Impacts of Policy Reforms on the Supply of Mexican Labor to U.S. Farms: New Evidence from Mexico

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Introduction

The availability of immigrant farmworkers from Mexico may be the single most important factor shaping the future of fruit, vegetable, and horticultural (FVH) production in the United States (U.S.), affecting cropping patterns, choice of production technologies, and the ability of U.S. producers to compete with low-cost producers abroad. According to the National Agricultural Worker Survey (NAWS), Mexico-born persons represented an estimated 77 percent of the U.S. farm workforce in 1997-98 (up from 57 percent in 1990; U.S. Department of Labor, 2000 and 1991). Most of these workers (52 percent) were unauthorized. An overwhelming majority originate from households in rural Mexico (U.S. Commission on Immigration Reform, 1997).

Two major policy changes, The North American Free Trade Agreement (NAFTA) and the 1986 Immigration Reform and Control Act (IRCA), together with intensified enforcement along the southern U.S. border, were aimed wholly or partially at curtailing the flow of unauthorized Mexico-to-U.S. migration, potentially reducing the supply of labor to U.S. farms. The goal of this research is to econometrically test the effect of these policy changes on the flow of migrant labor from rural Mexico to U.S. farms. We do this by estimating a model for migration using retrospective data from the 2003 National Mexico Rural Household Survey.

Conceptual Framework

Given individual, household and community characteristics, policy changes may alter the larger milieu within which migration decisions take place. IRCA represented an exogenous policy effort to control migration. In light of U.S. farmers' reliance on unauthorized immigrant labor, IRCA had the potential for disproportionately large

impacts on agricultural labor markets. NAFTA was only partially motivated by migration concerns but was expected to have far-reaching impacts on migration flows.[1] Sharp increases in U.S. border enforcement were intended to curtail unauthorized immigration.

All three policies' possible impacts on migration are complex and theoretically ambiguous. For example, although IRCA imposed fines on U.S. employers for knowingly hiring unauthorized immigrants, it also legalized large numbers of unauthorized immigrants already in the United States. NAFTA requires a phase-out of price supports for Mexico's maize farmers, but it also opened up U.S. markets to Mexican agricultural exports and rural Mexico to U.S. agricultural investments. Increased U.S. border enforcement, while increasing the cost and risks of border crossings, also discouraged return migration by those who succeed in crossing the border. Thus, the net effects of these policy shocks on the migration of labor from rural Mexico to U.S. farms are ambiguous and can only be determined empirically.

Isolating effects of policy changes on migration is complicated not only by the plethora of individual, household and community variables influencing migration decisions over time but macroeconomic shocks that may have affected migration. These include major devaluations of the Mexican peso and shifts in per-capita GDP in both countries. Our econometric analysis controls explicitly for these variables. It also

[1] Presidents Salinas and Bush argued that opening up markets would help Mexico export more goods and fewer people, thereby reducing migration pressures. However, the Commission for the Study of International Migration and Cooperative Economic Development warned that freer trade could temporarily increase migration pressures as labor markets adjust to new market realities.

controls for migration networks or contacts in both farm and non farm labor markets in the United States, represented by lagged stocks of villagers in farm and non farm jobs.

Theoretical Model

At the micro level, international migration is only observed for households and family members that choose to participate in migration, which is a discrete decision. Migrants are individuals for which the expected benefits of migration, R, exceed the (unobserved) migration "reservation wage," ω. The migration reservation wage depends on local opportunities on and off the farm. Following Mincer, the local wage is a function of human capital that affects the marginal productivity of labor. Let X_W denote a vector of human capital characteristics influencing wage income in the local labor market. The productivity of family members' labor on the farm and in other local off-farm activities is shaped both by these human capital variables and by family assets, $\overline{K}$. Remittances are a function of migrants' human capital, which affects earnings, as well as their motivations to remit, which may be influenced by both human capital and family assets (Lucas and Stark, Taylor). Contacts at migrant destinations are a form of migration capital, $\overline{MK}$, that can enhance the labor-market prospects of migrants (Munshi).

Migrant remittances and reservation wages have both deterministic and stochastic components; thus, $R = R(X_R) + u$ and $\varpi = \varpi(X_\varpi) + v$, where $X_\varpi = [X_W, \overline{K}]$, $X_R = [X_W, \overline{K}, \overline{MK}]$, and u and v are stochastic errors. Letting $\delta_i = 1$ if household member i migrates and 0 otherwise, the participation decision becomes:

$$(1) \qquad \delta_i = \begin{cases} 1 & \text{if } \eta_i < R(X_R) - \varpi(X_\varpi) \\ 0 & \text{otherwise} \end{cases}$$

where $\eta_i = v_i - u_i$. Total migration is simply the sum of individuals who migrate; that is, $M = \sum_i \delta_i$. Let θ_t represent the joint distribution of variables X_R and X_ϖ in community j at time t. Then

$$(2) \qquad M_{jt} = M(\theta_{jt}, Z_{jt})$$

where Z_{jt} is a vector of community variables influencing the productivity of labor in local activities and remittances. In the econometric model, we control for the influences of θ_{jt} and Z_{jt} by fixed effects for communities and a time trend.

Econometric Model

The econometric model we estimate is a fixed effects panel data model of the following form:

$$(3) \qquad \begin{aligned} M_{jt} = {} & \alpha_j + \gamma t + \delta_1 M_{jt-1} + \delta_2 MNFARM_{j,t-1} + \beta_1 IRCA_t + \beta_2 NAFTA_{tt} \\ & + \beta_4 BE_t + \theta_3 \Delta ER_t + \varphi_2 USGDP_{t-1} + \varphi_3 MGDP_{t-1} + u_{jt} \end{aligned}$$

where M_{jt} denotes total migration from community j to U.S. farm jobs at time t=2,...,23 (1981-2002); $MNFARM_{jt}$ is migration to U.S. nonfarm jobs; α_j is the community effect; $IRCA_t$ is a policy dummy variable equal to 1 for all time periods beginning in 1986, the year of IRCA's implementation, and zero otherwise; $NAFTA_t$ is a dummy variable equal

to 1 beginning in 1994 (the year NAFTA was implemented) and zero otherwise; BE_t is expenditure on border enforcement at time t; ΔER_t denotes the percentage change in the peso-dollar exchange rate between times t and t-1; $USGDP_t$ and $MXGDP_t$ are U.S. and Mexico per-capita GDP, respectively, at time t; δ_1, δ_2, $\beta_k, k = 1,...,4$ and φ_1, φ_2 are parameters to be estimated; and u_{jt} are stochastic errors. Under the null hypothesis of no policy impacts on migration, $\beta_k = 0 \ \forall k$.

Data

The data to estimate the model are from a nationwide rural household survey carried out jointly by the University of California, Davis, and El Colegio de Mexico in Mexico City. The Mexico National Rural Household Survey (Encuesta Nacional a Hogares Rurales de Mexico, or ENHRUM) provides retrospective data on migration by individuals from sample of rural households that is both nationally and regionally representative. The survey was carried out in January and February 2003. The sample for the present analysis includes 336 households from the West Central region, which traditionally has been the largest source region for Mexico-to-U.S. migration. INEGI (*Instituto Nacional de Estadística, Geografía e Informacion*), Mexico's national census office, designed the sampling frame to provide a statistically reliable characterization of Mexico's population living in rural areas, defined by the Mexican government as communities with fewer than 2,500 inhabitants. For reasons of cost and tractability, individuals in hamlets or disperse populations with fewer than 500 inhabitants were not included in the survey. The result is a sample that is representative of more than 80 percent of the population that the Mexican census office considers to be rural.

The survey assembled complete migration histories from 1980 through 2002 for (a) the household head, (b) the spouse of the head, (c) all individuals who lived in the household 3 months or more in 2002, and (d) a random sample of all sons and daughters of either the head or his/her spouse who lived outside the household longer than 3 months in 2002. The survey provides far and away the most reliable longitudinal data on migration from rural Mexican communities to U.S. farm jobs.

Estimation and Results

Survey data show an upward trend in migration from Mexican villages to both U.S. farm and nonfarm jobs throughout the period, with migration to nonfarm jobs accelerating during the second half of the decade (Figure 1).[2] In 2002, nearly 17 percent of villagers from this region were working in the United States. Most migrants were employed in nonfarm rather than farm jobs. Nevertheless, the data reveal an increasing trend in migration from Mexican villages to U.S. farms.

Figure 2 illustrates both the increasing shares of villagers migrating to the United States and the shifting composition of this region's rural Mexico-to-U.S. migration in favor of U.S. non farm jobs. In most villages, the percentage of villagers in both U.S. farm and nonfarm jobs increased between 1980 and 2002, but the percentage in nonfarm jobs rose more rapidly, as shown by the rays in the figure. In a few cases, the percentage in farm jobs decreased. In only 2 of the 16 villages did the share of villagers in nonfarm jobs go down.

[2] The surge in migration to the United States in the 1990s is mirrored in U.S. Census 2000 data. The U.S. Census does not provide information on where migrants originate in Mexico (e.g., from rural or urban areas). However, they show an unexpectedly large increase in Mexico-born persons living in the United States.

We estimate the model using ordinary least squares. The data set for this region provides information on migration from 16 villages over 23 years (from 1980 to 2002); however, one year (16 observations) is lost as a result of lagged right-hand-side variables. Thus, the total sample size is 352.

Table 1 presents variable definitions and means and Table 2 reports the econometric results. The regression explains a significant share of the variation in migration to U.S. farm jobs over time ($R^2 = 0.93$). The estimated coefficient on lagged farm migration is 0.90, indicating that there is a substantial amount of inertia in migration. This result is consistent with the theory that increases in migration build networks of contacts that lead to future increases in migration. These networks have a persistent but not permanent effect on future migration because the coefficient, although large, is significantly less than one. The coefficient on lagged number of villagers in U.S. non farm jobs is significant at the 10% level, but is much smaller (0.03), suggesting a small network effect that flows from non-farm to farm jobs.

Controlling for time trend and lagged migration, the policy variables are either insignificant or else positively associated with migration to farm jobs. Results suggest that U.S. border enforcement has no effect on the supply of Mexican labor to U.S. farms (t=—0.53). Migration shifts upward following NAFTA, by approximately 0.5 migrants per village (21 households). The 1986 IRCA appears to shift the supply of U.S. farm labor upward, by a similar amount. The small negative coefficient on the time trend suggests a decreasing trend in migration from rural areas in this region to U.S. farm jobs, all else equal. Thus, the increasing migration level that is evident in Figure 1 is attributable to NAFTA and IRCA.

Once we control for the dynamics of the migration process and policy effects, macroeconomic variables do not significantly influence migration. The estimated coefficient on the exchange rate is of the expected sign (peso devaluations increase the returns to migration in pesos), but neither it nor the GDP variables are statistically significant.

Conclusion

Villages in Mexico are the primary source of labor to U.S. farms. The findings reported in this paper suggest that the U.S. farm labor supply from Mexico is a dynamic process, in which past migration is the principal driver of future migration. Our findings support the conclusion of several past studies that networks of existing contacts at migrant destinations are a key determinant of the magnitude of migration and sector of employment for future migrants (Munchi, 2003; Taylor, 1987). Controlling for migration dynamics, the trend in Mexican migration to U.S. farm jobs is flat or possibly even negative.

Several policies have been implemented in recent decades in an effort to influence migration. However, we find no evidence that these policies have achieved their goal of curtailing Mexico-to-U.S. migration flows. The 1986 Immigration Reform and Control Act (IRCA) appears to have significantly increased the supply of Mexican workers to U.S. farms. Although IRCA imposed sanctions on employers who knowingly hired unauthorized immigrants, few penalties have been imposed. The legalization of large numbers of farm workers under the Special Agricultural Worker (SAW) program and the emergence of farm labor contractors as a risk buffer for farmers (Taylor and Thilmany, 1993) may have created a stimulus to migration that is reflected in our econometric results.

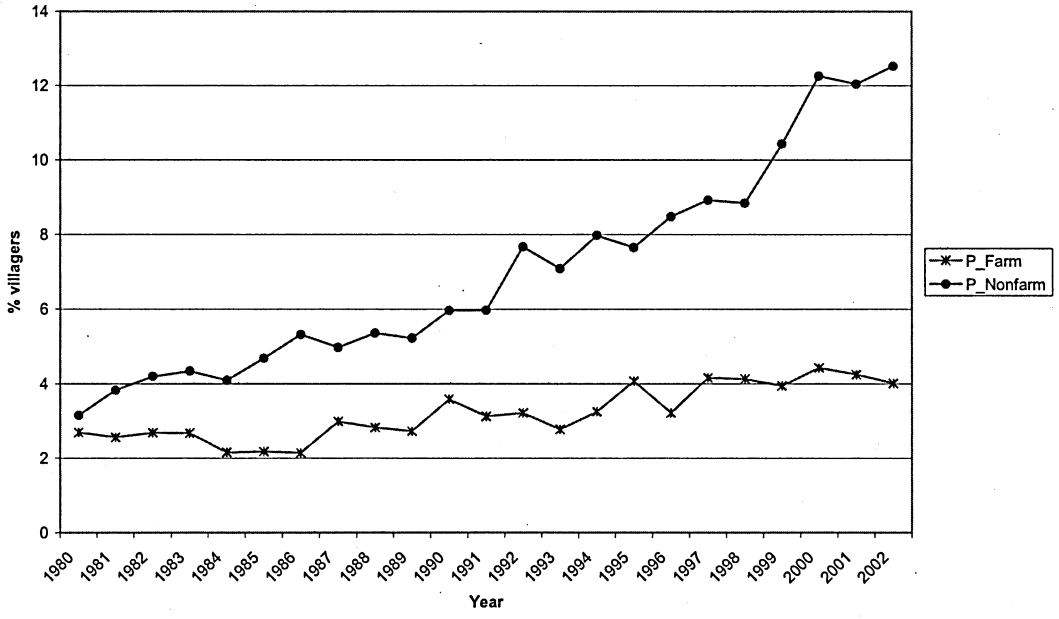
Implementation of the North American Free Trade Area (NAFTA) also appears to be positively related to the number of Mexican villagers working on U.S. farms. The association between trade integration and migration is complex. The U.S. Commission for the Study of International Migration and Cooperative Economic Development concluded that "expanded trade between the sending countries and the United States is the single most important remedy" for unwanted migration. However, it also warned that "the economic development process itself tends in the short to medium term to stimulate migration." The same policies that accelerate economic growth, including privatization, land reform, and freer trade, temporarily increase migration pressures, because of the displacement and disruptions that accompany market liberalization (Martin, 1993).

Increased U.S. expenditures on border enforcement appear to have had no discernable effect on the U.S. farm labor supply from Mexico. The U.S. annual border enforcement budget increased sevenfold between 1980 and 1995, tripled between 1995 and 2001 and now exceeds $2.5 billion. Border enforcement might be analogous to a sea wall that may resist the tide but also prevents waves that pass over it from returning to their source. Stricter border enforcement has increased the probability of apprehension on any crossing attempt and raised the cost of U.S. entry for unauthorized migrants, but most migrants eventually succeed in crossing the border and now appear to stay longer in the United States (Public Policy Institute of California, 2002).

In the long run, the migration of population out of rural areas surely will continue in Mexico, as it did previously in the United States and in all other high-income countries. The econometric findings reported in this paper highlight the difficulty of designing and implementing policies to break this migration dynamic. Despite U.S.

immigration reforms, border enforcement, and hopes for new employment opportunities post-NAFTA, for increasing numbers of rural Mexicans the question is not whether to migrate but where to go. The answer to this question will shape the future supply of labor to U.S. farms.

% of Villagers in US Farm and Nonfarm Jobs
(West Central Mexico: 1980 - 2002)



Changes in US migration and sector of employment: 1980 to 2002
(South Central Mexico)

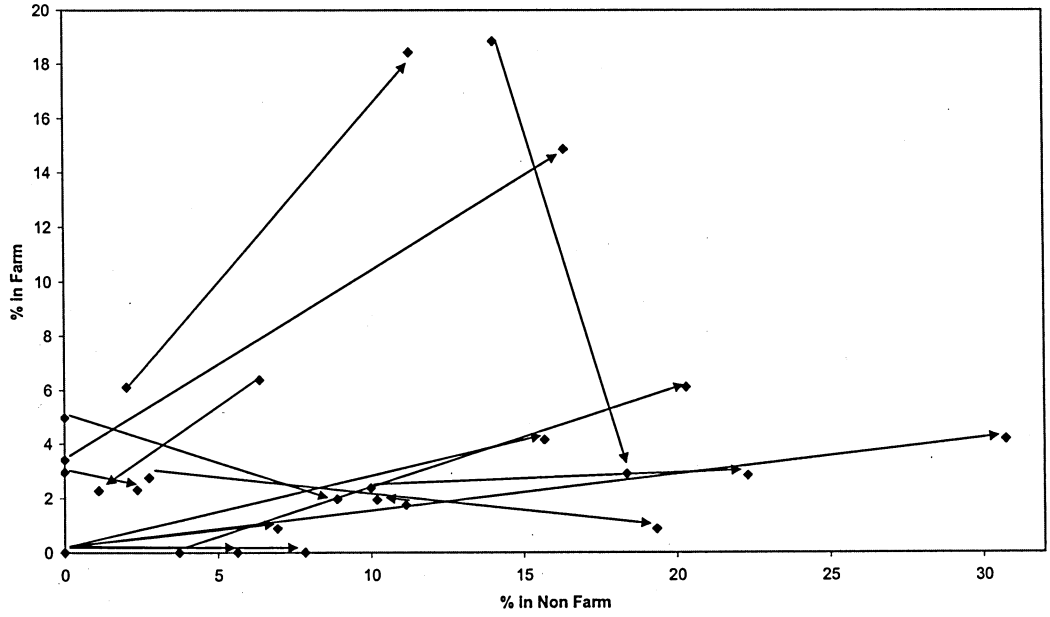


Table 1. Variable Definitions and Means

Variable	Description	Mean
Year	Year	1991
USFARMLAG	# villagers in US farm jobs lagged one year	2.1
USNFRMLAG	# villagers in US non farm jobs lagged one year	4.8
ER	% change in Peso-Dollar exchange rate from previous year	11.4
INS	INS border enforcement expenditures in millions of 2000 US$	1,346.5
NAFTA	Dummy variable = 1 beginning in 1994	0.39
IRCA	Dummy variable = 1 beginning in 1986	0.70
MGDPL	Mexico per capita GDP in thousands of 1990 Pesos	14.0
USGDPL	US per capita GDP in thousands of 2000 US$	26.6

Table 2. Regression Coefficients

(Dependent Variable is # villagers in US Farm Jobs)

Variable	Coefficient Estimate	Standard Error	t-statistic
(Constant)	181.253	113.593	1.596
Year	-.093	.058	-1.594
USFARMLAG	.898	.029	30.880
USNFRMLAG	.029	.017	1.715
ER	.032	.026	1.233
INS	.000	.000	-.526
NAFTA	.486	.228	2.136
IRCA	.513	.289	1.778
MGDPL	126.197	117.484	1.074
USGDPL	90.265	100.522	.898
$R^2 = 0.93$			
N = 352			

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