An Empirical Examination of Characteristics of Mexican Migrants to Metropolitan and Nonmetropolitan Areas of the United States*

Frank L. Farmer and Zola K. Moon
School of Human Environmental Sciences
University of Arkansas

ABSTRACT This research examines differences between those Mexican migrants choosing metropolitan destinations and those choosing destinations outside metropolitan areas of the United States. Using general estimating equations, the study presents data indicating that since the 1960s migrants choosing rural destinations are less fluent in English, slightly older, much less educated, far more likely to be unskilled, more likely to be married, and more likely to be undocumented. The picture is more complex when consideration is restricted to those migrants arriving in rural areas since the passage of the North American Free Trade Agreement. These migrants are far more likely to be single, have more education but have less English fluency, have less work experience, and have less family experience with migration to the United States. They are more likely to come from small towns and rural areas of Mexico.

Introduction

While the in-migration of individuals and families from Mexico and Mesoamerica to the United States is one of the oldest and most durable streams in the world (see Gamio 1930; Slayden 1921), the current wave of Hispanic immigration has gained currency among researchers, foundations, and policymakers alike. Much of the current attention directed toward this migration flow is driven by the sheer volume of newcomers. Although close estimates are difficult to achieve, figures range from 7 to 20 million unauthorized migrants currently residing in the United States, with most rigorous efforts generating numbers in the range of 11 to 12 million in 2005 (Passel 2005; Wasem 2004). An estimated 17 million of the foreign-born people in the United States are classified by the Census Bureau as Hispanic (Pew Hispanic Center 2007). Ballpark estimates indicate approximately 80 percent of that population are of Mesoamerican

* This research was partially funded by USDA National Research Initiative and the Arkansas Agricultural Experiment Station. Please direct correspondence to Frank L Farmer, School of Human Environmental Sciences, University of Arkansas, Fayetteville AR 72703 or at flfarmer@uark.edu.

origin with Mexico being the origin of nearly 60 percent of the migrants (Passel 2005).

While the magnitude of the inflow is certainly the primary driver for research interests, the destinations of the migrants have also heightened the visibility of the issue. To wit: unlike in earlier times, the current migration pattern has extended beyond the traditional urban ''gateway destinations'' or ''immigration portals'' to interior urban areas, small towns and rural areas (Alba and Denton 2004; Durand, Massey, and Charvet 2000; Hirschman and Massey 2008; Kandel and Cromartie 2004; Lichter and Johnson 2006; Singer 2004). This movement of Hispanic migrants to areas outside of traditional (and largely urban) destinations of Texas and Southern California to the Midwest and South, small towns and rural areas, has resulted in a greater awareness of the migrants within a wider range of communities than in the past. As Hirschman and Massey (2008:3) note, ''Given the virtual absence of immigrants to many regions of the U.S. up to 1990, even a small shift away from the traditional gateways impl[ies] huge relative increases at new destinations.''

Substantial work has been done on the community context and the social networks at the origin that impact migration (e.g., Durand et al. 2000; Durand, Massey, and Zenteno 2001; Fussell 2004; Massey and Espinosa 1997; Phillips and Massey 2000; Reyes and Mameesh 2002). The distribution of the migrants across the rural landscape is also being carefully monitored (see Cromartie 2001; Economic Research Service 2005; Fuguitt, Beale, and Tordella 2002; Guzman 2001; Johnson, Nucci, and Long 2005; Kandel and Cromartie 2004; Kochhar, Suro, and Tafoya 2005; Lichter and Johnson 2006; McGranahan 1999; Nord and Cromartie 2000). However, there has been much less work done considering the characteristics of migrants who choose rural areas compared to those who choose urban destinations.

The attraction of migrants to rural areas may be related to the area-specific opportunity structure (Nord 1998). Rural areas differ from urban areas in terms of the mix of opportunities that may require lower levels of education, provide accessibility of employment in low-skill occupations, and offer low-income subsistence opportunities, such as low-cost housing (Fitchen 1995; Nord 1998; Nord, Luloff, and Jenson 1995). Clearly this opportunity mosaic differs among areas with varying levels and types of social and economic structures. Just as the opportunity structure of places differs among areas, so do education, work skills, language abilities, and other sociodemographic characteristics vary among Mexican migrants. Thus the potential migrant,

endowed with a set of skills and abilities, is presented with a tableau of rural and urban opportunity structures, and those structures influence the destination choice.

The empirical question, then, is whether there is a degree of residential sorting that occurs among migrants to the United States—is there a relationship between the migrants' human and migration capital and where they migrate? In order to examine this question, our research analyzed human- and social-capital differences between those migrants choosing metropolitan destinations and those choosing destinations outside metropolitan areas in the United States. Given recent migration and economic policy dynamics, the article includes a temporal component. Specifically, two substantive policy and economic changes in the United States occurred during the time frame of the data included for analysis. First, the Immigration Reform and Control Act (IRCA), passed in 1986, resulted in the legalizing of many then-undocumented migrants. Second, the institution of the North American Free Trade Act (NAFTA) in 1994 significantly impacted the macroeconomic relations between Mexico and the United States. Other research (Canales 2003; Durand et al. 2000; Fussell and Massey 2004) has outlined the significance of these two events in understanding changes in migration patterns. Additionally, concomitant to these policy shifts have been changes in the social and economic landscape of the United States that may have impacted migration decision making. For example, during this period a substantial employment draw to rural destinations emerged in the food-processing and meatpacking industries. Consequently, the analyses consider subsets of the data in two time periods demarcated by IRCA and NAFTA, allowing insights about potential impacts of those policy shifts.

The following sections discuss the data employed in the analysis, the analytic model, and its empirical specification; present the empirical results; and discuss their implications.

Data and Methods

Data Source and Characteristics

To provide insight into potential differences among migrants, the study analyzed data from the Mexican Migration Project (MMP), a collaborative research project based at Princeton University and the University of Guadalajara.[1] Researchers collected these data through

[1] The data sets, codebooks, survey instruments, and full description of the project may be found at http://mmp.opr.princeton.edu.

household surveys begun in 1982 and continuing to the present. The surveys were conducted mainly in over 100 purposely sampled communities in west central Mexico. Comparisons with other survey data indicate that the MMP data ''can be used as a basic source of information on the processes and characteristics of Mexican migration to the United States'' in general (Massey and Zenteno 2000:790).

In each community, researchers collected an array of information from household heads and members of 150 to 200 households, including information on those individuals who had been to the United States.[2] In addition to these Mexican community samples, other surveys gathered information on U.S. migrants based on data from the surveys of Mexican households.[3] The MMP data contains attributes of individuals (both heads of households and spouses), the migration history of heads of households, household characteristics, and community characteristics. The project used heads of households since time-varying data were available only for them. Selection of heads of households enabled linking to the annual migration history as well as household and community characteristics. This construction of the data created an event-history table in which each record is a person-year containing individual attributes that changed over time (age, educational attainment, occupation, marital status) as well as migration (legal status, destination, length of stay) and employment information for the prior year. The study years are constrained to 1965 forward and the ages (at the time of the person-record) are between 15 and 65. Destination of a migratory trip was coded urban (0) or rural (1) depending on whether the migrant arrived in a metropolitan statistical area (MSA) (as defined in the year of migration) or in a non-MSA area. No county-level data are available.

Analytic Model

The potential difference between rural and urban migrants might be considered through a simple logistic regression with rural or urban

[2] A trip was defined by purpose, not length, in the MMP data. Therefore, a ''trip'' excluded visits for reasons such as shopping, social visits, vacations, or commuting (in the case of border residents).

[3] The study weighted samples by the inverse of the sampling fraction used at each Mexican and U.S. site. In the Mexican communities, the number of households in the sample divided by the number of households in the sampling frame created the weighting. In the United States, however, the sampling fractions were estimated, based on the division of the number of households actually surveyed by the estimated out-migrant community households. Information on the estimation of size of the out-migrant community was based on data provided by the heads of households regarding the location of children who were no longer residing with the head of household.

destination as the binary endogenous variable. However, in this case the longitudinal data cluster in subgroups (individuals and communities), and the correlation within these clusters has the potential to violate the assumption of independence of the observations. Failure to account for this correlation may result in inefficient and incorrect estimation of the model's parameters (Ballinger 2004; Zeger and Liang 1986).

In this analysis an individual may have made multiple trips and thus the individual's characteristics are represented in the record for each trip, suggesting repeated measurements and possible difficulties with the independence assumption. Generalized estimating equations (GEE) are a nonlikelihood based approach to modeling repeated or clustered data, accounting for the correlation among repeated measures or observations on the same subject (Zeger and Liang 1986; Ziegler, Kastner, and Blettner 1998).[4]

The general form of the GEE analytic model is derived from modifying the generalized linear model to account for correlated data in which repeated observations occur through time (Liang and Zeger 1986; Zeger and Liang 1986). For the data under consideration in this article, from notation from Liang and Zeger (1986), the dependent variable Y_{it} has k covariates X_{it} where $i = \{1, 2, \ldots, N\}$ is the set of units of analysis (''clusters'' of records for an individual through time) and $t = \{1, 2, \ldots, T\}$ for T time points. Suppose $Y_i = [Y_{i1}, Y_{i2}, \ldots, Y_{iT}]$ represents the column vector of observations for observation i, and $\boldsymbol{X}_i$ then represents the T x k matrix of covariates for the same observations. A function h can calculate the expected value $\mathrm{E}(Y_i)$, which provides a relationship between Y_i and X_i as $\boldsymbol{\mu}_i = h(X_i\boldsymbol{\beta})$, where $\boldsymbol{\beta}$ is a $k \times 1$ vector of parameters and h is known as the ''link'' function. Variance, V_i of Y_i, is given by a function g of the mean, $V_i = \frac{g(\boldsymbol{\mu}_i)}{\phi}$ where ϕ represents a scale parameter. To estimate $\boldsymbol{\beta}$, the model solves a set of k ''quasi-score'' differential equations described by

$$U_k(\boldsymbol{\beta}) = \sum_{i=1}^{N} D'_i V_i^{-1}(Y_i - \boldsymbol{\mu}_i) = 0$$

[4] GEE models are an extension of generalized linear models that enable the researcher to model the correlation matrix of the response variable by making use of a working correlation matrix. A variety of working correlation matrices can be specified. Finding a GEE solution involves selecting a link function, specifying the variance functions, and providing an initial working correlation matrix. The model estimates initial values of βs, then computes the working correlation matrix, estimates the covariance matrix, and then updates the βs, computes residuals, and updates the covariance matrix. This process iterates until convergence.

$$\text{where } D_i = \boldsymbol{\mu}_i/\boldsymbol{\beta} \text{ and } V_i = \frac{(A_k)^{1/2} R_i(\boldsymbol{\alpha})(A_i)^{1/2}}{\boldsymbol{\phi}}. \quad (1)$$

In this case, this model is a *binary* distribution and the link function is coded to be the *log* alternative accordingly.[5]

GEE is a particularly efficient large-sample method in the case of large numbers of clusters (Liang and Zeger 1986; Zeger and Liang 1986). As the number of clusters of records becomes large—as in this case—the GEE parameter estimates are consistent even if the working correlation matrix is misspecified, as long as the mean model is correct. In these data 12,258 records in 2,193 clusters remain after eliminating records with missing data.

Direct goodness of fit measures for GEE models are not as readily available as with other analytical methods. One way to evaluate goodness of fit is by comparing the empirical covariance structure used within the GEE model to estimate the covariance matrix of the response variable with the model-based covariance structure (Ziegler, Kastner, and Blettner 1998). If these are close in values and identical in pattern and sign, then one can presume the correlation structure used to fit the GEE mode is appropriate and does not indicate a poorly fitted model. Another method involves comparison to a traditional linear model; a better fitting GEE model should exhibit smaller standard errors. A third approach is to examine observation-level statistics. Review of these indicators reveals few observations that are extreme outliers. GEE analyses performed without these outlier data points give similar results. The findings reported here include all data points.

Another measure that has been developed for GEEs is a marginal *R*-square given in equation 2

$$R^2_{marg} = 1 - \frac{\sum_{t=1}^{T}\sum_{i=1}^{n}\left(Y_{it} - \hat{Y}_{it}\right)^2}{\sum_{t=1}^{T}\sum_{i=1}^{n}\left(Y_{it} - \overline{Y}\right)^2} \quad (2)$$

where $\bar{Y}$ is the marginal mean rather than the cross-sectional mean (Zheng 2000). This measure can be interpreted similarly to an R^2 measure for ordinary least squares except that we adjusted the calculation to reflect proportional reduction in variation of the

[5] GEEs estimating equations are a family of generalized linear models that includes logistic, probit, and complementary log-log regression for binomial data and Poisson regression for count data, as well as continuous models such as ordinary linear regression and gamma and inverse Gaussian regression models. This particular case specified a log link and binary distribution —this model reduces to the familiar logistic regression should there be zero violation of independence within repeated measures on a subject (here an individual with multiple records, one per year).

marginal model (note the use of the marginal mean). The range of the marginal R^2 is different, however, with an upper bound of 1 indicating perfect prediction and 0 indicating no association and having a negative value when the null model has less variation than the fitted model of interest (Zheng 2000). We use the marginal R^2 measure both to suggest the proportional reduction in variation in the models and for comparison of fit between the models.

Empirical Specification

The endogenous variable is binary and measured as migration to nonmetropolitan area or migration to a metropolitan area. The exogenous variables, β_i, … β_k, in this analysis include the individual migrant's attributes: education, occupation history (unskilled manufacturing or service work and agricultural work), English fluency, age, marital status, whether or not the migrant was undocumented, whether or not immediate family members (parents and siblings) have prior experience migrating to the United States, and whether or not the individual originates from a small town or rancho rather than from a metropolitan area.[6] We consider each of these variables in turn.

Educational attainment measures human capital. Not only does level of education speak to the ability to advance and excel in the local labor market but it also is important in the daily functioning of the individual within the local social structure. Research has provided limited evidence that among Mexicans the lowest educated are more likely to migrate than those in the middle of the education distribution (Caponi 2006; Chiquiar and Hanson 2005). Other research has linked educational attainment of migrants to resultant socioeconomic standing as well as labor market opportunities (Mare 1991). Educational attainment of the individual migrant therefore is important in understanding individual as well as familial or household outcomes.

Migrant job skills provide insight into human-capital measures not captured with the education variable. The inclusion of this variable explicitly recognizes that much of the training of workers occurs outside the formal school setting. Indeed, in many cases even workers with extensive education do not possess the skills required for specialized employment. This model measures different labor-employment experience, comparing agricultural experience to unskilled-

[6] Gender is not included as a parameter because most heads of household surveyed are male and the *N* for female heads of household is too small for separate analysis.

manufacturing or service-job experience to reflect the potential of different skill sets among migrants and different prospects for job placement.

English-language proficiency is a standard measure of acculturation and potential for success among migrants to the United States (Massey and Zenteno 2000; see also Carliner 2000). At a minimum, the lack of language proficiency limits the individual's ability to fully maximize skills and abilities he or she may possess and, to some degree, limits upward mobility, creates barriers to integration into local society, and requires communities to expend effort to ensure equitable and adequate educational and social services (Grenier 1984; Kandel and Cromartie 2004). Numerous studies (see Espinoza and Massey 1997 for summary) have demonstrated that English proficiency is positively related to earnings as well as general socioeconomic status of migrants. Recent research (Bauer, Epstein, and Gang 2005) has demonstrated a strong association between English-language proficiency and migration destination selection.

Age is important in that the current migration stream is largely labor driven. Age can be viewed as a measure of individual employment life cycle. From this perspective, younger migrants are in the entry and experimentation stage of employment, whereas older/middle-age are more career established and may migrate in response to opportunity for substantial economic/career gains (Ritchey 1976). In either case, age-selective migration has social, economic, and political impacts in both receiving and sending communities (Alba and Denton 2004; Singer 2004). Age composition directly and indirectly influences household formation, demand for child-care services, local fertility rates, and need for educational institutions among other institutional needs.

Studies have shown marital status and a history of family migration to be salient variables in understanding an individual's propensity to migrate (Aguilera and Massey 2003; Cerrutti and Massey 2001; Massey 1990; Massey and Espinosa 1997; Phillips and Massey 2000). Marital status contributes to the health and stability of the individual migrating, and perhaps contributes to the economic motivations of migration. Massey, Durand, and Malone (2002) suggest as well that migrant workers who are married and have spouses and families in the country of origin may find difficulties in addressing family-related matters and may have a tendency to return to Mexico. Other research indicates that married Mexican males tend to earn more while in the United States and have more opportunities for employment than those that are not married (Rivera-Bartiz 1999).

The influence of family migration capital is an important variable in understanding migration decision making. A history of family migration implies the individual will have available to him or her knowledge and skills that other migrants might lack and an important network of social capital to utilize. Aguilera and Massey (2003) demonstrated that having friends and family members who have migrated improves a migrant's ability to find and secure employment and increases earnings. Several studies have examined the influences of family migration history on the propensity for migration (e.g., Palloni et al. 2001; Massey and Espinosa 1997). Family-based migration networks appear to be significant even when other individual human-capital attributes are controlled (Palloni et al 2001).

An interplay of documentation status and age, education and marital status, and characteristics of the place of origin predicts the likelihood of migration. In general, those from interior rural origins, younger, less well educated, and unmarried are more likely to make undocumented trips to the United States (Fussell 2004; Massey and Espinosa 1997). The likelihood of such a trip is also conditioned by characteristics of local areas (presence of a preparatory school or a bank, for example) (Massey and Espinosa 1997). Legal status may also combine with social ties in destination decision making (Aguilera and Massey 2003; Reyes and Mameesh 2002).

Finally, rural origin is an important individual trait, particularly when examining migration to rural areas. Migrants from rural areas to rural areas will perhaps find the destination's rural nature more familiar and less challenging than a new urban environment. Community values in rural areas may also be more familiar than those stereotypically associated with urban lifestyles. Additionally, rural-to-rural migration may also imply selectivity based on employment background and skills and relative competitiveness.

Table 1 lists and defines the variables included in the analytical model. The study coded binary variables (except age) so a value of 1 indicates possession of the trait contained in the variable.

Findings

Univariate and Bivariate Results

Table 2 provides the characteristics of the variables. It includes means and standard deviations as well as *N*s (weighted and unweighted) for the total data set, which it then splits by trip destination. The univariate measures indicate a difference between those individuals making trips

Table 1. Definition of Variables Used in the Analysis of Differences between Migrants to Nonmetropolitan Areas and Metropolitan Areas

Variable	Definition
Outcome: trip to United States	Destination is nonmetropolitan area
Age	Age at time of trip to United States
Low education	Education below fourth grade
Agricultural work experience	Previous agricultural work experience
Unskilled manufacturing work experience	Previous unskilled manufacturing experience
Unskilled service work experience	Previous unskilled service experience
English fluency	Speaks and understands at least some English
Married	Married or in consensual union
Undocumented status	Lacks legal documentation for this trip
Immediate family history of migration to United States	Immediate family (parents or siblings) have history of migrating to United States
Rural origin	Migrant is from small town or rancho

to rural as opposed to urban areas.[7] Rural-destination migrants are, on average, older than those bound for urban areas. Similarly, the average age of migrants increases through time as does the average of persons with more than a fourth-grade education. Other differences are more easily seen in Table 3.

Table 3 provides a cross tabulation of the variables against rural versus urban destination and displays the chi-square differences between the two groups. In all cases, the differences between the groups are statistically significant. Educational levels differ within the pools, as about half of those destined for rural areas have less than a fourth-grade education compared to about a third of urban-destination migrants. Most migrants bound for the rural United States have previous experience in agricultural work, while only a few have had previous work experience as unskilled laborers in manufacturing or service industries. Within the pool of those migrants arriving at rural destinations, approximately two-thirds have little fluency with English, a larger percentage by about 10 points than in the pool of urban-destination migrants. A higher percentage of rural-destination migrants are married or in a consensual union than the percentage of urban-destination migrants. More than two-thirds of migrants, whether to

[7] There are cases in which a migrant goes to a nonmetropolitan destination and on a different trip goes to an urban destination, or vice versa. The research objective here is to consider migration trips to nonmetropolitan (rural) destinations regardless of whether prior or subsequent trips are made to urban areas. How individuals making multiple trips to disparate destinations may differ from one another is a separate analysis, though potentially an interesting one.

Table 2. Characteristics of Migrant Household Heads by Metropolitan/Nonmetropolitan Destination of Trip

	Complete Data Set			Rural Destination			Urban Destination		
	N (Unweighted)	Mean	SD	*N* (Unweighted)	Mean	SD	*N* (Unweighted)	Mean	SD
Rural destination	12,477	0.1123	0.913	2,219			10,258		
Age	12,990	30.3890	29.814	2,219	33.4970	22.8290	10,258	29.8850	30.8860
Low education	12,990	0.3344	1.366	2,219	0.4809	1.1485	10,258	0.2993	1.3762
Agricultural work experience	12,990	0.3453	1.377	2,219	0.537	1.1462	10,258	0.3139	1.3946
Unskilled manufacturing work experience	12,990	0.010	0.288	2,219	0.0161	0.2889	10,258	0.0098	0.2953
Unskilled service work experience	12,990	0.1133	0.918	2,219	0.047	0.4865	10,258	0.1207	0.9789
English fluency	12,990	0.0131	0.329	2,219	0.0134	0.2644	10,258	0.0136	0.3486
Married or in consensual union	12,754	0.4504	1.444	2,193	0.3678	1.1099	10,065	0.4630	1.5029
Undocumented status	12,990	0.6523	1.379	2,219	0.7802	0.9520	10,258	0.6323	1.4490
Immediate family history of migration to United States	12,990	0.6554	1.376	2,219	0.6643	1.0856	10,258	0.6502	1.4332
Rural origin	12,990	0.6931	1.335	2,219	0.7288	1.0220	10,258	0.6929	1.3862

Notes: All differences between rural and urban destination migrants are significant at $p < .001$. SD = standard deviation.

Table 3. Characteristics by Migration Destination as Percentage

	Rural Destination (Percent)[a]		Urban Destination (Percent)[a]			
Low education	Less than fourth grade	More than fourth grade	Less than fourth grade	More than fourth grade	Chi-square	*p*-value
	48.09	51.91	29.93	70.07	1577.21	<.0001
Agricultural work experience	No 46.3	Yes 53.7	No 68.61	Yes 31.39	2310	<.0001
Unskilled manufacturing work experience	No 98.39	Yes 1.61	No 99.02	Yes 0.98	39.969	<.0001
Unskilled service work experience	No 95.3	Yes 4.7	No 87.93	Yes 12.07	566.037	<.0001
English fluency	No fluency 63.22	Fluency 36.78	No fluency 53.7	Fluency 46.3	377.106	<.0001
Married or in consensual union	No 21.98	Yes 78.02	No 36.77	Yes 63.23	998.751	<.0001
Family has prior US migrant experience	No 27.12	Yes 72.88	No 30.71	Yes 69.29	63.330	<.0001
Undocumented status	No 33.57	Yes 66.43	No 34.98	Yes 65.02	9.111	<.003
Rural origin	No 47.66	Yes 52.34	No 68.46	Yes 31.54	2009.38	<.0001

[a] Percent applies to bottom row of each cell in Rural Destination and Urban Destination columns.

urban or rural areas, have immediate family members with previous immigration experience to the United States. Undocumented status percentages between the groups are similar, with approximately two out of three migrants being undocumented. Slightly more than half of those whose destination is a nonmetropolitan area come from a rancho or small town compared to less than one-third of those who migrate to urban areas.

Within the data set, then, migrants to rural areas are proportionately slightly older, less well educated, more likely to have agricultural work experience, less fluent in English, more likely to be married, more likely to come from a family with previous migration experience, and likely to be undocumented. These percentages reflect what might be anticipated. Multivariate analyses of the data set, however, allow a closer examination of the differences between the attributes of migrants to rural and urban areas.

Multivariate Results

Tables 4 and 5 give the results of the GEE models for the data. Table 4 compares two models: the complete data set and first-time migrators. Table 5 compares two different time periods: 1987 to 1994 and 1995 to 2004, periods based on policy and economic changes in the United States, specifically passage of IRCA and NAFTA. Other scholars have shown that these policy changes have significant influences on migration patterns (Canales 2003; Durand et al. 2000; Fussell and Massey 2004).

Table 4 indicates that the parameters of the model for the entire data set have explanatory power. The table shows the parameter's estimated value, odds ratio (natural log of the estimated value), and associated *p* value. The binary response variable indicates whether or not the destination of a trip to the United States was to a nonmetropolitan area or not and is modeled for the probability the destination was a rural one. The odds can be interpreted as the likelihood the parameter in question will take on a particular value. The table interprets odds ratios greater than 1 as the likelihood (at the time of migration) of being older than the mean age; having less than fourth-grade education; having prior experience in agriculture, unskilled manufacturing, or service work; speaking some to a great deal of English; being married or in a consensual union; being an undocumented migrant; having immediate family with migration experience; and coming from a small town or rancho in Mexico.

For the entire data set, which includes the time period between 1965 and 2004, all exogenous variables are significant and in the anticipated direction. Migrants to rural areas are slightly older than the mean. Compared to urban migrants, they are also far more likely to have less than a fourth-grade education. The previous work experience of migrants bound for rural areas is also notably more concentrated in agriculture and unskilled manufacturing and not in unskilled service work than that of the urban migrants. Those migrants choosing rural areas are also slightly less likely to be able to speak English and more likely to be married. As might be expected, migrants to nonmetropolitan regions are slightly more likely to be undocumented and more likely to come from a family with experience in migration to the United States than those to urban areas. Migrants to rural areas are more than twice as likely to originate in rural areas even though migrants originating in urban areas outnumber rural-resident migrants nearly two to one in the data. The marginal *R*-square for the entire data set indicates that the model does have some explanatory power, though it

Table 4. General Estimating Equation Model Results of Migrant Characteristics on Nonmetropolitan Destination, Models 1 and 2

	Model 1: All Data				Model 2: First-Time Migrators			
Parameter	Estimated Value	Standard Error	Odds Ratio	*p*-value	Estimated Value	Standard Error	Odds Ratio	*p*-value
Intercept	−3.970	0.051		<.0001	−4.650	0.125		<.0001
Age in years	0.022	0.001	1.023	<.0001	0.020	0.003	1.021	<.0001
Education less than fourth grade	0.304	0.023	1.355	<.0001	−0.185	0.054	0.831	<.0007
Agricultural work experience	0.715	0.022	2.045	<.0001	1.120	0.048	3.066	<.0001
Unskilled manufacturing work experience	0.949	0.084	2.583	<.0001	0.607	0.160	1.836	<.0002
Unskilled service work experience	−0.603	0.047	0.547	<.0001	−0.448	0.097	0.639	<.0001
Speaks some to a great deal of English	−0.069	0.022	0.933	<.003	−0.404	0.054	0.668	<.0001
Married or in consensual union	0.355	0.027	1.426	<.0001	0.278	0.053	1.320	<.0001
Undocumented	0.146	0.023	1.157	<.0001	0.899	0.089	2.457	<.0001
Immediate family history of migration	0.223	0.024	1.250	<.0001	−0.107	0.046	0.899	<.03
Rural origin	0.810	0.021	2.247	<.0001	0.883	0.046	2.417	<.0001
Marginal *R*-square	0.23				0.13			

Notes: Observations read, Model 1: 12,477; Model 2: 3717. Observations used, Model 1: 12,258; Model 2: 3,623. Observations weighted, Model 1: 103042.4; Model 2: 35031.07. Log likelihood, Model 1: −33318.65; Model 2: −7427.14.

Table 5. General Estimating Equation Model Results of Migrant Characteristics on Nonmetropolitan Destination, Models 3 and 4

	Model 3: Post IRCA and before NAFTA (1987–1994)				Model 4: Post NAFTA (1995–2004)			
Parameter	Estimated Value	Standard Error	Odds Ratio	*p*-value	Estimated Value	Standard Error	Odds Ratio	*p*-value
Intercept	−4.669	0.113		<.0001	−3.238	0.164		<.0001
Age in years	0.027	0.002	1.028	<.0001	0.035	0.004	1.036	<.0001
Education less than fourth grade	0.371	0.052	1.449	<.0001	−1.465	0.126	0.231	<.0001
Agricultural work experience	0.961	0.045	2.614	<.0001	−0.556	0.104	0.573	<.0001
Unskilled manufacturing work experience	1.536	0.183	4.646	<.0001	−0.434	0.145	0.648	<.003
Unskilled service work experience	−0.208	0.082	0.812	<.020	−0.676	0.149	0.509	<.0001
Speaks some to a great deal of English	0.093	0.045	1.098	<.0400	−0.229	0.082	0.795	<.006
Married or in consensual union	0.152	0.053	1.164	<.005	−0.617	0.080	0.539	<.0001
Undocumented	−0.190	0.046	0.827	<.0001	0.105	0.076	1.110	<.1704
Immediate family history of migration	0.479	0.060	1.615	<.0001	−0.305	0.069	0.737	<.0001
Rural origin	1.355	0.043	3.878	<.0001	2.257	0.074	9.554	<.0001
Marginal *R*-square	0.30				0.29			

Notes: Observations read, Model 3: 3,734; Model 4: 1,172. Observations used, Model 3: 3,670; Model 4: 1,156. Observations weighted, Model 3: 28608.07; Model 4: 9481.803. Log likelihood, Model 3: −8272.68; Model 4: −2969.54.

is also clear that other factors not examined in this model would contribute to explaining the marginal variance.

Separating the data set into first-time migrators provides an interesting comparison. All parameters are statistically significant as with the previous model. Several differences are notable. Low educational attainment, having less than a fourth-grade education, is less likely for first-time migrants to rural destinations. Another notable difference from the entire data set is the increase in likelihood that first-time migrants to rural areas are much less fluent in English than the first-time migrants to urban areas. First-time migrants to rural areas are also three times more likely to have had agricultural experience and more than twice as likely to be undocumented. Rural first-time migrators in this database also represent families who have little experience with migration to the United States, as the parameter for immediate family history of migration is slightly less than 1. The rest of the parameters are generally similar in size and sign to those in the entire data set.

Table 5 shows two more models, representing the two temporal divisions. The results indicate that, indeed, the characteristics of migrants to rural areas have changed over time.

Although age does not change much between the two time periods, educational attainment does change a great deal after NAFTA. In considering differences between rural and urban migrants, the table shows that the odds ratio for the parameter for education less than fourth grade drops by nearly 1.5 for the period before NAFTA to that after it. Mexican immigrants, in general, are better educated than in earlier periods (Reyes and Mameesh 2002) and increasing education tends to reduce additional migration (Fussell 2004). However, migration of better educated Mexicans may reflect the lack of economic returns for more education within Mexico itself, where wages declined rapidly in the 1980s and remained essentially stagnant through the 1990s (Canales 2003).

The more recent Mexican migrants to rural areas are considerably less likely than their predecessors to have previous work experience in agriculture or unskilled manufacturing. This result seemed somewhat anomalous but other recent research (Canales 2003; Marcelli and Cornelius 2001) appears to support the finding. A review of frequencies for all the occupational categories in the data confirms the shift in the distributional patterns of migrants in earlier periods and the period since NAFTA.

Fluency in English is clearly a more significant issue for the more recent arrivals in rural areas. Migrants to rural areas since NAFTA are

much less likely to speak some English than earlier migrants. Another large difference in migrants coming to rural regions since NAFTA is the difference in the parameter for being married or in a consensual union. More recent immigrants are half as likely to be married or in a consensual union as earlier migrants to rural areas. Interestingly, the parameter for being an undocumented migrant is not significant after NAFTA. It is in the expected direction—that is, indicating a greater likelihood of being undocumented—but is not statistically significant at the $p < .05$ range.

The last two parameters shed an intriguing light on the changes over time in characteristics of Mexican migrants to rural areas. Unlike in earlier time periods, compared to urban migrants, Mexican migrants to rural areas since NAFTA are less likely to have immediate family members with migration experience to the United States. This implies that many of these migrants are family ''pioneers'' to the United States. This study did not examine extended family or community connections, and this parameter indicates a need for further investigation. It may be this parameter reflects the extension of more tenuous social networks operating now. It also indicates that those migrating to urban areas are far more likely to have close family members who have migration experience. This raises another question for future research regarding return migration to rural areas. Studies have demonstrated family linkages and migration experience to be important (Fussell and Massey 2004; Massey and Espinosa 1997; Phillips and Massey 2000), and this parameter's change over time raises the question as to whether migrants with previous experience in the United States favor return to urban or rural regions.

Finally, it is abundantly clear that more recent migrants to rural areas come from small towns and ranchos in Mexico. This parameter overshadows the others and is stronger in the post-NAFTA group than in any other subpopulation analyzed. For the period between IRCA and NAFTA, migrants were nearly four times as likely to come from rural areas. The size of this parameter more than doubles after NAFTA, raising additional questions for further research about the specific changes in the underlying mechanisms in both Mexico and the United States that might explain this dramatic result.

Conclusions

The data presented here show that since the 1960s migrants choosing rural destinations are less fluent in English, slightly older, much less educated, far more likely to be unskilled, far more likely to be married,

slightly more likely to have close family members with previous migration experience, and more likely to be undocumented than those choosing urban areas. These measures do not account for other traits that may also be present such as stronger family ties, work ethic, motivations, or personal objectives.

The picture is a bit more complex if one examines only those migrants arriving in rural areas more recently. These migrants are far more likely than those migrating to urban areas to be single, have more education but less English fluency, have less unskilled work experience, and have less family experience with migration to the United States. They are significantly more likely to come from small towns and rural areas of Mexico. These particular attributes have different implications for rural communities than in earlier periods. Unlike previously, these newer migrants may seek to live in shared, communal spaces with other unattached migrants. They are also likely to have relatively less experience, at least through close family members, of social institutions, expectations, and customs in the United States, which might serve as a barrier to integration and assimilation.

These findings indicate that, in general, there are substantial differences across an array of important sociodemographic characteristics between migrants to rural areas and urban destinations. The analytical results indicate a pattern of differences between these groups of migrants. It is reasonable to presume migrants are being drawn to rural areas because of actual or perceived opportunity structures that better match the migrants' existing set of characteristics than urban areas provide. The analysis provides evidence as well that substantive differences exist between pre- and post-NAFTA periods, which suggest changes in the demand for labor in metropolitan and nonmetropolitan destinations.

Migrants from Mexico's historic sending regions have long provided apparently needed labor in the United States. The empirical results herein are important when placed in the context of efforts by leaders (at all levels of government) to grapple with migration policy for these apparently needed workers. The recognition that rural areas have limited resources compared to urban areas for assisting in the adaptation and assimilation of new residents is crucial. Should there be a comprehensive migration policy implemented, it is important to recognize the unique circumstance of rural areas. Understanding the stresses placed on rural communities in terms of educational institutions, social services, governmental interactions, language and cultural barriers, and the efforts toward workforce training and development should be a key element in any policy actions.

References

Aguilera, M.B. and D.S. Massey. 2003. ''Social Capital and the Wages of Mexican Migrants: New Hypotheses and Tests.'' *Social Forces* 82:671–701.

Alba, R. and N. Denton. 2004. ''Old and New Landscapes of Diversity: The Residential Patterns of Immigrant Minorities.'' Pp. 237–61 in *Not Just Black and White: Historical and Contemporary Perspectives on Immigration, Race, and Ethnicity in the United States*, edited by N. Foner and G.M. Frederickson. New York: Russell Sage Foundation.

Ballinger, G.A. 2004. ''Using Generalized Estimating Equations for Longitudinal Data Analysis.'' *Organizational Research Methods* 7:127–50.

Bauer, T., G.S. Epstein, and I.N. Gang. 2005. ''Enclaves, Language, and the Location Choice of Migrants.'' *Journal of Population Economics* 18:649–62.

Canales, A.I. 2003. ''Mexican Labour Migration to the United States in the Age of Globalization.'' *Journal of Ethnic and Migration Studies* 29:741–61.

Caponi, V. 2006. ''Heterogenous Human Capital and Migration: Who Migrates from Mexico to the US?'' Discussion Paper No. 2446, Institute for the Study of Labor, Bonn, Germany

Carliner, G. 2000. ''The Language Ability of U.S. Immigrants: Assimilation and Cohort Effects.'' *International Migration Review* 34:150–82.

Cerrutti, M. and D.S. Massey. 2001. ''On the Auspices of Female Migration from Mexico to the United States.'' *Demography* 38:187–200.

Chiquiar, D. and G. Hanson. 2005. ''International Migration, Self-selection and the Distribution of Wages: Evidence from Mexico and the United States.'' *Journal of Political Economy* 113:239–81.

Cromartie, J. 2001. ''Migrants in the Rural South Choose Urban and Natural Amenities.'' *Rural America* 15:7–18.

Durand, J., D.S. Massey, and F. Charvet. 2000. ''The Changing Geography of Mexican Immigration to the United States: 1910–1996.'' *Social Science Quarterly* 81:1–16.

Durand, J., D.S. Massey, and R.M. Zenteno. 2001. ''Mexican Immigration to the United States: Continuities and Change.'' *Latin American Research Review* 36:107–27.

Economic Research Service. December 2005. *Rural Hispanics at a Glance.* Economic Research Service, U.S. Department of Agriculture: Economic Information Bulletin No. 8. Washington, DC: U.S. Department of Agriculture.

Espinosa, K.E. and D.S. Massey. 1997. ''Determinants of English Proficiency among Mexican Migrants to the United States.'' *International Migration Review* 31:28–49.

Fitchen, J. 1995. ''Spatial Redistribution of Poverty through Migration of Poor People to Depressed Rural Communities.'' *Rural Sociology* 60:181–201.

Fuguitt, G.V., C.L. Beale, and S.J. Tordella. 2002. ''Recent Trends in Older Population Change and Migration for Nonmetro Areas, 1970–2000.'' *Rural America* 17:11–20.

Fussell, E. 2004. ''Sources of Mexico's Migration Stream: Rural, Urban, and Border Migrants to the United States.'' *Social Forces* 82:937–67.

Fussell, E. and D.S. Massey. 2004. ''The Limits to Cumulative Causation: International Migration from Mexican Urban Areas.'' *Demography* 41:151–71.

Gamio, M. 1930. *Mexican Immigration to the United States: A Study of Human Migration and Adjustment.* Chicago, IL: University of Chicago Press.

Grenier, G. 1984. ''The Effects of Language Characteristics on the Wages of Hispanic-American Males.'' *Journal of Human Resources* 19:35–52.

Guzman, B. 2001. *The Hispanic Population: Census 2000 Brief.* Economics and Statistics Administration, U.S. Census Bureau, U.S. Department of Commerce: Report C2KBR/01–3. Washington, DC: U.S. Census Bureau.

Hirschman, C. and D.S. Massey. 2008. ''People and Places: The New American Mosaic.'' Pp. 1–22 in *New Faces and New Places: The Changing Geography of American Immigration*, edited by D.S. Massey. New York: Russell Sage Foundation.

Johnson, K.M., A. Nucci, and L. Long. 2005. ''Population Trends in Metropolitan and Nonmetropolitan America: Selective Deconcentration and the Rural Rebound.'' *Population Research and Policy Review* 24:527–42.

Kandel, W. and J. Cromartie. 2004. *New Patterns of Hispanic Settlement in Rural America*. Economic Research Service, U.S. Department of Agriculture. Washington, D.C.: U.S. Department of Agriculture.

Kochhar, R., R. Suro, and S. Tafoya. 2005. *The New Latino South: The Context and Consequences of Rapid Population Growth*. Washington, DC: Pew Hispanic Center.

Liang, K.-Y. and S.L. Zeger. 1986. ''Longitudinal Data Analysis Using Generalized Linear Models.'' *Biometrika* 73:13–22.

Lichter, D.T. and K.M. Johnson. 2006. ''Emerging Rural Settlement Patterns and the Geographic Distribution of America's New Immigrants.'' *Rural Sociology* 71:1037–59.

Marcelli, E.A. and W.A. Cornelius. 2001. ''The Changing Profile of Mexican Migrants to the United States: New Evidence from California and Mexico.'' *Latin American Research Review* 36(3):105–31.

Mare, R. 1991. ''Five Decades of Educational Assortative Mating.'' *American Sociological Review* 56:15–32.

Massey, D.S. 1990. ''Social Structure, Household Strategies, and the Cumulative Causation of Migration.'' *Population Index* 56:3–26.

Massey, D.S., J. Durand, and N. Malone. 2002. *Beyond Smoke and Mirrors: Mexican Immigration in an Era of Free Trade*. New York: Russell Sage Foundation.

Massey, D.S. and K.E. Espinosa. 1997. ''What's Driving Mexico-U.S. Migration? A Theoretical, Empirical, and Policy Analysis.'' *American Journal of Sociology* 102:939–99.

Massey, D.S. and R. Zenteno. 2000. ''A Validation of the Ethnosurvey: The Case of Mexico-U.S. Migration.'' *International Migration Review* 34:766–93.

McGranahan, D.A. 1999. *Natural Amenities Drive Rural Population Change*. Economic Research Service, U.S. Department of Agriculture: Agricultural Economic Report No. 781. Washington, DC: U.S. Department of Agriculture.

Nord, M. 1998. ''Poor People on the Move: County to County Migration and the Spatial Concentration of Poverty.'' *Journal of Regional Science* 38:329–51.

Nord, M. and J. Cromartie. 2000. ''Migration in the Nonmetropolitan South.'' *Southern Rural Sociology* 16:175–205.

Nord, M., A.E. Luloff, and L. Jenson. 1995. ''Migration and the Spatial Concentration of Poverty.'' *Rural Sociology* 60:399–415.

Palloni, A., D.S. Massey, M. Ceballos, K. Espinosa, and M. Spittel. 2001. ''Social Capital and International Migration: A Test Using Information on Family Fetworks.'' *American Journal of Sociology* 106:1262–98.

Passel, J.S. 2005. *Estimates of the Size and Characteristics of the Undocumented Population*. Pew Hispanic Center Report, March. Washington, DC: Pew Hispanic Center.

Pew Hispanic Center. 2007. *A Statistical Portrait of the Foreign-Born Population at Mid-Decade, Table 4. Population by Race and Ethnicity: 2005*. Retrieved September 15, 2007 (http://pewhispanic.org/files/other/foreignborn/Table-4.pdf).

Phillips, J.A. and D.S. Massey. 2000. ''Engines of Immigration: Stocks of Human and Social Capital in Mexico.'' *Social Science Quarterly* 81:33–48.

Reyes, B.I. and L. Mameesh. 2002. ''Why Does Immigration Trip Duration Vary across U.S. Destinations?'' *Social Science Quarterly* 83:580–93.

Ritchey, N. 1976. ''Explanation of Migration.'' *Annual Review of Sociology* 2:363–404.

Rivera-Bartiz, F. 1999. ''Undocumented Workers in the Labor Market: An Analysis of the Earnings of Legal and Illegal Mexican Immigrants in the United States.'' *Journal of Population Economics* 12:91–116.

Singer, A. 2004. *The Rise of New Immigrant Gateways*. Center on Urban and Metropolitan Policy, Brookings Institute. Washington, DC: Brookings Institute.

Slayden, D. 1921. ''Some Observations on Mexican Immigration.'' *Annals of the American Academy of Political and Social Science* 43:121–26.

Wasem, R. 2004. *Unauthorized Aliens in the United States: Estimates since 1986*. Congressional Research Report RS21938, September 2004, Washington, DC.

Zeger, S.L. and K.-Y. Liang. 1986. ''Longitudinal Data Analysis for Discrete and Continuous Outcomes.'' *Biometrics* 42:121–30.

Zheng, B. 2000. ''Summarizing the Goodness of Fit of Generalized Linear Models for Longitudinal Data.'' *Statistics in Medicine* 19:1265–75.
Ziegler, A., C. Kastner, and M. Blettner. 1998. ''The Generalized Estimating Equations: An Annotated Bibliography.'' *Biometrical Journal* 40:115–39.