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by

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No. 2000-7 – May 2000

Working Paper Series in

Agricultural and Resource Economics

ISSN 1442 1909

http://www.une.edu.au/febl/EconStud/wps.htm

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Abstract

In this paper, we examine whether the causes and patterns of Mexican rural female migration differ significantly from rural male migration. A number of hypotheses are discussed to explain why female migration may differ from male migration, with a particular emphasis on the role of migrant networks. Using data from a national survey of rural Mexican households in the ejido sector, significant differences between the determinants of male and female migration are found. While evidence suggests that networks play an important role in female migration, we find that, contrary to case study evidence, female networks are not more influential than male networks in female migration. In fact, female and male networks are found to be substitutes, suggesting they serve similar functions in female migration. Although female migrant networks do not play a special role in the female migration decision, the destination of female migrants is strongly influenced by the location of female network migrants.

Key Words: migration, networks, gender, Mexico

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* The authors wish to thank Guy Stecklov, Kristin Espinosa and participants in the gender and migration session at the 2000 Population Association of America annual meetings for helpful comments on an earlier version of this paper.

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1. *Introduction*

The stereotype of a Mexican migrant to the United States is that of an undocumented, young male. However, considerable evidence exists from community-level studies and a variety of data sources indicating that women participate actively in national and international migration [Goldring, 1996; Mummert, 1991; Kossoudji and Ranney, 1984; and Hondagneu-Sotelo, 1994]. In the Durand and Massey 1992 review of migration literature, the authors find that while women and children made up a considerable share of Mexican migration to the United States in the early part of this century, the massive deportations of the 1930s, combined with the implementation of the *Bracero* program (1940-65), led to primarily male migration. This again changed after 1965, as women and children increasingly migrated to the United States. Houston, *et al* [1984] find that since 1940 the majority of legal immigrants to the United States are women and children. While Mexican migration to the United States in the 1970s was still mostly male (though just barely), female migrants from Mexico constituted the single largest nationality among women. Similarly, 43% of the amnesty applications under the Immigration Reform and Control Act of 1986 were made by women suggesting they form a significant portion of undocumented workers [Miller, 1996].[1] In this paper, we examine whether the causes and patterns of rural female migration from Mexico to the United States differ significantly from rural male migration. The results provide insights into the gender-specific effects of migration policy on both sides of the border, as well as implications for agricultural policy in Mexico.

Even if women actively participate in migration, this does not necessarily imply that female migration requires separate analysis from male migration. For example, if female migration is a response to perceived income differentials between the origin and destination, and thus unlikely to differ from male migration, then a separate analysis is unnecessary [Thadani and Todaro, 1995]. Gender differences in the economic determinants of migration become relevant if the causes and patterns of female migration are significantly different from male migration. Not considering gender, as is done in the vast majority of migration studies, assumes that this is not the case. What is required, as Boyd [1989] argues, is a "conceptual approach (that) asks if existing models can be enriched or extended by explicit analyses of women in network and family migration research." In this paper, we examine this proposition.

The paper is divided into six sections. Section 2 provides the conceptual approach for examining how gender may influence the migration decision. This section also proposes some testable hypotheses. Section 3 provides an overview of the data used in this study and a general comparison of male and female migrants. Section 4 uses a logit model to compare the role of individual, household, community and network characteristics on male and female migration. Section 5 looks at the importance of gender-centred networks on the destination and occupation of migrants. Section 6 draws general conclusions.

[1] Bustamonte, et al [1998] argue that the share of female migration derived from different data sources reflects the different populations represented by each survey. Those capturing relatively more settled immigrants (such as the Census) tend to have 50-50 ratios, while those capturing farmworkers and other more transient migrants are predominantly male.

2. *Conceptual approach and gender implications*

Examining the role of gender in the migration decision requires first understanding the migration decision in general. To do this, we briefly examine three micro-level models of migration – the neoclassical model of migration, the "new economics of migration" and the network, or social capital, theory of migration. We then consider how gender fits into these models.

2.1 *Models of migration*

Neoclassical models explain the migration decision as a cost-benefit calculation where potential migrants consider the expected net income at the destination with the expected net income at the origin [Sjaastad, 1962; Todaro 1969, 1976]. Given their skill levels and financial resources, potential migrants determine the location at which they will be most productive. The expected time required to obtain employment at each location, as well as the cost of reaching a destination and the cost of maintenance while searching for work are also estimated. For international migrants, government regulations at the potential destination must also be factored into the decision [Borjas, 1990]. For illegal international migrants, the probability of apprehension and deportation is also considered. Based on these various estimates of the flow of costs and benefits over time, the discounted net return to each location is calculated and the decision to migrate is made if the net return to migration is greater than the net return to remaining at the point of origin.

The new economics of migration expands on the neoclassical model by focusing on migration as a household decision rather than an individual decision [Stark, 1991]. Households are the appropriate unit of analysis if the individual migration decision is made jointly with household members and if the costs and returns are shared by some explicit or implicit sharing rule. Evidence of migration as a household decision is found in the fact migrants often send remittances to family members.[2] While improving expected income may be one motivation for sending migrants, the household may use migration as a mechanism for diversifying risk and gaining access to capital in the presence of insurance and credit market imperfections or failures.

The network theory of migration stresses the value of direct relationships in the migration decision [Boyd, 1989]. Immigration within a region or community is initiated based on individual or household reasons. These early migrants may assist family members or friends in migration by providing information on job possibilities or providing direct assistance such as housing, food, and transportation. For example, Menjivar [1995] notes that it is not uncommon for newly arrived migrants to stay with kin, borrow money from them and seek their assistance in emergencies. "Kin terms" were also extended to members of their hometown. Additionally, the majority of interviewees mentioned a friend or relative "who took them to, recommended them for, or informed them about a job." As migration flows from a community increase, a migrant network develops of former migrants, current migrants and non-migrants within the community. Network connections are a form of social capital that can be drawn upon by non-migrants with access to the network [Massey, *et al* 1993].

[2] It is important to consider, however, that some sociological perspectives of migration dispute this notion. While most cases of migration may be household decisions, Hondagneu-Sotelo [1994] notes that many single migrants, both male and female, disobey family wishes in migrating, even if they subsequently remit. Similarly, many married women follow their husbands without the explicit consent of the husband, not as a result of a collective household decision. She argues that excessive emphasis on the economic determinants of migration often obscures social or cultural motivation behind the individual's migration decision.

Information and direct assistance provided through migrant networks lower the costs, enhance the benefits and limit the uncertainty of migration thus increasing the net benefits of migrating.

While the implications of each of these models at the macro-level may differ, at the micro-level the network theory of migration can be viewed as enhancing the neoclassical model and the new economics of migration rather than as an alternative [Winters, de Janvry and Sadoulet, 1999]. In this view, returns to migration are based on the information the potential migrant has about migration, the benefits the migrant can obtain, and the costs associated with migration. Networks serve as a conduit for information on the expected returns and variance of returns to migration. Network members provide direct assistance in obtaining benefits and reducing costs. The migration decision is still based on expected income differentials and the relative uncertainty of migration, but these factors are migrant-specific and a function of network access.

The purpose of this paper is not to judge the validity of these models or even the "most correct" model. Instead, we accept each of these models as providing insight into the migration decision and wish to examine the implications of the models. From the neoclassical model, we find that individual characteristics factor into the migration decision in a number of ways. First, characteristics, such as education, experience, gender and age, may influence the income and employment opportunities at each location. Secondly, individual characteristics as well as social conditions and technologies may influence the cost of migration [Massey, *et al*, 1993]. Finally, preferences of individuals may differ. Empirical evaluation of the neoclassical model requires controlling for these factors.[3]

From the new economics of migration, we find that migration may be part of a household strategy to cope with market failure. Household characteristics such as assets, land holdings, and demographic composition, which reflect the household's exposure to risk and the household's ability to respond to risk, are relevant considerations in evaluating the migration decision.

From the network theory of migration, the importance of networks in conveying information and in providing assistance are noted. Both weak and strong networks may play a role in migration with the distinction being the former is between close friends and kin and the latter involving relationships between acquaintances [Boyd, 1989; Wilson, 1998]. However, analysis that includes community networks runs the risk of spurious correlation between network variables and migration. That is, community networks may be found to significantly influence migration not because they serve a function in the migration decision, but because they represent common unobservable community characteristics such as community development or organisation [Durand and Massey, 1992]. To control for this, community characteristics, such as location, infrastructure and organisation, are necessarily included in any analysis.

As providers of information and assistance to potential migrants, networks influence migration in other ways than simply increasing the probability of migration. Direct assistance is only possible if migrants go, at least initially, to a destination in which the network is established. Information is likely to also be specific to certain locations. However, this does

[3] For example, Lucas [1985] in his evaluation of Batswana migration includes a number of individual characteristics such as education, age and marital status. Emerson [1989] in his evaluation of U.S. migration includes education, experience, and ethnicity in his analysis.

not imply migration to a single destination in the United States from a given community. This may be true for some communities but the more common pattern is for multiple migration destinations, or nodes, for a given network [Cornelius, 1991; Wilson, 1994; Massey, *et al*, 1987]. The diffusion of migrants to multiple destinations is the result of 1] initial migrants going to distinct locations; and 2] migrants within the United States hearing of other opportunities and migrating directly to those locations or going there on subsequent migrations. These nodes form the basis of the network. As with location, the occupational niche of migrants within the network may influence the pattern of migration. Whether the occupations are agriculturally or urban based, the skills required for the occupation and whether the occupations are gender specific will influence the pattern of migration.

2.2 *Migration and gender*

The above discussion runs upon the assumption that gender does not play a role in migration. While gender may be considered one of a number of relevant characteristics that influence the migration decision, this is not equivalent to arguing that female migration differs from male migration. For this to be the case, either the models of migration for each gender or the parameters of the models must be different. In this paper, we consider the latter view. Female migration, while governed by the same models of migration (neoclassical, new economics of migration and network theory), differs from male migration in that explanatory variables influence the decision to migrate differently. Below we list a number of theoretical and empirical reasons that support this view.

- Females are more risk averse, or households (particularly male-dominated households) are more risk averse on their behalf. Women may be less likely to migrate if uncertainty remains high, suggesting they will only migrate if risk can be averted or will wait until a network is more established before migrating.

A higher level of risk aversion suggests that females will be more likely to migrate when uncertainty is diminished or if they, or their families, have mechanisms for coping with risk. Risk may be coped with by a variety of household strategies including the use of household assets. Thus, when a household is better able to cope with risk (ie., it has more liquid assets) more female migration might occur. Migrant networks also play a role in diminishing risk exposure by providing information on job prospects, circumventing the border, etc. that enhance the net benefits of migration. Case studies demonstrate that women face additional dangers in illegal migration compared to men, particularly rape and other forms of sexual abuse by *coyotes*, Border Patrol agents, or other males taking advantage of the migrants' defenceless position [for example, Massey, *et al*, 1987]. Having a network with established migration routes may be more important for women due to these additional risks.

- Females who migrate have different (observable and unobservable) characteristics than male migrants, since different characteristics may be beneficial to male and female migrants and societal norms may hinder female migration.

Within the United States certain characteristics of male and female migrants may be more desirable to potential employers. Thus, a characteristic, such as education, that may be desirable in a male migrant may not be in a female migrant or *vice versa*. This may be largely dependent on the occupational niche of males and females within the network. Additionally, gender roles at the point of origin, particularly the way in which labour is allocated by gender within ejido farms, may differentiate male and female migrants. Finally, case studies have shown that social norms regarding gender roles play an important role in promoting or

hindering migration by females and males [Hondagneu-Sotelo, 1994; Massey *et al*, 1987]. The patriarchal family system accepts and foments male migration, but hinders female migration. Fathers are more likely to resist the migration of daughters, and husbands the accompaniment of their wives and children, even years after first leaving home.[4] On the other hand, Hondagneu-Sotelo [1994] points out that one characteristic of single women that migrated to the United States was that they hailed from "weakly bounded families that provided little economic support and lacked patriarchal rules of authority." In this situation, women may have similar unobservable characteristics as male migrants, and instead it is the particular household characteristics that permits their migration. While economic crisis and the redefinition of gender roles brought on by the same migration processes have opened options for women, especially in rural areas, Mexico remains a patriarchal society.

- Women may not benefit equally from male-dominated networks and instead may be more dependent on gender-specific networks.

Case studies have emphasised that women, particularly single women, may not benefit in the same fashion as men from migration networks. Women may depend more on women to women networks, as well as their own kin networks (which may include men), than men [see Hondagneu-Sotelo, 1994 and Kossoudji and Ranney, 1984]. These female networks may offer advice and job descriptions, directly motivate migration, provide encouragement and contacts, lend money and accompany first timers. Hondagneu-Sotelo contends that these networks allow women to circumvent or contest domestic patriarchal authority. The fact that women tend to be more reliant on networks, particularly female-centred networks, for information and assistance suggest that 1] they are more likely to choose migrant destinations where networks are more firmly established, particularly where female migrants are established; and 2] they are more likely to choose occupations where the network has already established a niche, particularly where female migrants are established.

- Women are more constrained from doing certain types of work (because of labour requirements or societal constraints) and thus have more limited employment options. This lowers expected returns and increases the value of specific information.

Kossoudji and Ranney [1984] find, for example, that recent migrant women in the United States are more limited than men in terms of the employment opportunities available to them. These women face a dichotomous wage scale; they either earn a salary far below the minimum wage, almost exclusively as live in maids, or a salary roughly at the minimum wage. Long term migrants and/or married women, however, tend to occupy better paid positions.[5] Massey and Durand [1992], on the other hand, find that women tend to enter agricultural jobs, while men have greater access to urban employment—the latter of which tend to be higher paying.[6] Given the lower wage opportunities, the network again is likely to play a more important role in migration for females rather than for males.

The implications of the discussion presented in this section can be summarised into the following testable hypotheses:

[4] Note that Durand and Massey [1992] present a variant on this point, arguing that men wanting to bring their wives is one of the reasons behind the big increase in female migration after 1965.

[5] It is unsure what the causality is here, since married women in the study tended to have been in the States for a longer period of time.

[6] In our sample of permanent migrants, however, only 2 percent of females residing in the US worked in agricultural wage labour.

1. The individual and household characteristics that influence migration, such as education, age, household asset position, etc, influence the female migration decision differently than the male migration decision.
2. The female migration decision is more influenced by the existence of migrant networks than the male migration decision.
3. Females are more likely to migrate if the migrant network includes a significant number of women.
4. Communities that have long histories of migration send a larger proportion of female migrants than communities with shorter histories.
5. The locations of network nodes are more likely to influence female migration than male migration.
6. The destination decisions of female migrants are more influence by the location of female network migrants than male network migrants.
7. Female migrants are more likely than male migrants to take jobs that are part of the network occupational structure.
8. The occupation decisions of female migrants are more influence by the occupation of female network migrants than male network migrants.

3. *Data*

The analysis is based on data taken from a nationally representative sample of ejido households.[7] The ejido is the land reform mechanism utilised by successive Mexican governments from the early 1930s to 1992. Land and water resources were granted by the government not individually but to a community or group of producers, or ejido. Each ejidatario, or comunero, was given usufruct rights over a parcel, as well as access to common lands. The 1992 reform of Article 27 of the constitution formally ended the distribution of land in Mexico. This reform established a legal process, called *Procede*, by which land rights are delineated within the ejido and land titles provided, and by which ejidos, if authorised by the assembly, can then privatise individual parcels and eventually rent or sell their land.[8] As of 1996, over 29,000 legally constituted ejidos and agrarian communities were in existence [INDA, 1996], governing more than half of the nation's irrigated and rainfed land, and over 70 percent of forest cover. The land reform sector includes more than 3 million ejidatarios, representing more then 75 percent of all agricultural producers in the country, with over 15 million people directly depending on ejido lands for part of their livelihood [de Janvry, *et al*, 1995]. The data set is thus national in scope, but representative only of ejido households. Given the characteristics of this sector, one can interpret the data as providing insight on most small and medium size producers, ejido or private, in Mexico. Our results may thus differ from studies including non-landed households, an issue we discuss later in the paper.

Panel data were collected from 1287 households, covering 261 ejidos, at two points in time, the Spring and Summer of 1994 and 1997.[9] The survey covers a wide array of household assets including land, livestock, machinery, education, and migration, as well as household demographics, land and labour market participation, migration, agricultural and livestock production, and participation in organisations. Community level data was also collected on characteristics and organisation of the ejido. The surveys were carried out by the

[7] Chiapas was excluded from the 1994 survey due to civil unrest in that state, but included in the 1997 survey.
[8] See de Janvry, Gordillo, and Sadoulet [1997}, for a more detailed description and analysis of the ejido sector.
[9] A detailed description of the Mexico data and its sampling properties can be found in Cord [1998]. The total 1997 dataset, panel and non panel, numbered 1665 households.

Secretariat of Agrarian Reform and the World Bank with assistance from the University of California, Berkeley.

The ejido panel data show a significant increase in temporary migration to the United States during the 1994 to 1997 period. While in 1994 only 3 percent of panel households had family members with recent migration to the US, by 1997 this figure had reached 8 percent.[10] While this figure is small, it covers only those households with current migration to the United States. Overall, as seen in Table 1, 44 percent of all 1997 households had some connection to the United States, whether historical migration, or children or siblings living in the United States. This share was significantly higher for households with more than 5 hectares of land.

The increase in the incidence of migration by ejidatarios between 1994 and 1997 can be attributed to a number of factors. First, Hanson and Spilimbergo [1999] in their study of illegal migration between 1968 and 1996, find that after controlling for enforcement levels and other factors, variations in real wages in Mexico are a critical determinant of the number of border apprehensions, a measure of illegal migration. These effects are rapid, generally within a month or two of changes in wages, and large, with elasticities of 0.64 to 0.86. Mexican real wages have suffered two serious shocks in the last thirty years, the first taking place in 1982 and the second in 1995-1996 with the peso crisis, when real wages fell 24 percent. The peso crisis resulted in a 120 percent devaluation of the peso between December, 1994 and March, 1995, greatly increasing the purchasing power of dollars remitted to Mexico [Banco de México, 1999; INEGI, 1999].[11] However, during this same period, the INS stiffened control over the border with Mexico [as measured in enforcement hours, reported by Hanson and Spilimbergo] resulting in an increase in monthly apprehensions. The greater difficultly of entry in the United States is likely to have put a brake, to a certain extent, on northward migration. Given our arguments above, it is likely that this mitigating effect on migration is stronger among women then men.

Data on Mexican-U.S. migration for the entire sample and by gender is presented in Table 2. Migrants are defined as those individuals that migrated to the U.S. during the period of 1994 to 1997, whether temporarily or permanently. Of the 5310 individuals in the survey, 282 (5.3%) migrated to the U.S. during this period. Substantially less women than men migrated during this period with only 2.1% of women migrating and 8.1% of men. To examine the characteristics of migrants in general and by gender, the relevant variables have been divided into individual, household, migrant network, community and regional variables. Tests of significance of differences between migrants and non-migrants in all cases are performed using t-tests and chi-squared tests as appropriate.

3.1 *Individual and household variables*

The data on individual migrant characteristics suggest little difference between male and female migrants. Migrants of both genders tend to be about 10 years younger, more educated and are less likely to be indigenous than non-migrants. Among the household variables, which are taken from the 1994 survey to avoid problems with endogeneity, there are similarly few clear differences between male and female migrants. Both tend to come from households

[10] The definition of temporary here is if a current household member had migrated during the survey period, or the year prior. This is different then the definition used in the rest of the paper, where we have added those who left the household definitively between 1994 and 1997 to live in the United States. This information was not available in 1994.

[11] Increasing, however, the *coyote*-assisted cost of crossing the border.

with a larger number of males age 15 to 34. Both also tend to come from families with more female members between the ages of 35 and 59. This factor appears to be stronger for female migrants. In terms of asset ownership, migrants tend to have less irrigated land (1.0 versus 0.7 – although this is only significant for male migrants), more rainfed land (6.6 versus 10.2) and more heads of cattle (6.1 versus 8.8). Access to formal credit, prior to current migration, does not seem to differ by migration which is somewhat surprising since credit access is often seen as one motivation for migration [Stark, 1991]. Finally, migrants are found to come from households that are less likely to belong to organisations.

3.2 *Migrant network variables*

The size of a family migrant network is simply the number of family members, including both immediate family members and relatives of the head of household and spouse, who migrated to the United States prior to 1994 either on a temporary or permanent basis – that is, any family member with migration experience. This is then broken down by gender. Figure 1 shows the distribution of male-centred and female-centred family networks within the sample. Nearly 40% of individuals have at least one male family member with migration experience and nearly 30% have at least one female family member with migration experience.

From Table 1, both male- and female-centred networks are found to be significantly larger for migrants in general and for female and male migrants in particular. The average size of the family migrant networks is slightly larger for female migrants (female=2.09 and male=3.16) than for male migrants (female=1.47 and male=2.18).[12]

For reasons of sample size the community is defined as the municipio, which includes one or more ejidos that are in relatively close proximity. This assumes that there is significant interaction across ejidos within the same municipio. Within each community sample, the number of individuals found to be part of a family network are added up and divided by the total individuals within that community. For example, to determine the female community migrant network the total number of female family migrants is divided by the total number of females within that community. This gives the per capita number of female network migrants and a measure of the density of migrant networks. Figure 2 shows the distribution of male-centred and female-centred community networks. Only 16% of individuals have no male-centred community network and only 23% have no female-centred community network. From Table 2, as with family migrant networks, the data shows that community networks are greater for migrants than non-migrants and particularly for female migrants.

From the data on the date of initial migration of individuals, we calculated the years since the initiation of migration to the United States for each community. On average, migration began 24 years ago. Figure 3 shows a distribution of the years since migration was initiated (with 1994 being the base year). Over 20% of migration was initiated within communities in the last 10 years. However, over 40% of communities initiated migration over 30 years prior to 1994 (that is before 1965).

3.3 *Community and regional variables*

Community characteristics and regional variables are included in the analysis to control for factors that may cause migration other than migrant networks. That is, migration "streams" from a particular community may not be due to the presence of networks but due to community characteristics that "push" people towards migration. A number of ejido

[12] Tests of the difference between male-centred and female-centred networks by gender show that this difference is not significant.

characteristics are incorporated in the analysis including communal property, infrastructure (paved roads), degree of isolation (time to urban centre), indigenous population (percent of non-Spanish speakers), community organisation (ejido campesino organisation) and the stage of community participation in the ejido reform process. In Table 2, male migrants are found to have less access to community property than male non-migrants. In general, migrants are found to come from communities with less infrastructure (paved roads) and fewer non-Spanish speakers. Finally, communities in the midst of the Procede process have fewer male migrants.

4. *Gender and the migration decision*

The conceptual framework presented in Section 2 suggested testable hypothesis about the influence of gender on the decision to migrate to the U.S. In this section, we examine the first four hypotheses. The individual migration decision is a discrete decision (migrating to the U.S. versus remaining at the point of origin) and thus may be evaluated using a discrete regression model.

Since the focus of this analysis is migration over a limited period of time (1994-1997), the number of temporary migrants to the US in the sample is relatively small (5.3%). With such a skewed distribution of migrants and non-migrants the ability of a discrete regression model to accurately predict migration is limited. For this reason, 30% of the non-migrants were randomly selected for inclusion in the regression analysis while all of the migrants where included.[13] This type of non-proportionate sampling has potential to lead to biased coefficients. However, for the logit model all coefficients are unbiased except for the constant term, which may be corrected using a simple transformation [Maddala, 1983].[14] In the results presented below, the constant term has been adjusted appropriately.

Table 3 presents the results of the logit model for each gender. In addition to the estimated coefficient, marginal effects, calculated using the sample average of individual marginal effects, are presented to allow for easier interpretation of the results. Since marginal effects are not appropriate for dummy variables, a calculation comparing the change in probability as the dummy goes from zero to one is presented.

4.1 *Individual and household variables*

The age of both male and female migrants is found to negatively influence migration. The effect is stronger for male migrants with each year reducing the probability of migration by 0.5%. Education is only found to influence male migration with each year of education increasing the probability of migrating by 0.4%. Among the household variables, the number of males aged 15-34 is found to positively influence both male and female migration. The marginal effect is greater for male migrants than female migrants. This suggests that the more young adult males in the household the greater the likelihood of migration. Female migrants are found to be positively influenced by the number of female family members aged 35-59. This suggests that female migration is more likely if there is already a mature aged female in the household. Access to formal credit and household membership in a registered organisation are not found to influence female or male migration.

[13] The data used in the logit thus has 15% migrants and 85% non-migrants.

[14] For the probit model, both the slope and intercept terms are potentially biased although Madalla [1983] notes that the bias on the slope terms is limited. Since the results of the probit and logit models do not differ substantially, the logit model is used in this analysis.

Different asset variables have significant affects on male and female migration. The amount of irrigated land owned by the household appears to have a negative influence on male migration while the amount of rainfed land and heads of cattle owned by the household have, respectively, a positive and negative affect on female migration. These differences in the influence of assets can be tied to gender roles. In rural Mexico men are more likely to work on farm. Irrigated land is associated with higher returns in agriculture [see Davis, *et al*, 1999], thus raising the opportunity cost of migration for males. Women, on the other hand, are less likely to work on farm, and thus the sign on rainfed land could have gone either way.[15] Women do however often care for livestock explaining the negative impact of cattle stocks on female migration.[16]

The first hypothesis at the end of Section 2 notes that individual and household characteristics may influence male and female migration differently. The evidence is mixed. While age and the presence of young adult males seem to have similar effects, education only influences male migration, the presence of mature adult females influences only female migration and different household asset variables influence female and male migration. Individual and household characteristics thus do influence the migration decision differently and the hypothesis is correct. A more direct test of this hypothesis is to run a single regression with dummy variables to allow for intercepts and slope values to differ across the two data sets, in this case male and female migration. The hypothesis that "gender does not matter" can be tested by examining whether the vector of coefficients on the gender dummy and interactive terms (product of the dummy and other variables) is equal to zero. Although not presented due to space considerations, results from this test suggest the hypothesis that gender does not matter in Mexico-U.S. migration can be rejected with 99% confidence.

4.2 *Migrant network variables*

Both female-centred and male-centred family and community networks are included in each regression as well as interaction terms for male and female networks. As discussed, both female-centred and male-centred migrant networks can influence the decision to migrate, although the influence on each gender may differ. Furthermore, the relationship between the gender-based migrant networks may differ. A positive sign on the interaction of male and female family (community) networks would suggest that these networks complement each other. That is, each network performs a specific function and having both male- and female-centred networks is superior (in terms of assistance and information on migration) to having a single gender network. A negative sign on the interaction term would suggest that the networks are substitutes and that each network performs a similar function and there are some overlapping benefits of each network. Finally, the initial date of migration within a community is included in the regressions as well as a squared term to capture any non-linearities.

For female migration, the results suggest that the male-centred family networks are more important in determining female migration than female-centred networks. For each additional male network migrant the probability of migration by a female increases by 0.9%. At the community level, both male and female migrant networks are found to significantly

[15] Donato [1992], using a rural sample drawn from a small number of communities with a history of migration, finds that land owned has a negative impact on the probability of female migration. She argues that in the face of a tradition of male migration in a household, women must stay behind to take care of land and livestock.

[16] Livestock are also used as a means of liquidity (a source of cash in the event of problems) and it may be a sign of the households ability to deal with risk, which would have provided a rationale for a positive significant on cattle stocks.

influence female migration and based on the marginal effects the influence is almost equal. That is, each additional community network migrant, whether male or female, has a similar effect on female migration. The female-male interaction term is negative and significant in both regressions indicating that male- and female-centred community network migrants are substitutes. Therefore, male- and female-centred migrant networks are likely to serve the same function for female migrants.

Among male migrants, both male- and female-centred family migrant networks have a positive affect on migration. The marginal effect for male-centred networks (2.3%) is only slightly larger than the marginal effect of female migrants (2.0%). Furthermore, the two sets of family networks are found to be substitutes suggesting they serve the same function for migrants. For community migrant networks, both types of networks increase the probability of migration and are substitutes. However, male-centred networks are found to have a greater marginal effect on male migration than female-centred networks. Note that for all the migrant network variables the marginal effect is greater for male migration than female migration suggesting that the presence of migrant networks has a greater influence on male migration.

For both male and female migration, the years since first migration within a community is negative although the squared term is positive (both are significant). While at first glance this result may seem counterintuitive, we are controlling for the current size of the network. The salient determinant is the size of the network instead of the years since the first migration. Individuals from communities with a long history of migration, but with limited networks, have a lower probability of migration.

While the evidence suggests an important role for both family and community networks in female migration, it also shows (by the larger marginal effects) that male migration is more influenced by the presence of migrant networks that female migration. Thus the second hypothesis in Section 2 is rejected. Furthermore, for female migration the insignificant marginal effect of family female network migrants, the negative interaction term for male-female networks (substitution effect) and the similar marginal effects of male and female community migrant networks strongly suggest the rejection of the third hypothesis that females are more likely to migrate if the female-centred network is large. Finally, the results for the linear and squared term for variable years since community migration was initiated do not support the fourth hypothesis on the positive relationship between female migration and the longevity of the migrant network.

4.3 *Community and regional variables*

Community and regional factors are included in the regression to control for factors other than community networks that may cause migration streams from a certain community. Female migrants are found to be less likely to come from the central region of Mexico as opposed to the south [the excluded group) and are less likely to come from communities with substantial infrastructure (paved roads). Male migrants are more likely to come from the north than the south and are likely to come from communities with less communal land per capita and which are not in the process of enacting ejido reforms.

5. *Gender and migrant destination and occupation*

Thus far, analysis of the data on migration has explored the relationship between gender-based migrant networks and the decision by female and male Mexicans to migrate. In this

section, we examine the role of networks on the migrants' choice of destination and occupation (hypotheses 5-8).

Both the destination and occupation of a migrant can be viewed as a single decision made over a number of unordered alternatives. For example, a migrant can choose between a number of different regions or states within the United States. The choice the migrant makes between these alternatives is assumed to be the one that provides the most net benefits to the migrant. The choice is partially based on the attributes of the destination (occupation), which in this case includes the importance of gender-specific migrant networks at that destination (in that occupation). The appropriate model for examining this type of choice is the conditional logit [Greene, 1997]. Below a conditional logit on the choice of destination and occupation are estimated for both female and male migrants.

5.1 *Choice of destination*

For a subset of 253 migrants (46 female and 207 male migrants), data are available on both the migrant destination and the destinations of network migrants. Destinations can be grouped into four regions within the United States as follows: California, Texas, Southwest and other destinations. For each region, the number of female (male) network migrants going to a destination is calculated and divided by the total number of females (males) in that municipio. This gives the relative size of female (male) network migrants at a given destination. It is anticipated that the larger the size of the female and male networks at a destination the more likely migrants will go there. The majority of female migrants went to Texas (34.8%), followed by California (30.4%), and then other destinations (26.1%). Male migrants were more likely to go to other destinations (38.2%), followed by California (31.4%), and then Texas (25.1%).

Table 4 reports the results of the conditional logit on the choice of destination. The sizes of the male and female networks at the point of destination are included in the regression to see their role in the destination decision. A fixed effect of each region (using other destinations as a base case) is included to account for the attractiveness of the destination independently of the networks. Additionally, the migrant's age and education are included to control for individual factors, which may influence destination choice. Since these are individual characteristics and not attributes of the destination the variables must be multiplied by regional dummies to make the variables appear to vary across the choices [Greene, 1997].

For the female migrant's choice of destination, we find that none of the regions appear to independently lead women to migrate to those destinations. Age and education also do not appear to significantly factor into the female migrant's destination decision. Both female and male network destinations are found to significantly influence the destination choice for female migrants. The coefficient suggests, however, that the location of female migrants has a greater influence on the choice of female destination than the location of male migrants.

For the male migrant's choice of destination, both California and the Southwest are found to be significantly less attractive destinations than the other destination category. Older and more educated male migrants are found to be more likely to go to California. While the destination of females in the migrant network does not affect a male migrant's destination choice, the destination of other male migrants has a significant effect.

The results presented in Table 4 provide strong support to hypotheses 5 and 6 presented in Section 2. The evidence suggest that the destination choice of female migrants is

strongly influenced by the location of network migrants, and in particular by the location of female network migrants.

5.2 *Choice of occupation*

For a subset of 252 migrants (43 female and 209 male migrants), data are available on both the migrant occupation and the occupations of network migrants. Migrant occupations within the United States can be divided into five categories: no formal employment, agricultural employment, unskilled non-agricultural employment (including services), skilled employment (defined as industrial and non-agriculture) and other non-agricultural employment. Just under half of female migrants (48.6%) report no formal employment suggesting they are working within the home or are searching for work. Most of the other female migrants are in the skilled sector (18.6%) or in other types of non-agricultural work (20.9%). Few female migrants report being in agriculture or in unskilled non-agricultural categories. For male migrants, most had jobs in the other non-agricultural category (35.6%), with the rest of migrants almost equally divided between agriculture (20.6%), unskilled non-agriculture (19.4%) and skilled (19.6%) employment. Given the large numbers reporting "other" types of non-agricultural work, it may be that the categories provided were unclear or that the survey respondents did not have enough information to accurately provide a specific occupation. The results should thus be treated with some caution.

Table 5 presents the conditional logit on the choice of occupation. The sizes of the male and female networks for the individual occupation are included in the regression to see their role in the occupation decision. Following the logic presented for the conditional logit on destination, a fixed effect for each occupation (using other occupations as a base case) is included to account for the attractiveness of the occupation independently of the networks and the migrant's age and education are included to control for individual factors. For the female choice of occupation, the occupation of the male members of the migrant network appears to have a strong affect on choice of occupation while the occupation of female network members does not have a significant effect. Additionally, higher levels of education are found to lead to a greater likelihood of female migrants having skilled employment. For the male choice of occupation, the occupation of female and male network migrants is found to influence the occupation of male migrants. Surprisingly, the choice of occupation is found to be more influenced by female network occupation than male network occupation. Recall that these results should be viewed with caution given the unclear nature of the "other" non-agricultural occupation category.

Given the questionable nature of the data, clear conclusions cannot be made about hypotheses 7 and 8 presented in section 2. The evidence does suggest that the occupation choice of females migrants is strongly influenced by the occupation of network migrants (hypothesis 7) but that it is the male network migrants' occupations that matter not the female (a rejection of hypothesis 8).

6. *Conclusions*

Gender matters when considering international migration. Studies focusing on international migration, and particularly the role of networks, miss an element of the migration dynamic if male-female differences are not taken into account. We find that these differences revolve around the role of individual and household characteristics in affecting the probability of migration to the US. While we do not find support for case study evidence on

the special role of female networks in motivating female migration, we do find differences in the role of networks for male and female migration.

For female migration, family male networks appear to be more influential on the migration decision than family female migration. This calls into question the generality of case study evidence that suggests the opposite conclusion. One possible explanation is that for rural, agriculturally-based communities (as in our sample), male assistance in migration is of more importance than female assistance for female migrants. This could be partially motivated by safety considerations and a generally more patriarchal family structure in rural areas, where women tend to follow male migrants, whether husband, father, or sibling. In terms of community networks, both male and female networks appear important and are substitutes. This supports the view that female migrant networks, at least in terms of the migration decision, do not play a special role in migration.

Female migrant networks do appear, however, to have a strong influence on the destination of female migrants. While both networks, particularly male networks, influence the migration decision, female networks have a greater influence on female migrant destination. This result echoes case study observations that women are more limited than men in terms of job opportunities. Women may be more dependent on men and male networks for passage to the US, particularly in those times of increased danger in passing the border, but they choose destinations with a female network presence in order to assure access to information and assistance in employment and other aspects of adjusting to life in the States.

These results have research and policy implications. First, the results give credence to the study, at the case study level, of a gender perspective of migration. Second, they validate the importance of including gender differences in the quantitative study of the determinants of migration. Third, in policy terms, the results provide insight into understanding how potential migrants will react to policy decisions and economic change on both sides of the border. Policies on land use and tenure issues, for example, such as increasing availability of irrigated land or increased land transactions due to Procede, may effect the migration of each gender differently. The evidence does suggest however that policies designed to stem the flow of migrants to the United States from the ejido sector are likely to be successful if they manage to stem the flow of male migrants, at least for now. Without established male networks the probability of either gender migrating is less.

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Table 1. US migration 1997, by land size

		Land size categories (NRE has)		
	Total	**0**	**e-5**	**>5**
Total observations	1665	91	782	792
% of households that had each type of migration				
Temporary migration to the US				
Current	8	10	5	10
Historic	10	11	8	11
Permanent migration (children)				
Living in the US	21	21	17	24
Living in Mexico, but migrating temporarily to the US	7	6	5	9
Permanent migration (siblings)				
Living in the US	22	33	15	27
Living in Mexico, but migrating temporarily to the US	13	16	8	17
Any migration or relative in US	44	56	35	52

Table 2. Mexico-U.S. migration by gender

	Total population			Female			Male		
	Non-migrant	*Migrant*		*Non-migrant*	*Migrant*		*Non-migrant*	*Migrant*	
Total observations	5028	282		2412	51		2616	231	
Percent of total	94.7%	5.3%		97.9%	2.1%		91.9%	8.1%	
Individual variables									
Age (years)	37.1	27.4	***	36.2	27.3	***	37.9	27.4	***
Education (years)	5.3	6.8	***	5.3	7.0	*	5.2	6.8	***
Gender (% female)	48.0%	18.1%	***	-	-		-	-	
Indigenous (%)	20.1%	4.3%	***	19.3%	3.9%	***	20.7%	4.3%	***
Household variables									
Family members under age 14	1.7	1.8		1.7	1.8		1.7	1.8	
Family males age 15-34	1.3	1.8	***	1.2	1.5	**	1.3	1.8	***
Family females age 15-34	1.0	1.0		1.1	1.0		0.9	1.0	*
Family males age 35-59	0.7	0.8	**	0.7	0.8		0.7	0.8	*
Family females age 35-59	0.7	0.8	***	0.7	1.0	***	0.6	0.7	**
Family members over age 60	0.4	0.3		0.3	0.4		0.4	0.3	*
Age of household head	53.5	53.8		53.5	55.7		53.6	53.3	
Irrigated land owned (hectares)	1.0	0.7	**	1.0	0.7		1.0	0.7	*
Rainfed land owned (hectares)	6.6	10.2	***	6.6	14.2	***	6.6	9.4	***
Heads of cattle	6.1	8.8	***	6.0	10.5	**	6.1	8.4	**
Access to formal credit (%)	31.8%	29.4%		30.7%	31.4%		32.8%	29.0%	
Organizational membership (%)	45.9%	34.0%	***	44.9%	31.4%	*	46.8%	34.6%	***
Registered organization (%)	28.7%	20.9%	***	27.3%	23.5%		30.5%	20.4%	***
Unregistered organization (%)	23.4%	15.3%	***	23.3%	7.8%	***	23.5%	16.9%	**
Migrant network variables									
Family network - U.S.	1.61	3.95	***	1.71	5.25	***	1.53	3.66	***
Female	0.68	1.59	***	0.72	2.09	***	0.65	1.47	***
Male	0.93	2.36	***	0.99	3.16	***	0.88	2.18	***
Community network - U.S.	0.39	0.80	***	0.42	1.03	***	0.38	0.75	***
Female	0.36	0.70	***	0.37	0.92	***	0.36	0.65	***
Male	0.45	0.92	***	0.47	1.16	***	0.42	0.87	***
Years since first migration	23.8	30.1	***	24.1	30.4	**	23.4	30.1	***
Community variables									
Community property per capita	24.5	19.4		23.2	26.7		25.6	17.8	*
Paved roads (km)	12.8	8.0	***	12.0	4.9	**	12.7	8.7	**
Time to urban center (hours)	50.7	45.5	*	50.0	42.1		51.3	46.3	
Non-spanish speakers (%)	18.5%	3.6%	***	18.0%	3.5%	***	19.0%	3.6%	***
Ejido campesino organization	72.2%	68.1%		72.1%	74.5%		72.3%	66.7%	*
No ejido reform	33.4%	36.2%		33.4%	33.3%		33.5%	36.8%	
Initiated ejido reform	19.2%	12.1%	***	19.0%	13.7%		19.4%	11.7%	***
Completed ejido reform	47.4%	51.8%		47.6%	52.9%		47.2%	51.5%	
Regional distribution (%)									
North	20.3%	38.3%	***	20.8%	49.0%	***	19.7%	35.9%	***
North Pacific	12.8%	3.7%	***	12.3%	2.0%	***	13.3%	3.9%	***
Center	29.4%	36.5%	**	29.3%	27.5%		28.9%	38.5%	***
Gulf	17.0%	7.8%	***	16.3%	5.9%	**	17.7%	8.2%	***
South Pacific	20.5%	13.8%	***	20.7%	15.7%		20.4%	13.4%	**

Test of difference between non-migrant and migrant households: t-test for means, chi-squared for percentages.

*= significant at 90%, **= significant at 95% and ***= significant at 99% .

Table 3. Migration decision - Logit analysis

	Female			***Male***		
	Estimated coefficient	*Marginal effect*	*P-value*	*Estimated coefficient*	*Marginal effect*	*P-value*
Constant (adjusted)	-2.08	-	0.15	-0.84	-	0.22
Individual variables						
Age (years)	-0.05	-0.002	0.00 ***	-0.04	-0.005	0.00 ***
Education (years)	0.01	0.0003	0.79	0.03	0.004	0.06 *
Indigenous (%)+	1.47	0.092	0.29	-0.53	-0.063	0.42
Household variables						
Family members under age 14	0.06	0.003	0.59	0.01	0.001	0.90
Family males age 15-34	0.35	0.016	0.02 **	0.24	0.030	0.00 ***
Family females age 15-34	-0.21	-0.010	0.22	0.01	0.001	0.90
Family males age 35-59	-0.08	-0.004	0.85	-0.09	0.015	0.69
Family females age 35-59	1.18	0.054	0.01 ***	0.11	0.009	0.63
Family members over age 60	0.26	0.012	0.60	0.07	0.009	0.77
Age of household head	-0.02	-0.0008	0.49	-0.003	-0.0004	0.77
Irrigated land owned (hectares)	-0.06	-0.003	0.55	-0.10	-0.013	0.03 **
Rainfed land owned (hectares)	0.03	0.001	0.07 *	0.01	0.001	0.42
Heads of cattle	-0.04	-0.002	0.02 **	-0.004	-0.0006	0.58
Access to formal credit (%)+	0.26	0.012	0.56	-0.11	-0.013	0.62
Registered organization (%)+	0.40	0.020	0.40	-0.15	-0.019	0.53
Migrant network variables						
Family network - U.S.						
Male	0.21	0.009	0.08 *	0.19	0.023	0.01 ***
Female	0.03	0.001	0.82	0.16	0.020	0.06 *
Female-Male interaction	-0.01	-0.0006	0.66	-0.04	-0.005	0.03 **
Community network - U.S.						
Male	1.58	0.072	0.01 ***	1.35	0.171	0.00 ***
Female	1.92	0.088	0.02 **	0.75	0.095	0.08 *
Female-Male interaction	-0.65	-0.030	0.04 **	-0.46	-0.057	0.02 ***
Years since first migration	-0.14	-0.006	0.01 ***	-0.06	-0.007	0.03 **
Years since first migration-squared	0.002	0.0001	0.03 **	0.001	0.0001	0.05 **
Community variables						
Community property per capita	-0.01	-0.0002	0.38	-0.01	-0.001	0.01 ***
Paved roads (km)	-0.06	-0.003	0.03 **	-0.01	-0.001	0.22
Time to urban center (hours)	0.002	0.0001	0.65	0.004	0.0005	0.13
Non-spanish speakers (%)	-0.03	-0.001	0.17	-0.10	-0.002	0.12
Ejido campesino organization+	0.45	0.020	0.32	-0.21	-0.027	0.36
Initiated ejido reform+	-0.38	-0.016	0.54	-0.58	-0.070	0.07 *
Completed ejido reform+	-0.29	-0.013	0.54	-0.24	-0.030	0.30
Regional distribution (%)						
North+	0.65	0.031	0.34	0.78	0.106	0.03 **
North Pacific+	-1.75	-0.051	0.17	-0.50	-0.060	0.35
Center+	-1.34	-0.054	0.04 **	0.19	0.025	0.53
Gulf+	-1.44	-0.046	0.14	0.43	0.056	0.33

	No. of observations = 790		No. of observations = 942	
	Predicted		Predicted	
Actual	No migration	Migration	No migration	Migration
No migration	715	25	589	137
Migration	28	22	60	156
Percent Correct	96.2%	46.8%	90.8%	53.2%

Prediction based on whether the predicted probability of migration is greater than 30%.

+ Dummy variables.

*= significant at 90%, **= significant at 95% and ***= significant at 99% .

Table 4. Choice of destination

Conditional logit on choice of destination for each migrant.

	Female		***Male***	
	Coefficient	P-value	Coefficient	P-value
Regional dummies				
California	0.12	0.95	-2.39	0.00 ***
Texas	-0.37	0.85	-0.76	0.33
Southwest	1.31	0.68	-3.40	0.00 ***
Network size at destination				
Female	6.12	0.06 *	0.83	0.56
Male	3.56	0.07 *	4.50	0.00 ***
Interaction terms				
Age*California	0.03	0.48	0.04	0.03 **
Age*Texas	0.01	0.86	0.00	0.88
Age*Southwest	-0.07	0.56	0.04	0.25
Education*California	-0.16	0.42	0.11	0.10 *
Education*Texas	0.09	0.62	0.05	0.42
Education*Southwest	-0.07	0.78	0.10	0.15
	No. of observations 184 = (46x4 destinations)		No. of observations 828 = (207x4 destinations)	

*= significant at 90%, **= significant at 95% and ***= significant at 99% .

Table 5. Choice of occupation

Conditional logit on choice of occupation for each migrant.

	Female		***Male***	
	Coefficient	P-value	Coefficient	P-value
Occupational dummies				
No formal employment	0.88	0.72	-1.92	0.11
Agriculture	3.84	0.44	-0.88	0.26
Unskilled non-agriculture	-5.28	0.46	-1.10	0.18
Skilled	-5.19	0.11	-0.41	0.61
Network size for occupation				
Female	5.24	0.29	4.23	0.02 **
Male	12.06	0.00 ***	2.32	0.10 *
Interaction terms				
Age*No formal employment	0.01	0.76	0.02	0.42
Age*Agriculture	-0.04	0.61	0.02	0.21
Age*Unskilled	-0.01	0.97	0.00	0.92
Age*Skilled	0.06	0.33	0.00	0.89
Education*No formal employment	0.07	0.76	-0.12	0.71
Education*Agriculture	-0.89	0.16	-0.04	0.84
Education*Unskilled	0.52	0.38	0.09	0.96
Education*Skilled	0.54	0.07 *	0.01	0.89
	No. of observations 215 = (43x5 destinations)		No. of observations 1045 = (209x5 destinations)	

*= significant at 90%, **= significant at 95% and ***= significant at 99% .

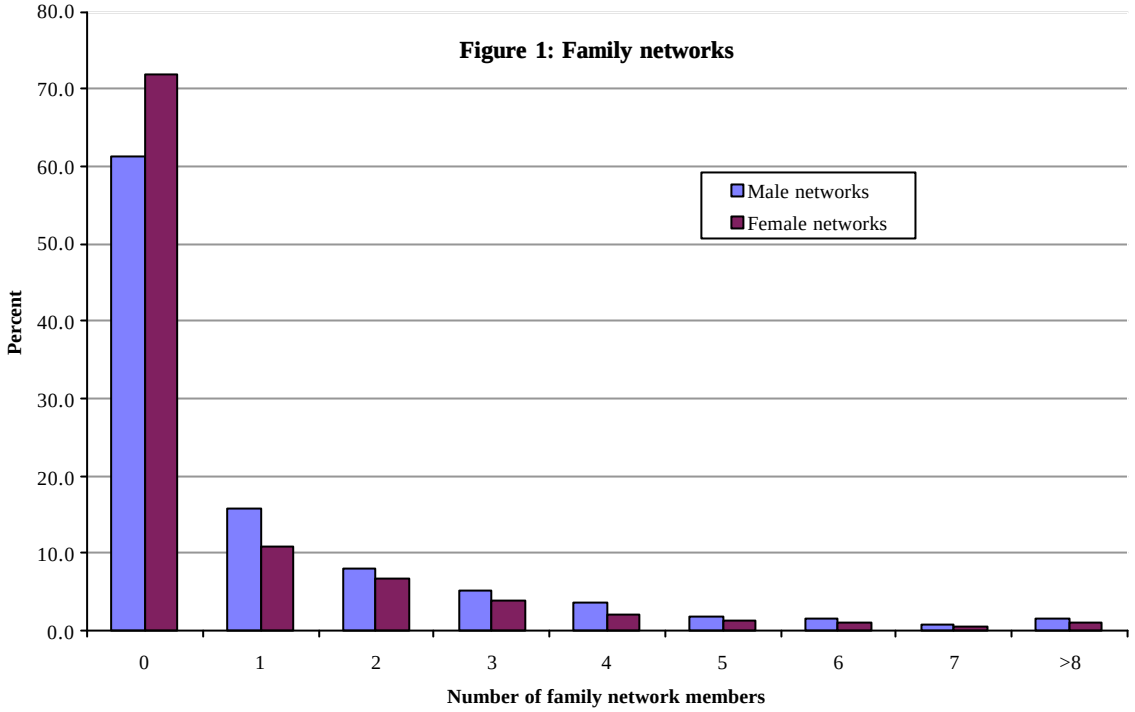
Figure 1: Family networks
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
Percent
Male networks
Female networks
0
1
2
3
4
5
6
7
>8
Number of family network members

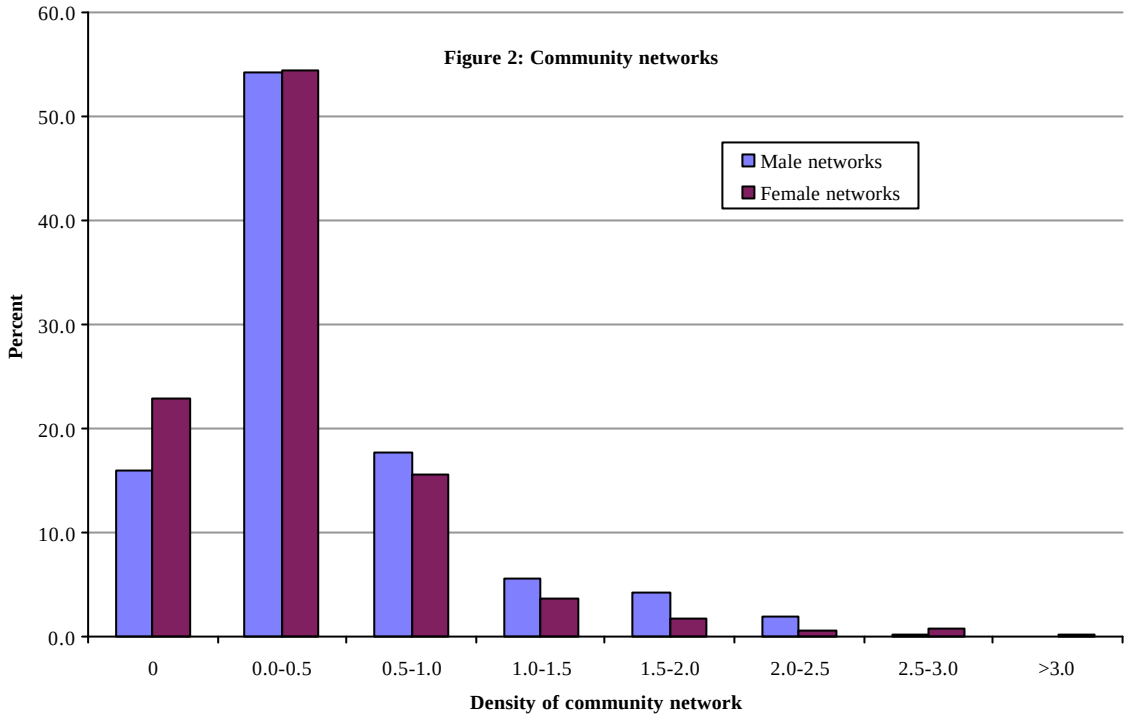
Figure 2: Community networks
Male networks
Female networks
Percent
60.0
50.0
40.0
30.0
20.0
10.0
0.0
0
0.0-0.5
0.5-1.0
1.0-1.5
1.5-2.0
2.0-2.5
2.5-3.0
>3.0
Density of community network

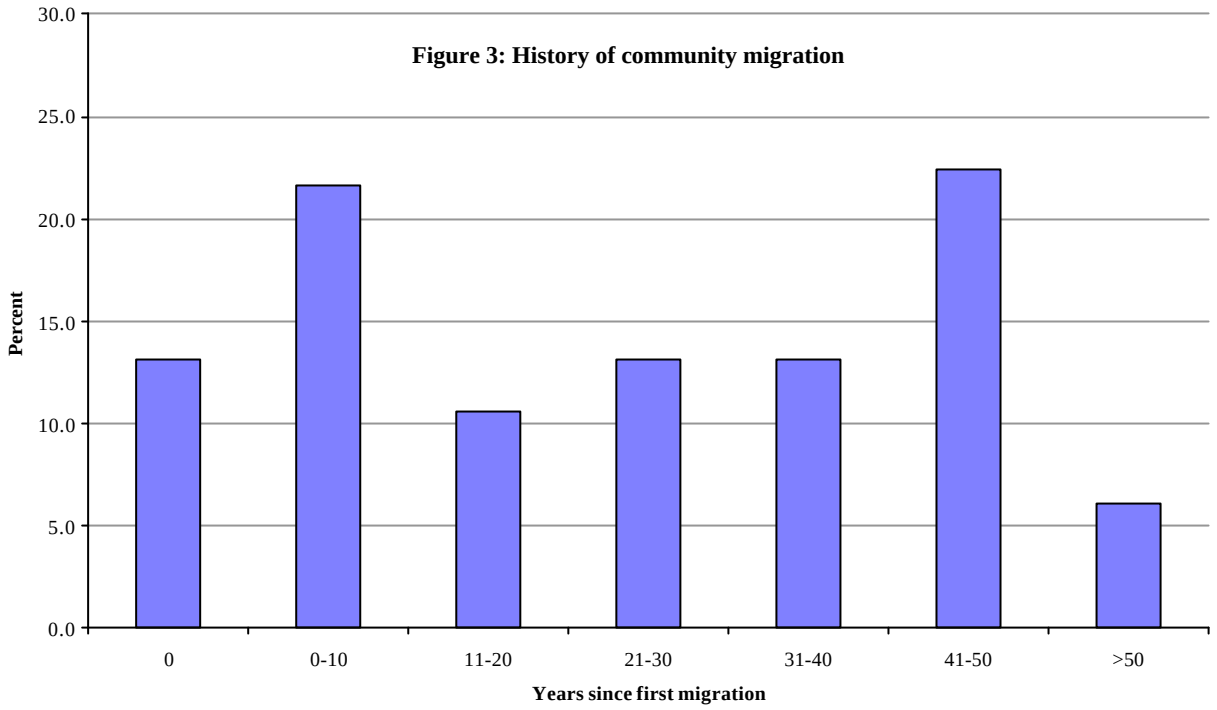
Figure 3: History of community migration
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Percent
0
0-10
11-20
21-30
31-40
41-50
>50
Years since first migration