0.01, *** p<0.001.

Table 4: IV results for migration within Mexico

	Dependent variable is probability of new migration within Mexico								
	(1a)	(1b)	(2a)	(2b)	(3)	(4a)	(4b)	(5a)	(5b)
Fraction of neighbors with new migration to US	0.1761	0.2652	0.1454	0.2394	0.4063	-0.0224	-0.0777	0.1422	0.2285
	(0.3825)	(0.4038)	(0.2887)	(0.3353)	(0.5536)	(0.7594)	(0.8892)	(0.3843)	(0.4052)
Fraction of neighbors with new migration within Mexico	0.9541***	0.9701***	1.1757***	1.1209***	1.0096*	0.9370**	1.0490***	0.9734***	0.9881***
	(0.3089)	(0.2682)	(0.3474)	(0.3003)	(0.5372)	(0.3744)	(0.3021)	(0.3098)	(0.2686)
Number of basic schools	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0005)	(0.0003)	(0.0003)	(0.0001)	(0.0001)
Number of indigenous schools	-0.0009	-0.0009	-0.0012	-0.0012	0.0071	-0.0135	-0.0112	-0.0008	-0.0008
	(0.0051)	(0.0050)	(0.0034)	(0.0033)	(0.0356)	(0.0133)	(0.0138)	(0.0051)	(0.0050)
Number of cars	-0.0000	0.0000	-0.0000	-0.0000	0.0000	0.0000	0.0000	-0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Number of buses	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0001)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Number of males in household	0.0019	0.0020	-0.0011	-0.0010	0.0192	0.0096	0.0096	0.0023	0.0023
	(0.0052)	(0.0052)	(0.0039)	(0.0039)	(0.0147)	(0.0067)	(0.0068)	(0.0052)	(0.0052)
Household head age (years)	-0.0006*	-0.0006*	-0.0003	-0.0003	0.0006	-0.0009*	-0.0009*	-0.0005	-0.0005
	(0.0003)	(0.0003)	(0.0002)	(0.0002)	(0.0007)	(0.0005)	(0.0005)	(0.0003)	(0.0003)
First born is male (dummy)	-0.0051	-0.0050	-0.0003	-0.0004	-0.0223	-0.0139	-0.0139	-0.0053	-0.0052
	(0.0084)	(0.0084)	(0.0064)	(0.0064)	(0.0193)	(0.0114)	(0.0116)	(0.0084)	(0.0084)
Household head schooling (years)	-0.0029**	-0.0029**	-0.0009	-0.0009	-0.0005	-0.0038*	-0.0038*		
	(0.0014)	(0.0014)	(0.0012)	(0.0012)	(0.0033)	(0.0021)	(0.0021)		
Household head is the most educated (dummy)								-0.0133*	-0.0135*
								(0.0076)	(0.0076)
Household average schooling (years)	0.0004	0.0004	-0.0026	-0.0027	0.0035	-0.0013	-0.0014	-0.0022	-0.0021
	(0.0031)	(0.0031)	(0.0023)	(0.0023)	(0.0077)	(0.0043)	(0.0043)	(0.0026)	(0.0026)
Household maximum schooling (yeras)	0.0032	0.0032	0.0038**	0.0038**	0.0016	0.0047*	0.0047*	0.0032	0.0032
	(0.0021)	(0.0021)	(0.0016)	(0.0016)	(0.0050)	(0.0028)	(0.0028)	(0.0021)	(0.0021)
Household size (members)	0.0016	0.0016	0.0040*	0.0040	-0.0058	-0.0042	-0.0044	0.0012	0.0012
	(0.0032)	(0.0032)	(0.0024)	(0.0024)	(0.0078)	(0.0042)	(0.0043)	(0.0032)	(0.0032)
US migration in past 5 years (dummy)	-0.0274**	-0.0273*	-0.0225**	-0.0216*	0.0085	-0.0232	-0.0234	-0.0263*	-0.0262*
	(0.0139)	(0.0140)	(0.0113)	(0.0113)	(0.0329)	(0.0192)	(0.0192)	(0.0140)	(0.0140)

Table 4: (continued)

	(1a)	(1b)	(2a)	(2b)	(3)	(4a)	(4b)	(5a)	(5b)
Mexico migration in past 5 years (dummy)	0.0511**	0.0511**	0.0336**	0.0333**	0.1202**	0.0838***	0.0836**	0.0518**	0.0518**
	(0.0222)	(0.0224)	(0.0167)	(0.0168)	(0.0599)	(0.0324)	(0.0329)	(0.0222)	(0.0223)
Plots' slope interacted with rain	0.0000	0.0000			-0.0000	0.0001**	0.0001**	0.0000	0.0000
	(0.0000)	(0.0000)			(0.0001)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Plots' quality interacted with rain	-0.0000	-0.0000			0.0000	-0.0000	-0.0000*	-0.0000	-0.0000
	(0.0000)	(0.0000)			(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Employment in tertiary sector (% working population)	0.0012	0.0014	0.0006	0.0009	-0.0058	0.0015	0.0008	0.0010	0.0013
	(0.0018)	(0.0017)	(0.0015)	(0.0014)	(0.0221)	(0.0038)	(0.0040)	(0.0018)	(0.0017)
Avg. hourly wage (pesos)	0.0020	0.0005	0.0036	0.0014	0.0198	-0.0030	0.0003	0.0025	0.0005
	(0.0106)	(0.0030)	(0.0051)	(0.0020)	(0.2031)	(0.0151)	(0.0044)	(0.0106)	(0.0030)
Avg. crime in circle 1 (murders per 10,000 inhabitants)	0.0003	0.0002	0.0000	0.0001	-0.0005	-0.0002	-0.0002	0.0003	0.0002
	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0027)	(0.0007)	(0.0007)	(0.0004)	(0.0004)
Avg. crime in circle 2 (murders per 10,000 inhabitants)	0.0006	0.0001	0.0001	0.0001	0.0016	0.0004	0.0001	0.0006	0.0001
	(0.0008)	(0.0006)	(0.0002)	(0.0001)	(0.0121)	(0.0011)	(0.0008)	(0.0008)	(0.0006)
Avg. number of apprehensions in circle 1	0.0000	0.0000	0.0000	0.0000	-0.0000	-0.0000	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Avg. number of apprehensions in circle 2	-0.0000	-0.0000	0.0000	-0.0000	0.0000	-0.0000	0.0000	0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Avg. number of deaths in circle 1	-0.0000	-0.0000	0.0002	0.0001	0.0028	-0.0002	-0.0000	0.0000	-0.0000
	(0.0003)	(0.0002)	(0.0003)	(0.0002)	(0.0072)	(0.0004)	(0.0003)	(0.0003)	(0.0002)
Avg. number of deaths in circle 2	0.0001	0.0002	0.0001	0.0001	0.0020	-0.0007	-0.0003	0.0001	0.0002
	(0.0006)	(0.0005)	(0.0005)	(0.0004)	(0.0096)	(0.0009)	(0.0008)	(0.0006)	(0.0005)
Avg. number of agents in circle 1	-0.0000	0.0000	-0.0000	-0.0000	-0.0002	0.0000	0.0000	-0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0008)	(0.0001)	(0.0000)	(0.0000)	(0.0000)
Avg. number of agents in circle 2	-0.0000	0.0000	-0.0000	-0.0000	-0.0002	0.0000	0.0000	-0.0000	0.0000
	(0.0001)	(0.0000)	(0.0001)	(0.0000)	(0.0007)	(0.0001)	(0.0001)	(0.0001)	(0.0000)
Year		-0.0031		-0.0010			0.0009		-0.0029
		(0.0065)		(0.0042)			(0.0108)		(0.0065)
Village fixed effects	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year effects	Y	N	Y	N	Y	Y	N	Y	N

Table 4: (continued)

	(1a)	(1b)	(2a)	(2b)	(3)	(4a)	(4b)	(5a)	(5b)
p-value (Pr>F)	0.0185	0.0199	0.0002	0.0004	0.9333	0.1116	0.0821	0.0214	0.0245
adjusted R-squared	-0.1014	-0.1049	-0.1363	-0.1253	-0.2514	-0.0766	-0.0912	-0.1047	-0.1074
# observations	3174	3174	5103	5103	693	1707	1707	3174	3174

Notes: Standard errors in parentheses. Significance codes: * p<0.05, ** p<0.01, *** p<0.001.

Table 5: Robustness of IV results of migration to the US

	Dependent variable is probability of new migration to the U.S.					
	(6)	(7)	(8)	(9)	(10)	(11)
Fraction of neighbors with new migration to US	1.3033***	1.3691***	1.3568***	1.3180***	1.3756***	1.4505***
	(0.4202)	(0.4641)	(0.3731)	(0.4183)	(0.5086)	(0.4824)
Fraction of neighbors with new migration within Mexico	-0.2330	0.2052	-0.1495	-0.2432	0.1148	-0.1396
	(0.7047)	(0.6891)	(0.6485)	(0.6934)	(0.6672)	(0.6432)
Number of basic schools	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	
Number of indigenous schools	-0.0053	-0.0058	-0.0060	-0.0051	-0.0076	
	(0.0037)	(0.0048)	(0.0039)	(0.0038)	(0.0046)	
Number of basic schools(normalized)						-0.0004
						(0.0005)
Number of indigenous schools(normalized)						0.0003
						(0.0038)
Number of cars	0.0000	-0.0000	-0.0000	0.0000	-0.0000	
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	
Number of buses	0.0000	0.0000	0.0000	0.0000	0.0000	
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	
Number of cars(normalized)						-0.0000
						(0.0000)
Number of buses(normalized)						0.0000
						(0.0001)
Number of males in household	0.0087*	0.0121***	0.0085*	0.0087*	0.0121***	0.0084*
	(0.0050)	(0.0044)	(0.0050)	(0.0050)	(0.0044)	(0.0050)
Household head age (years)	-0.0001	-0.0000	-0.0001	-0.0001	-0.0000	-0.0001
	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)
First born is male (dummy)	0.0045	0.0048	0.0044	0.0045	0.0051	0.0049
	(0.0082)	(0.0070)	(0.0083)	(0.0082)	(0.0070)	(0.0083)
Household head schooling (years)	-0.0017	-0.0011	-0.0017	-0.0017	-0.0010	-0.0018
	(0.0013)	(0.0012)	(0.0013)	(0.0013)	(0.0012)	(0.0013)

Table 5: (continued)

	(6)	(7)	(8)	(9)	(10)	(11)
Household average schooling (years)	0.0030	0.0035	0.0030	0.0030	0.0035	0.0033
	(0.0030)	(0.0027)	(0.0030)	(0.0030)	(0.0027)	(0.0030)
Household maximum schooling (yeras)	-0.0008	-0.0026	-0.0008	-0.0008	-0.0027	-0.0009
	(0.0018)	(0.0017)	(0.0018)	(0.0018)	(0.0017)	(0.0018)
Household size (members)	-0.0004	0.0003	-0.0003	-0.0004	0.0003	-0.0003
	(0.0027)	(0.0024)	(0.0027)	(0.0027)	(0.0024)	(0.0028)
US migration in past 5 years (dummy)	0.1444***	0.1367***	0.1436***	0.1445***	0.1370***	0.1428***
	(0.0342)	(0.0285)	(0.0344)	(0.0343)	(0.0285)	(0.0347)
Mexico migration in past 5 years (dummy)	0.0108	0.0089	0.0127	0.0109	0.0075	0.0121
	(0.0210)	(0.0155)	(0.0207)	(0.0210)	(0.0154)	(0.0202)
Plots' slope interacted with rain	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Plots' quality interacted with rain	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Employment in primary sector (% working population)	0.0003					
	(0.0022)					
Hourly wage in primary sector (pesos)	-0.0003					
	(0.0046)					
Hourly wage in secondary sector (pesos)	-0.0076					
	(0.0081)					
Hourly wage in tertiary sector (pesos)	0.0027					
	(0.0066)					
Avg. crime in circle 1 (murders per 10,000 inhabitants)	0.0003		0.0003	0.0003		0.0003
	(0.0005)		(0.0004)	(0.0005)		(0.0005)
Avg. crime in circle 2 (murders per 10,000 inhabitants)	-0.0003			-0.0003		-0.0003
	(0.0009)			(0.0009)		(0.0009)
Avg. number of apprehensions in circle 1	-0.0000		-0.0000	-0.0000		
	(0.0000)		(0.0000)	(0.0000)		
Avg. number of apprehensions in circle 2	-0.0000			-0.0000		

Table 5: (continued)

	(6)	(7)	(8)	(9)	(10)	(11)
	(0.0000)			(0.0000)		
Avg. number of deaths in circle 1	-0.0000		0.0002	-0.0001		
	(0.0005)		(0.0004)	(0.0005)		
Avg. number of deaths in circle 2	-0.0008			-0.0007		
	(0.0008)			(0.0008)		
Avg. number of agents in circle 1	0.0000		-0.0000	0.0000		
	(0.0001)		(0.0001)	(0.0001)		
Avg. number of agents in circle 2	0.0001*			0.0001		
	(0.0001)			(0.0001)		
Employment in tertiary sector (% working population)		0.0007	0.0011	0.0006	0.0008	0.0014
		(0.0020)	(0.0022)	(0.0021)	(0.0019)	(0.0025)
Avg. hourly wage (pesos)		-0.0016	-0.0026	-0.0037	-0.0004	-0.0159
		(0.0042)	(0.0048)	(0.0061)	(0.0047)	(0.0110)
Avg. crime in closest border (murders per 10,000 inhabitants)		-0.0000				
		(0.0008)				
Avg. crime in second closest border (murders per 10,000 inhabitants)		0.0001				
		(0.0001)				
Avg. crime in third closest border (murders per 10,000 inhabitants)		-0.0000				
		(0.0002)				
Avg. number of apprehensions in closest border		-0.0000				
		(0.0000)				
Avg.number of apprehensions in second closest border		-0.0000				
		(0.0000)				
Avg. number of apprehensions in third closest border		0.0000				
		(0.0000)				
Avg. number of deaths in closest border		0.0002				
		(0.0003)				
Avg. number of deaths in second closest border		0.0004				
		(0.0004)				

Table 5: (continued)

	(6)	(7)	(8)	(9)	(10)	(11)
Avg. number of deaths in third closest border		-0.0004				
		(0.0004)				
Avg. number of agents in closest border		0.0000				
		(0.0001)				
Avg. number of agents in second closest border		-0.0000				
		(0.0001)				
Avg. number of agents in third closest border		-0.0000				
		(0.0000)				
Avg. crime along the border (murders per 10,000 inhabitants)				-0.0002		
				(0.0018)		
Avg. apprehensions along the border				-0.0000		
				(0.0000)		
Avg. deaths along the border				0.0011		
				(0.0010)		
Avg. agents along the border				-0.0002		
				(0.0001)		
Avg. number of apprehensions in circle 1 (normalized)						-0.0000
						(0.0000)
Avg. number of apprehensions in circle 2 (normalized)						-0.0000
						(0.0000)
Avg. number of deaths in circle 1 (normalized)						-0.0040
						(0.0265)
Avg. number of deaths in circle 2 (normalized)						-0.0284
						(0.0400)
Avg. number of agents in circle 1 (normalized)						0.0027
						(0.0029)
Avg. number of agents in circle 2 (normalized)						0.0071
						(0.0056)

Table 5: (continued)

	(6)	(7)	(8)	(9)	(10)	(11)
Village fixed effects	Y	Y	Y	Y	Y	Y
Year effects	Y	Y	Y	Y	Y	Y
p-value (Pr>F)	0.0481	0.0036	0.0523	0.0505	0.0021	0.045203
adjusted R-squared	-0.1800	-0.1848	-0.1916	-0.1840	-0.1828	-0.21732
# observations	3174	4270	3174	3174	4270	3174

Notes: Standard errors in parentheses. Significance codes: * p<0.05, ** p<0.01, *** p<0.001.

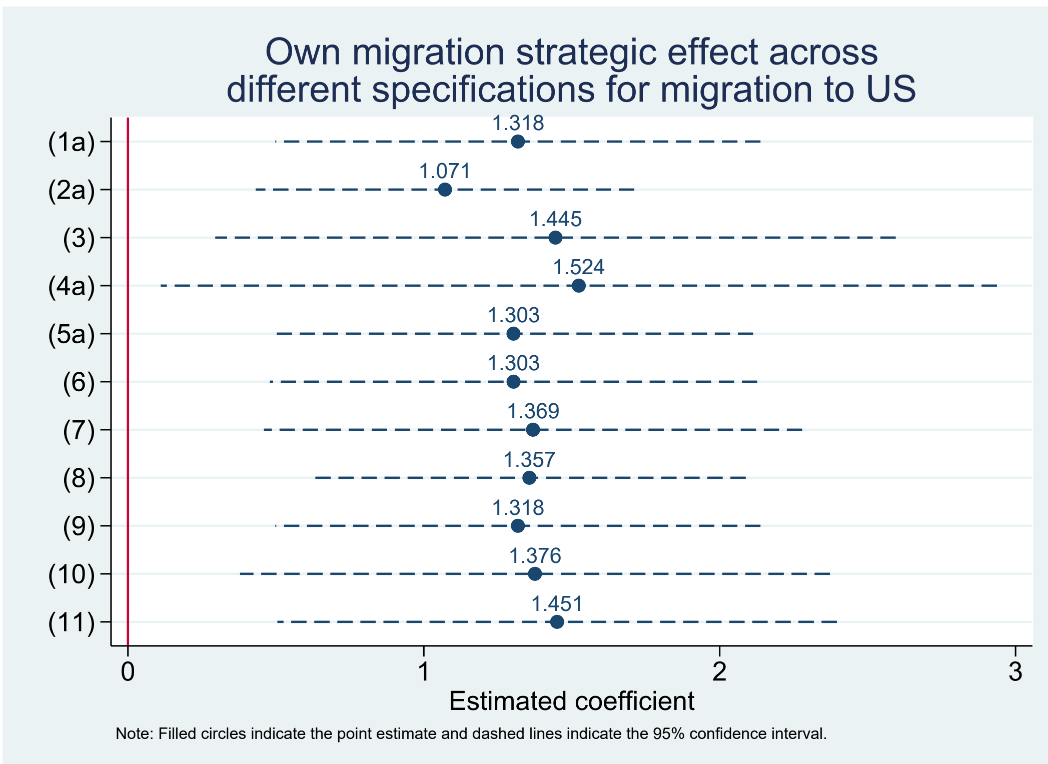

Figure 2: Summary of strategic interaction results for migration to US from specifications 1a-5a (Table 3) and from 6-11 (Table 5).

Table 6: Robustness of IV results of migration within Mexico

	Dependent variable is probability of new migration within Mexico					
	(6)	(7)	(8)	(9)	(10)	(11)
Fraction of neighbors with new migration to US	0.1816	0.1471	0.0995	0.1761	0.0961	0.2344
	(0.3735)	(0.4537)	(0.3526)	(0.3825)	(0.5344)	(0.4557)
Fraction of neighbors with new migration within Mexico	0.9476***	1.1372***	0.9455***	0.9541***	1.1231***	0.9481***
	(0.3090)	(0.2437)	(0.3033)	(0.3089)	(0.2497)	(0.3449)
Number of basic schools	0.0000	0.0001	0.0000	0.0000	0.0001	
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	
Number of indigenous schools	-0.0013	-0.0024	-0.0007	-0.0009	-0.0014	
	(0.0051)	(0.0070)	(0.0054)	(0.0051)	(0.0061)	
Number of basic schools(normalized)						-0.0001
						(0.0004)
Number of indigenous schools(normalized)						0.0032
						(0.0053)
Number of cars	-0.0000	-0.0000	0.0000	-0.0000	-0.0000	
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	
Number of buses	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	
Number of cars(normalized)						-0.0000
						(0.0000)
Number of buses(normalized)						-0.0001
						(0.0001)
Number of males in household	0.0020	0.0005	0.0019	0.0019	0.0004	0.0019
	(0.0052)	(0.0045)	(0.0052)	(0.0052)	(0.0044)	(0.0051)
Household head age (years)	-0.0006*	-0.0005	-0.0006*	-0.0006*	-0.0005*	-0.0006**
	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)
First born is male (dummy)	-0.0051	-0.0063	-0.0050	-0.0051	-0.0064	-0.0053
	(0.0084)	(0.0076)	(0.0084)	(0.0084)	(0.0075)	(0.0083)
Household head schooling (years)	-0.0029**	-0.0023*	-0.0029**	-0.0029**	-0.0022*	-0.0030**
	(0.0014)	(0.0013)	(0.0014)	(0.0014)	(0.0013)	(0.0015)

Table 6: (continued)

	(6)	(7)	(8)	(9)	(10)	(11)
Household average schooling (years)	0.0004	-0.0012	0.0003	0.0004	-0.0012	0.0004
	(0.0031)	(0.0028)	(0.0031)	(0.0031)	(0.0029)	(0.0031)
Household maximum schooling (yeras)	0.0032	0.0046**	0.0032	0.0032	0.0045**	0.0032
	(0.0021)	(0.0019)	(0.0021)	(0.0021)	(0.0019)	(0.0021)
Household size (members)	0.0016	0.0020	0.0016	0.0016	0.0020	0.0017
	(0.0032)	(0.0026)	(0.0032)	(0.0032)	(0.0026)	(0.0032)
US migration in past 5 years (dummy)	-0.0274**	-0.0104	-0.0274**	-0.0274**	-0.0104	-0.0279**
	(0.0139)	(0.0127)	(0.0139)	(0.0139)	(0.0127)	(0.0140)
Mexico migration in past 5 years (dummy)	0.0506**	0.0398**	0.0513**	0.0511**	0.0398**	0.0505**
	(0.0223)	(0.0179)	(0.0222)	(0.0222)	(0.0179)	(0.0223)
Plots' slope interacted with rain	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Plots' quality interacted with rain	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Employment in primary sector (% working population)	-0.0000					
	(0.0021)					
Hourly wage in primary sector (pesos)	0.0006					
	(0.0052)					
Hourly wage in secondary sector (pesos)	0.0037					
	(0.0076)					
Hourly wage in tertiary sector (pesos)	-0.0016					
	(0.0081)					
Avg. crime in circle 1 (murders per 10,000 inhabitants)	0.0003		0.0001	0.0003		0.0004
	(0.0004)		(0.0004)	(0.0004)		(0.0004)
Avg. crime in circle 2 (murders per 10,000 inhabitants)	0.0006			0.0006		0.0005
	(0.0008)			(0.0008)		(0.0008)
Avg. number of apprehensions in circle 1	0.0000		0.0000	0.0000		
	(0.0000)		(0.0000)	(0.0000)		
Avg. number of apprehensions in circle 2	0.0000			-0.0000		

Table 6: (continued)

	(6)	(7)	(8)	(9)	(10)	(11)
	(0.0000)			(0.0000)		
Avg. number of deaths in circle 1	0.0000		-0.0000	-0.0000		
	(0.0003)		(0.0003)	(0.0003)		
Avg. number of deaths in circle 2	0.0001			0.0001		
	(0.0006)			(0.0006)		
Avg. number of agents in circle 1	-0.0000		0.0000	-0.0000		
	(0.0000)		(0.0000)	(0.0000)		
Avg. number of agents in circle 2	-0.0000			-0.0000		
	(0.0001)			(0.0001)		
Employment in tertiary sector (% working population)		0.0005	0.0010	0.0012	0.0006	0.0012
		(0.0017)	(0.0018)	(0.0018)	(0.0018)	(0.0022)
Avg. hourly wage (pesos)		0.0015	0.0006	-0.0030	0.0011	-0.0017
		(0.0045)	(0.0043)	(0.0049)	(0.0050)	(0.0113)
Avg. crime in closest border (murders per 10,000 inhabitants)		0.0002				
		(0.0006)				
Avg. crime in second closest border (murders per 10,000 inhabitants)		0.0000				
		(0.0001)				
Avg. crime in third closest border (murders per 10,000 inhabitants)		-0.0001				
		(0.0002)				
Avg. number of apprehensions in closest border		-0.0000				
		(0.0000)				
Avg.number of apprehensions in second closest border		0.0000				
		(0.0000)				
Avg. number of apprehensions in third closest border		-0.0000				
		(0.0000)				
Avg. number of deaths in closest border		0.0001				
		(0.0002)				
Avg. number of deaths in second closest border		-0.0001				
		(0.0004)				

Table 6: (continued)

	(6)	(7)	(8)	(9)	(10)	(11)
Avg. number of deaths in third closest border		0.0001				
		(0.0004)				
Avg. number of agents in closest border		0.0000				
		(0.0000)				
Avg. number of agents in second closest border		-0.0000				
		(0.0001)				
Avg. number of agents in third closest border		-0.0000				
		(0.0000)				
Avg. crime along the border (murders per 10,000 inhabitants)				-0.0019		
				(0.0015)		
Avg. apprehensions along the border				-0.0000		
				(0.0000)		
Avg. deaths along the border				0.0001		
				(0.0011)		
Avg. agents along the border				0.0000		
				(0.0001)		
Avg. number of apprehensions in circle 1(normalized)						0.0000
						(0.0000)
Avg. number of apprehensions in circle 2(normalized)						-0.0000
						(0.0000)
Avg. number of deaths in circle 1(normalized)						-0.0004
						(0.0173)
Avg. number of deaths in circle 2(normalized)						0.0086
						(0.0334)
Avg. number of agents in circle 1(normalized)						0.0005
						(0.0027)
Avg. number of agents in circle 2(normalized)						0.0007
						(0.0054)

Table 6: (continued)

	(6)	(7)	(8)	(9)	(10)	(11)
Village fixed effects	Y	Y	Y	Y	Y	Y
Year effects	Y	Y	Y	Y	Y	Y
p-value (Pr>F)	0.0181	0.0010	0.0129	0.0185	0.0007	0.018474
adjusted R-squared	-0.1005	-0.1393	-0.0975	-0.1014	-0.1346	-0.10092
# observations	3174	4270	3174	3174	4270	3174

Notes: Standard errors in parentheses. Significance codes: * p<0.05, ** p<0.01, *** p<0.001.

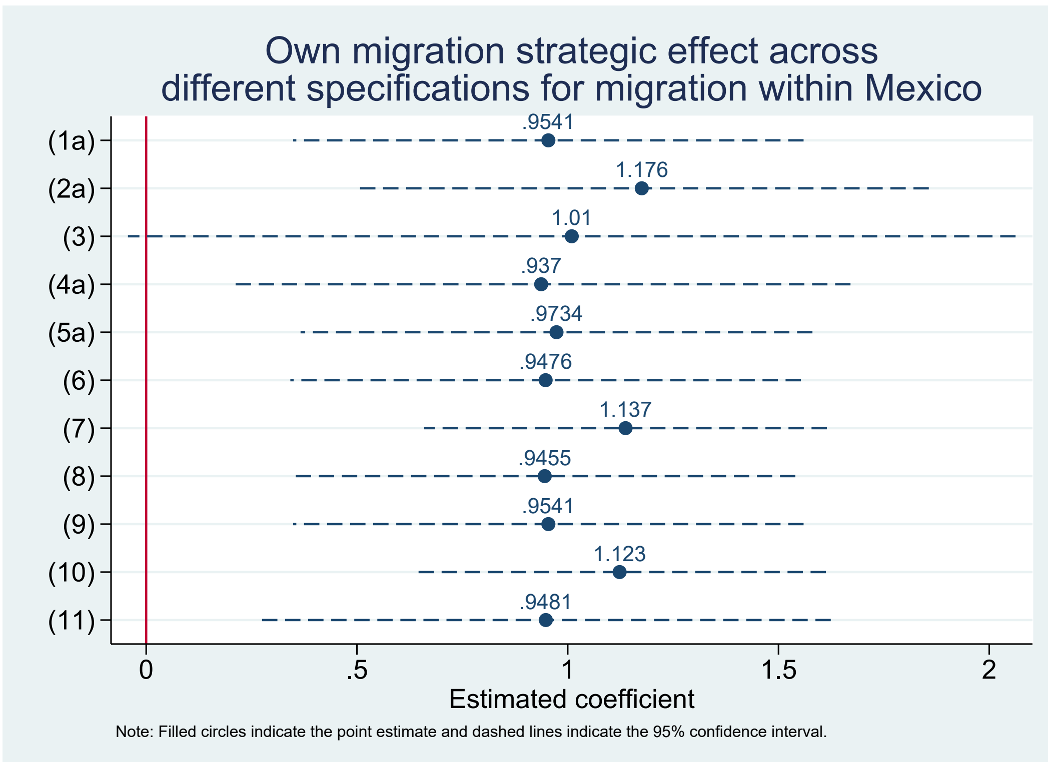

Figure 3: Summary of strategic interaction results for migration within Mexico from specifications 1a-5a (Table 4) and from 6-11 (Table 6).

Table 7: IV results of migration to the US by village size

	Dependent variable is probability of new migration to the U.S.			
	(12a)	(12b)	(13a)	(13b)
Fraction of neighbors with new migration to US x Village quartile 1	1.6110**	1.4091**	1.6096**	1.4286**
	(0.8195)	(0.7068)	(0.8137)	(0.7081)
Fraction of neighbors with new migration to US x Village quartile 2	0.8711	0.9224	1.0695	1.2160
	(1.5194)	(1.6567)	(1.3518)	(1.5492)
Fraction of neighbors with new migration to US x Village quartile 3	1.4256**	1.3999**	1.3758**	1.3135**
	(0.6364)	(0.6449)	(0.6251)	(0.6150)
Fraction of neighbors with new migration to US x Village quartile 4	-0.1270	-0.0874	-0.0631	0.0420
	(0.7929)	(0.7844)	(0.7803)	(0.7759)
Fraction of neighbors with new migration within Mexico x Village quartile 1	0.2106	0.0371	0.2151	0.1067
	(0.5844)	(0.5063)	(0.5826)	(0.4981)
Fraction of neighbors with new migration within Mexico x Village quartile 2	0.2399	0.0931	0.0923	-0.1042
	(0.9767)	(1.0435)	(0.8836)	(0.9829)
Fraction of neighbors with new migration within Mexico x Village quartile 3	-0.1891	-0.2559	-0.1464	-0.1889
	(0.6642)	(0.6459)	(0.6437)	(0.6215)
Fraction of neighbors with new migration within Mexico x Village quartile 4	-0.2046	-0.9900	-0.1776	-0.8996
	(1.4088)	(1.2646)	(1.3435)	(1.2364)
Village population	0.0000	0.0001	0.0000	0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Number of basic schools	-0.0001	-0.0001	-0.0001	-0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Number of indigenous schools	-0.0054	-0.0035	-0.0054	-0.0039
	(0.0056)	(0.0050)	(0.0054)	(0.0049)
Number of cars	0.0000	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Number of buses	-0.0000	-0.0000	-0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Number of males in household	0.0080	0.0088*	0.0079	0.0087*

Table 7: (continued)

	(12a)	(12b)	(13a)	(13b)
	(0.0052)	(0.0052)	(0.0052)	(0.0052)
Household head age (years)	-0.0000	-0.0001	-0.0000	-0.0000
	(0.0004)	(0.0004)	(0.0004)	(0.0004)
First born is male (dummy)	0.0039	0.0031	0.0040	0.0032
	(0.0087)	(0.0086)	(0.0087)	(0.0086)
Household head schooling (years)	-0.0024*	-0.0025*	-0.0025*	-0.0026*
	(0.0013)	(0.0014)	(0.0013)	(0.0014)
Household average schooling (years)	0.0050*	0.0051*	0.0051*	0.0052*
	(0.0027)	(0.0027)	(0.0027)	(0.0028)
Household maximum schooling (yeras)	-0.0015	-0.0015	-0.0015	-0.0015
	(0.0017)	(0.0018)	(0.0017)	(0.0018)
Household size (members)	-0.0000	-0.0003	-0.0000	-0.0003
	(0.0029)	(0.0030)	(0.0029)	(0.0030)
US migration in past 5 years (dummy)	0.1412***	0.1439***	0.1411***	0.1436***
	(0.0349)	(0.0348)	(0.0349)	(0.0348)
Mexico migration in past 5 years (dummy)	0.0105	0.0009	0.0098	0.0008
	(0.0228)	(0.0225)	(0.0227)	(0.0225)
Plots' slope interacted with rain	-0.0000	-0.0000		
	(0.0000)	(0.0000)		
Plots' quality interacted with rain	0.0000	0.0000		
	(0.0000)	(0.0000)		
Employment in tertiary sector (% working population)	0.0001	0.0007	0.0002	0.0008
	(0.0026)	(0.0025)	(0.0026)	(0.0026)
Avg. hourly wage (pesos)	-0.0023	-0.0032	-0.0035	-0.0039
	(0.0120)	(0.0061)	(0.0117)	(0.0061)
Avg. crime in circle 1 (murders per 10,000 inhabitants)	0.0007	0.0006	0.0007	0.0006
	(0.0008)	(0.0007)	(0.0008)	(0.0007)
Avg. crime in circle 2 (murders per 10,000 inhabitants)	-0.0004	-0.0005	-0.0004	-0.0006
	(0.0010)	(0.0009)	(0.0010)	(0.0009)

Table 7: (continued)

	(12a)	(12b)	(13a)	(13b)
Avg. number of apprehensions in circle 1	-0.0000	-0.0000	-0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Avg. number of apprehensions in circle 2	0.0000	0.0000	-0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Avg. number of deaths in circle 1	-0.0001	-0.0001	-0.0001	-0.0001
	(0.0005)	(0.0004)	(0.0005)	(0.0004)
Avg. number of deaths in circle 2	-0.0006	-0.0002	-0.0006	-0.0002
	(0.0006)	(0.0006)	(0.0006)	(0.0006)
Avg. number of agents in circle 1	-0.0000	-0.0000	-0.0000	-0.0000
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Avg. number of agents in circle 2	0.0001	0.0000	0.0001	0.0000
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Year		0.0044		0.0034
		(0.0059)		(0.0058)
Village fixed effects	Y	Y	Y	Y
Year effects	Y	N	Y	N
p-value (Pr>F)	0.1015	0.0466	0.0784	0.0315
adjusted R-squared	-0.1230	-0.1379	-0.1278	-0.1430
# observations	2981	2981	2981	2981

Notes: Standard errors in parentheses. Significance codes: * p<0.05, ** p<0.01, *** p<0.001.

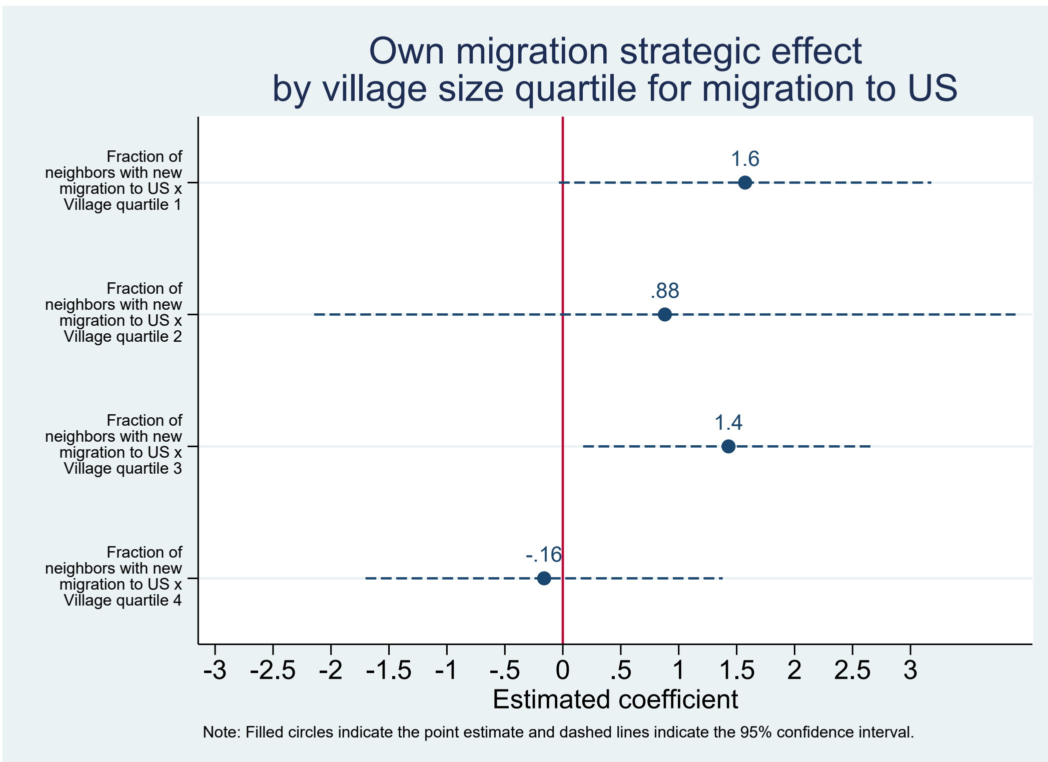

Figure 4: Strategic interactions in migration to US by village size

Table 8: IV results of migration within Mexico by village size

	Dependent variable is probability of new migration within Mexico			
	(12a)	(12b)	(13a)	(13b)
Fraction of neighbors with new migration to US x Village quartile 1	0.5831	0.6283	0.5551	0.6046
	(0.4452)	(0.4390)	(0.4441)	(0.4340)
Fraction of neighbors with new migration to US x Village quartile 2	-0.3135	-0.3714	-0.3347	-0.3916
	(0.5929)	(0.6076)	(0.5968)	(0.6107)
Fraction of neighbors with new migration to US x Village quartile 3	0.0482	0.1712	0.1242	0.2210
	(0.4933)	(0.4702)	(0.4893)	(0.4700)
Fraction of neighbors with new migration to US x Village quartile 4	0.9717	0.9153	0.9086	0.8624
	(1.2536)	(1.2501)	(1.2509)	(1.2497)
Fraction of neighbors with new migration within Mexico x Village quartile 1	0.2372	0.4871	0.3292	0.4494
	(1.0087)	(0.8575)	(1.0082)	(0.8621)
Fraction of neighbors with new migration within Mexico x Village quartile 2	0.8497	0.8615	0.9284*	0.9136*
	(0.5359)	(0.5239)	(0.5299)	(0.5221)
Fraction of neighbors with new migration within Mexico x Village quartile 3	0.8457	0.9415	0.7507	0.8725
	(0.6879)	(0.6759)	(0.6758)	(0.6659)
Fraction of neighbors with new migration within Mexico x Village quartile 4	1.2096***	1.1879***	1.1851***	1.1725***
	(0.4086)	(0.4051)	(0.4100)	(0.4062)
Village population	0.0001	0.0001	0.0001	0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Number of basic schools	-0.0001	-0.0001	-0.0001	-0.0001
	(0.0002)	(0.0001)	(0.0002)	(0.0001)
Number of indigenous schools	-0.0016	-0.0012	-0.0016	-0.0010
	(0.0056)	(0.0054)	(0.0056)	(0.0054)
Number of cars	-0.0000	-0.0000	-0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Number of buses	0.0000	-0.0000	0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Number of males in household	0.0018	0.0020	0.0018	0.0018

Table 8: (continued)

	(12a)	(12b)	(13a)	(13b)
	(0.0055)	(0.0055)	(0.0055)	(0.0055)
Household head age (years)	-0.0007**	-0.0007**	-0.0007**	-0.0007**
	(0.0004)	(0.0004)	(0.0003)	(0.0003)
First born is male (dummy)	-0.0054	-0.0054	-0.0057	-0.0054
	(0.0092)	(0.0092)	(0.0092)	(0.0092)
Household head schooling (years)	-0.0034**	-0.0034**	-0.0034**	-0.0034**
	(0.0016)	(0.0016)	(0.0016)	(0.0016)
Household average schooling (years)	0.0010	0.0009	0.0013	0.0012
	(0.0032)	(0.0032)	(0.0032)	(0.0032)
Household maximum schooling (yeras)	0.0032	0.0032	0.0029	0.0030
	(0.0022)	(0.0022)	(0.0022)	(0.0022)
Household size (members)	0.0019	0.0018	0.0019	0.0018
	(0.0034)	(0.0034)	(0.0034)	(0.0034)
US migration in past 5 years (dummy)	-0.0280*	-0.0279*	-0.0275*	-0.0274*
	(0.0149)	(0.0150)	(0.0149)	(0.0150)
Mexico migration in past 5 years (dummy)	0.0433*	0.0452*	0.0447*	0.0456*
	(0.0233)	(0.0236)	(0.0234)	(0.0237)
Plots' slope interacted with rain	0.0000	0.0000		
	(0.0000)	(0.0000)		
Plots' quality interacted with rain	-0.0000	-0.0000		
	(0.0000)	(0.0000)		
Employment in tertiary sector (% working population)	0.0013	0.0018	0.0013	0.0018
	(0.0020)	(0.0020)	(0.0020)	(0.0020)
Avg. hourly wage (pesos)	0.0036	0.0031	0.0040	0.0032
	(0.0114)	(0.0035)	(0.0114)	(0.0035)
Avg. crime in circle 1 (murders per 10,000 inhabitants)	0.0006	0.0003	0.0005	0.0003
	(0.0006)	(0.0006)	(0.0006)	(0.0006)
Avg. crime in circle 2 (murders per 10,000 inhabitants)	0.0013	0.0006	0.0013	0.0006
	(0.0010)	(0.0008)	(0.0010)	(0.0008)

Table 8: (continued)

	(12a)	(12b)	(13a)	(13b)
Avg. number of apprehensions in circle 1	0.0000	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Avg. number of apprehensions in circle 2	0.0000	-0.0000	0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Avg. number of deaths in circle 1	-0.0001	-0.0001	-0.0001	-0.0002
	(0.0003)	(0.0003)	(0.0003)	(0.0003)
Avg. number of deaths in circle 2	-0.0001	0.0002	-0.0000	0.0001
	(0.0008)	(0.0005)	(0.0008)	(0.0005)
Avg. number of agents in circle 1	0.0000	0.0000	-0.0000	0.0000
	(0.0001)	(0.0000)	(0.0001)	(0.0000)
Avg. number of agents in circle 2	-0.0000	0.0000	-0.0000	0.0000
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Year		-0.0065		-0.0060
		(0.0074)		(0.0073)
Village fixed effects	Y	Y	Y	Y
Year effects	Y	N	Y	N
p-value (Pr>F)	0.0492	0.0646	0.0370	0.0473
adjusted R-squared	-0.1201	-0.1227	-0.1185	-0.1197
# observations	2981	2981	2981	2981

Notes: Standard errors in parentheses. Significance codes: * p<0.05, ** p<0.01, *** p<0.001.

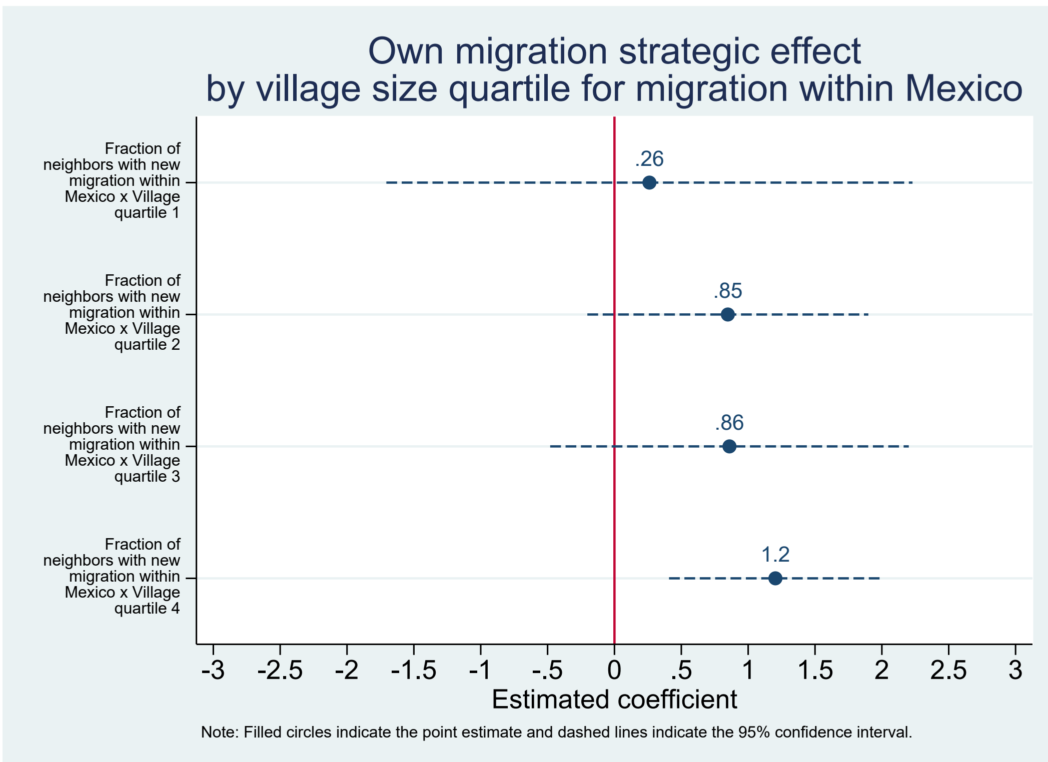

Figure 5: Strategic interactions in migration within Mexico by village size.

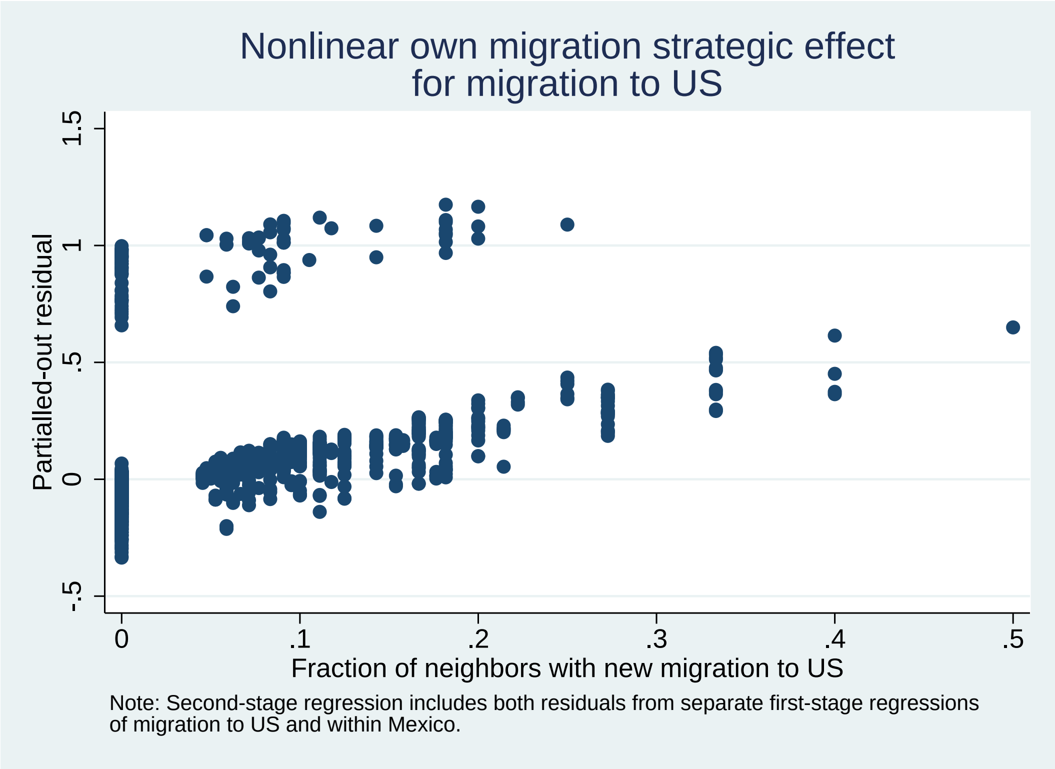

Figure 6: Non-linearities in the strategic interactions for migration to US.

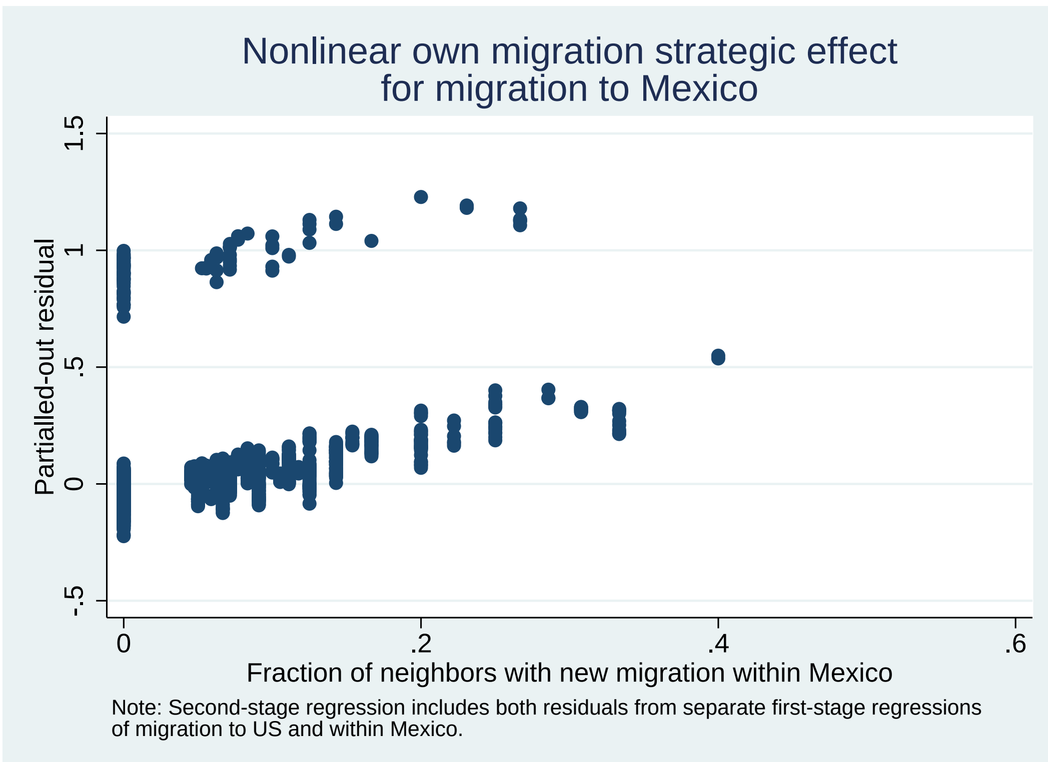

Figure 7: Non-linearities in the strategic interactions for migration within Mexico.