Whither Mexican Immigration?

BY JESSE ROGERS AND ADAM OZIMEK

Mexican immigration to the United States declined precipitously in the wake of the Great Recession and has continued to fall in subsequent years, resting at lows not seen since the start of mass Mexican immigration to the U.S. in the 1940s. Indeed, in five of the past six years, the number of return migrants to Mexico has exceeded those bound for the U.S. What explains the steep fall in Mexican immigration, and will it persist?

This is no trivial question for the U.S. economy. As the natural born population expands more slowly than that of prior generations, immigration will prove critical to filling gaps in the labor force and to easing the economic burden of a greying workforce. Though immigration from India and China has leapfrogged that of Mexico in recent years, Mexican immigrants still account for the largest share of the U.S. foreign-born population. As such, the steep decline in Mexican immigration can cast light on the broader incentives that shape individuals' decisions to migrate.

This article examines the determinants of Mexican immigration to the United States at the Mexican state level. Because weakness in Mexican immigration has persisted despite a strengthening U.S. economy, we focus on Mexico-level push factors—both economic and demographic—that shape individuals' decisions to migrate. Despite the muted performance of Mexico's economy over the past six years, we find that improving economic outcomes and falling fertility rates in Mexico's poorest states go far in explaining the decline in immigration and suggest that current low levels of Mexican immigration are here to stay.

While recent work on Mexican immigration to the U.S. has focused on the role of demographic pressures, the influence of economic factors has received less attention, in no small part due to the lackluster performance of the Mexican economy. However, by focusing on the relationship between economic outcomes and migration flows at the state level, we find evidence of a large and significant impact between state-level incomes and migration.

Furthermore, we find strong evidence that the relationship between migration and economic and demographic trends changes over time. Initially, rising incomes and falling fertility rates drive greater migration. But as state incomes rise and as family size shrinks, the rate of migration flattens and ultimately declines.

The way north

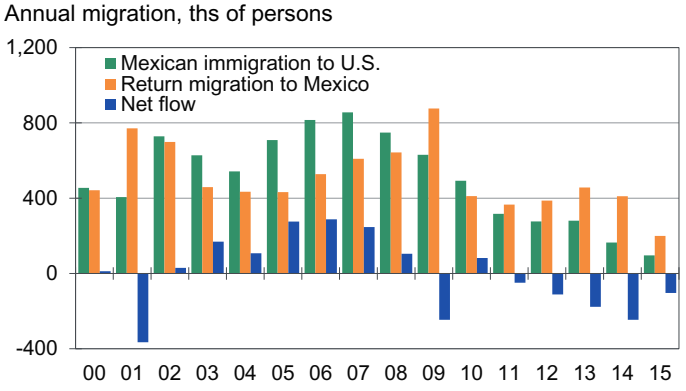
Since the Bracero program first brought large numbers of Mexican immigrants to the United States in the 1940s, Mexican immigration has ebbed and flowed with the fortunes of the U.S. and Mexican economies. Annual inflows of Mexican immigrants nearly doubled in the wake of Mexico's 1982 sovereign debt crisis and increased further during the long U.S. economic expansion in the 1990s. The sharp economic contraction in Mexico in the latter half of the 1990s and the displacement of hundreds of thousands of agricultural laborers following Mexico's opening to trade further contributed to the surge. Although net flows briefly reversed after the 2001 tech bust, large inflows of Mexican immigrants quickly resumed as the U.S. economy gathered steam[1].

The decline in Mexican immigration in the aftermath of the global financial crisis is of little surprise given the duration and severity of the ensuing recessions in Mexico and the U.S. But in contrast to previous economic cycles, Mexican immigration continued to fall long after the U.S. economy found its legs. Indeed, the number of return migrants to Mexico has exceeded those migrating to the U.S. in five of the last six years, a change unprecedented in magnitude and duration in the modern history of Mexican migration (see Chart 1).

The vitality of the current U.S. economy and the more muted performance of the Mexican economy make the sharp fall in Mexican immigration even more puzzling. In contrast to the U.S., Mexican unemployment is still elevated relative to its long-run average. Real wages are stagnant and well below their 2007 peak, and economic growth on a per capita basis trails the U.S. and that of most other large Latin American economies. The divergence between the U.S. and Mexican economies casts doubt on traditional theories of migration, which hold that migrants will relocate as the differ-

1 See Passel, Jeffery S. Cohn, D'Vera, and Gonzalez-Barrera, Ana "Net Migration From Mexico Falls to Zero–and Perhaps Less," Pew Hispanic Center (April 2012)

Chart 1: Fewer Mexicans Head North



Sources: EMIF, Moody's Analytics

ence in incomes widens between origin and destination countries.

If there is one knock against the U.S. economy of consequence to the decline in Mexican immigration, it is the incomplete recovery in the U.S. construction industry. The decline in construction activity and employment in the wake of the U.S. housing crisis was especially severe. Indeed, construction employment began to decline nearly a year ahead of the rest of the economy and bottomed two years after total job growth began to return. However, employment gains in other industries that also rely on migrant labor such as leisure/hospitality, transportation/logistics, and food manufacturing have more than made up for job losses in construction, making the large downturn in construction an incomplete explanation at best.

Given the apparent break in the relationship between an improving U.S. economy and immigration from Mexico, we turn our attention to Mexico-level determinants of migration flows. Have there been any changes in economic performance among Mexican states that would reduce the lure of migrating to the U.S.?

State-level migration flows can tell us more about the Mexico-level determinants of migration alone, especially when wages and economic conditions at the national level have improved only meagerly. Indeed, despite the lackluster performance of the Mexican economy, we find that economic outcomes of Mexico's poorest states have improved. Better economic outcomes in Mexico's poorer states can help explain why Mexican migration has slowed even as Mexico's economy as a whole is struggling.

Data and methodology

We examined immigration flows from Mexican states to the U.S. on an annual basis starting in 1998, the first year that annual migration and wage data are available for all Mexican states. The sample period ends in 2015, the most recent year for which annual data are available. This is a shorter time horizon than most longitudinal studies of Mexican immigration, which rely on decennial counts of population in the U.S. and Mexican censuses. However, what we give up in length we gain in precision: The use of annual data is better suited to analyzing the responsiveness of immigration to short-run changes in economic and demographic factors.

The analysis draws on data collected by both Mexican and U.S. government sources. Data on subnational migration flows come from the College of the Northern Border's Survey of Migrants on the Northern Border, or EMIF for its Spanish acronym, which is conducted annually in conjunction with the Mexican statistics and population institutes.

The EMIF provides a comprehensive tally of annual migration flows at the Mexican state and municipal levels and employs larger sample sizes than other U.S. or Mexican surveys that track Mexican migrants on an annual basis. The EMIF has been shown to be less biased than other annual surveys[2], and migration figures are broadly consistent with those reported by the decennial U.S. and Mexican censuses.

In order to compare migration across Mexican states, we divide state-level flows by annual population counts from Mexico's national statistics institute, or INEGI for its Spanish acronym. This simple calculation yields the migration rate—the share of each state's population that migrates to the U.S. in a given year. Comparing migration rates rather than absolute flows allows for an apples-to-apples comparison regardless of population size.

We use real average hourly earnings as the primary measure of state-level economic performance. Data on nominal average hourly earnings are sourced from INEGI and are deflated by the national consumer price index. While we consider other labor market variables such as the unemployment and labor force participation rates, the two measures vary little among states and with respect to the national average. This owes primarily to the high degree of labor market informality and ease of movement between the formal and informal sector, which tends to result in an over-count of employed workers and of the share of workers in the labor force.[3]

Finally, we obtain data on fertility rates from the national population council, or CONAPO, while we utilize state-level remittances data from Mexico's central bank. For alternative specifications of the model that include pull factors, we utilize data on U.S. employment and income from the Bureau of Labor Statistics and Bureau of Economic Analysis.

A second great migration

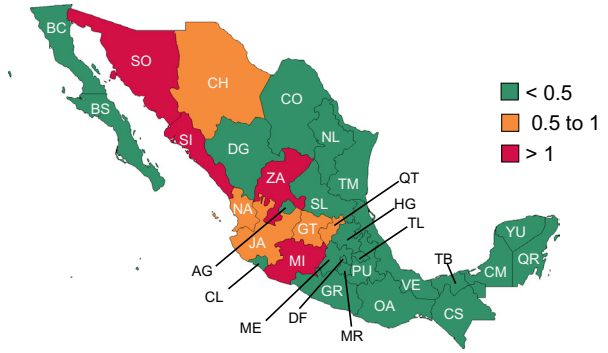
The geographic pattern of Mexican migration shifted dramatically over the past two decades. Until the mid-2000s, large and relatively well-off states along the northern border and in central Mexico accounted for the bulk of Mexican immigration to the U.S. (see Chart 2). However, as the U.S.

2 See Chort, Isabelle and de la Rupelle, Maelys. "Determinants of Mexico-US Outwards and Return Migration Flows: A State-Level Panel Data Analysis," IRD Working Paper UMR DIAL (February 2015)

3 For a thorough discussion of the difficulties of interpreting Mexico's unemployment rate, see Heath, Jonathan "Unemployment in Mexico Revisited," Articles and Commentary on the Mexican Economy, jonathanheath.net (March 2014) and Fleck, Susan and Constance Sorrentino, "Employment and Unemployment in Mexico's Labor Force," U.S. Bureau of Labor Statistics Monthly Labor Review (November 1994)

Chart 2: More Migrants in Central, Border States

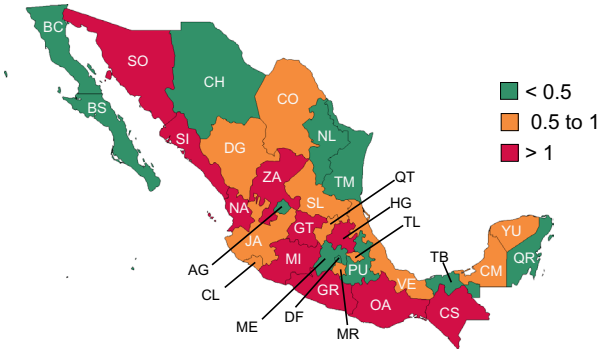
Migration rate, gross out-migration, % of population, 2000



Sources: INEGI, EMIF, Moody's Analytics

Chart 3: Migration Surges in South, Pacific

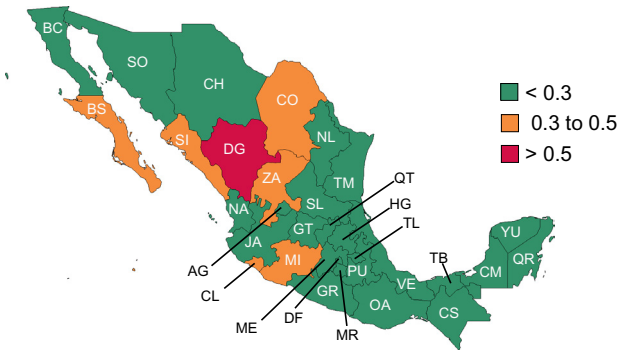
Migration rate, gross out-migration, % of population, 2007



Sources: INEGI, EMIF, Moody's Analytics

Chart 4: After Crisis, Migration Wanes

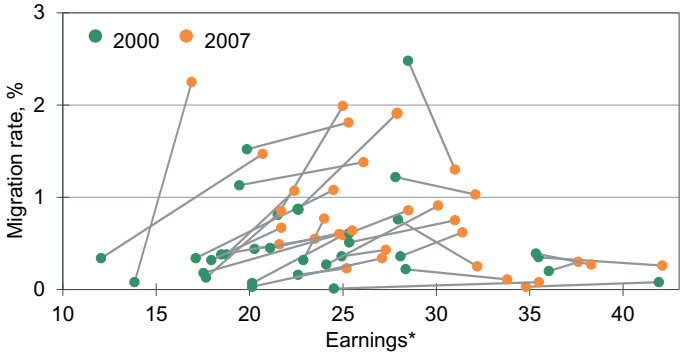
Migration rate, gross out-migration, % of population, 2014



Sources: INEGI, EMIF, Moody's Analytics

Chart 5: Wages, Migration Positively Related

Mexican states



Sources: INEGI, EMIF, Moody's Analytics

*Avg hourly earnings, 2007 MXN

economy emerged from the 2001 tech bust, migration from larger states began to wane, and the locus of migration moved south to Mexico's least well-off states. As late as 2003, Mexico's eight poorest states, which make up a third of the total population, accounted for just 20% of total migrants to the U.S. In the following four years, however, this share nearly doubled (see Chart 3). Though migration fell across states in the aftermath of the global financial crisis, Mexico's' poorest states experienced the largest decline (see Chart 4). States that saw the largest increases in migration from 2000 to 2007 also experienced the largest gain in real wages (see Chart 5). By and large, these were poorer states in the south and along Mexico's Pacific coast such as Chiapas, Oaxaca, Tlaxcala and Guerrero. In contrast, traditional bastions of migration—large border states such as Chihuahua, Sonora and Nuevo Leon—sent far fewer migrants over this period, both in the absolute and as a share of each state's population.

That poorer states saw the largest increase in migration from 2000 to 2007 comes as little surprise given the extensive literature relating incomes and family size to the propensity to migrate. Indeed, the level of real wages in 2000 is a strong predictor of changes in the migration rate from 2000 to 2007. Given the large disparity in wages among states—average wage rates in the top quartile of states are nearly twice as large as those in the lowest—the return to migration for poorer states is higher.

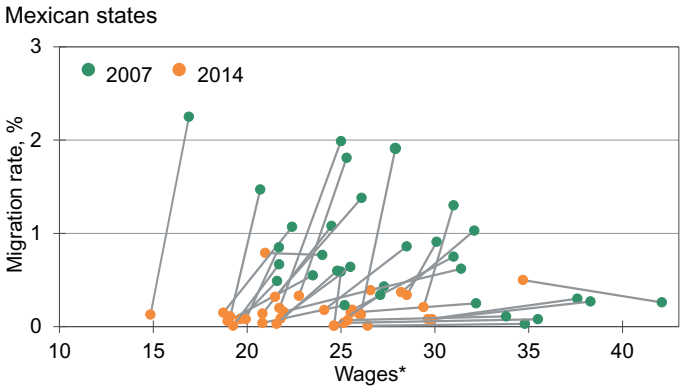
Less expected, however, is the finding that wage gains are positively related to increases in migration from year to year. In other words, the more wages rise in a given year, the higher the share of the population that chooses to migrate. This result clashes with traditional models of migration, which hold that the incentive to migrate weakens as local wages rise, narrowing the differential between wages in origin and destination states.

The opposite is true when we look at the relationship between wages from 2007 to 2014. Though real wages and migration rates for all states fell in this period, poorer states largely held onto wage gains in the first period, and also saw the largest decrease in migration (see Chart 6).

Indeed, if we sketch the relationship between migration and wages over the whole period, we would trace out an inverted "U." Initial wage gains are driving an increase in migration. This effect dampens as wages continue to rise. As states grow wealthier, the relationship between wage gains and migration completely flattens and ultimately reverses.

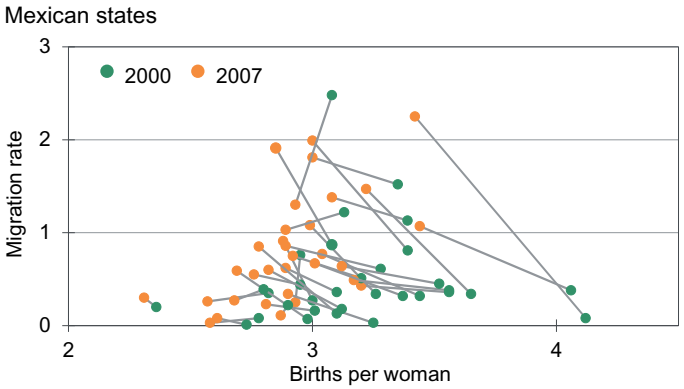
Interestingly, cross-country studies of the relationship between economic development and wages also show evidence of the same

Chart 6: Wages Fall Less for Poorer States



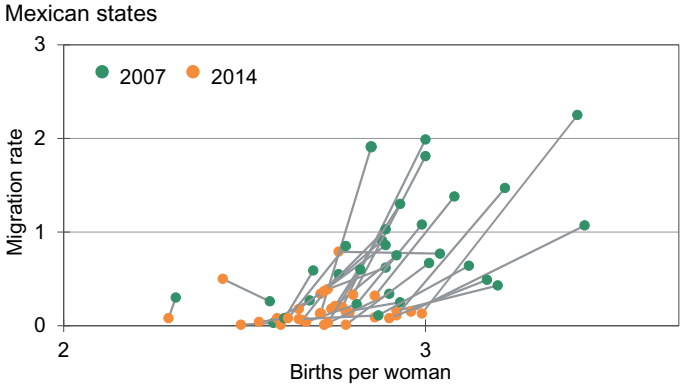
Sources: INEGI, EMIF, Moody's Analytics *Avg hourly earnings, 2007 MXN

Chart 7: Family Size Falls as Migration Surges…



Sources: CONAPO, EMIF, Moody's Analytics

Chart 8: …And Remains Smaller Post-Crisis



Sources: CONAPO, EMIF, Moody's Analytics

inverted "U" curve, known alternatively as the "development" or "mobility curve."[4]

Why might this be the case? For one, migration entails several fixed costs, the largest of which may be the cost of relocation. At very low wage levels, potential migrants may not be able to afford the costs of the journey north, even if wages received at the destination exceed the opportunity cost of foregone wages in Mexico. If so, we would expect to see a positive relationship between migration and wages at very low income levels, prompting a virtuous cycle in which more migration increases wages, and higher wages increase migration. As local wages rise, the opportunity cost of migrating increases, and migration begins to decrease.

We observe a similar nonlinear relationship between migration and fertility rates. From 2000 to 2007, states with the largest decline in fertility rates experienced the largest increase in migration (see Chart 7). Once again, these are largely the least well-off states in Mexico's south and Pacific coast. From 2007 to 2014, however, this relationship reverses: the more fertility rates decline, the larger the decline in the migration rate (see Chart 8).

The relationship between falling fertility rates and migration is supported by traditional models of migration and economic development that link declines in family size to reduced pressures to migrate. But what explains the inverse relationship between migration and fertility rates in the first period?

One possible answer is that family size represents another fixed cost of migrating. If larger households rely on multiple family members to generate income—an assumption not unreasonable for Mexico's more rural states—the temporary loss of a breadwinner may be too costly to bear in the short term even if the marginal benefit of migration ultimately exceeds the marginal cost.

As family members begin to migrate, families may accumulate sufficient savings to cover the period in which migrants leave and resettle in the country of destination. In turn, higher family incomes resulting from migration may reduce future generations' need for dependents, leading to smaller family size.

Another possible explanation is that decisions about family size also reflect expectations of future lifetime income. If migration increases wages today and thus expectations for income in the future, increased migration may go hand in hand with lower fertility rates. As expected incomes continue to rise, however, the incentive to migrate may wane even as family size declines.

Indeed, cross-country studies of economic development and migration point to a similar inverted "U" relationship between migration and fertility rates.[5] As economies move from developing to developed, they undergo a demographic transition that includes lower fertility rates. In part, this is due to a quality and quantity tradeoff. The returns to human capital investments are higher in rich countries, and this means a higher level of investment per child becomes optimal. More investment per child then leads to a lower number of children, given the higher costs.

The decline in fertility in the poorest Mexican states is a sign that these areas are moving up the development path, a transi-

4 See Clemens, Michael A. "Does Development Reduce Migration?" IZA Discussion Paper No. 8592 (October 2014) and Azuara, Oliver "Does Poverty Alleviation Increase Migration? Evidence from Mexico," Munich Personal RePEc Archive, 17599 (September 2009).

5 See Lee, Ronald "The Demographic Transition: Three Centuries of Fundamental Change," Journal of Economic Perspectives, Volume 17, No. 4 and Lucas, Robert E. "International Migration and Economic Development: Lessons from Low-Income Countries," Northhampton, MA: Edward Elgar

Table 1: Panel Analysis of Migration Rates

Dependent Variable: Migration Rate
Method: Least Squares, Random Effects
Sample: 1998-2015
Included Observations: 576

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Real avg hourly earnings	0.138380	0.051160	2.700	0.007
Real avg hourly earnings squared	-0.002026	0.000918	-2.210	0.027
Fertility rate	5.507236	1.409904	3.910	0.000
Fertility rate squared	-0.863530	0.248920	-3.470	0.001
Real per capita remittances	0.000064	0.000032	2.020	0.044
		R-squared	0.2923	
		Mean dependent var	0.5082	
		S.D. dependent var	0.5209	

Sources: EMIF, INEGI, CONAPO, Banco de Mexico, Moody's Analytics

tion that is unlikely to be reversed. Decisions on family size also represent forward-looking decisions for households that suggest they believe that the long-run economic outlook has changed.

Moving up the mobility curve

As a formal test of the inverted "U" relationship between migration and wages, and between migration and fertility rates, we conduct a panel analysis of migration rates from all 31 Mexican states and the federal district. To control for unobserved state-level heterogeneity, we use a random effects model.

The dependent variable in our analysis is the migration rate, which is modeled as a function of real wages and fertility rates. Both real wages and fertility rates incorporate linear and squared terms to test for the possibility of a quadratic relationship with respect to migration that the inverted "U," or mobility curve, predicts. We also include per capita state-level remittances to control for reverse causality—the potential that wages and fertility rates are the result of changes in migration rather than the cause.

The model explains a large share of the variation in migration across states (see Table 1). The relationship between migration and wages and migration and fertility rates is highly significant for both the linear and quadratic terms. Indeed, the sign on each of the quadratic terms is negative, providing strong evidence of an upside down "U." The predictive power of the model increases from 29% to 43% if the sample is restricted to 2008 to 2015, suggesting that the relationship between wage gains, fertility rates, and migration is stronger in this period. While the quadratic terms lose their significance in this restricted sample, this is to be expected, as states would be progressing to the second half of the downward "U" curve.

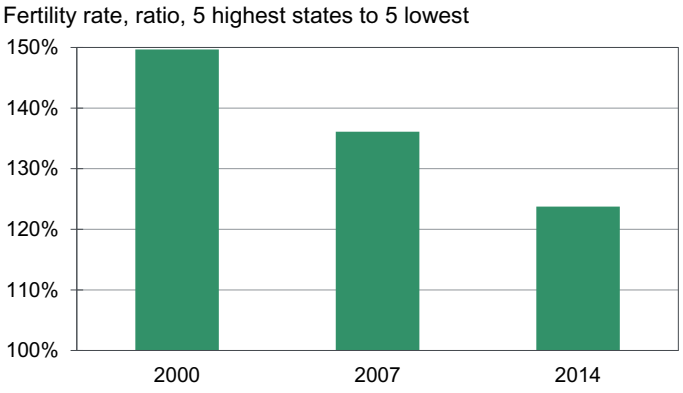
With respect to both real wage and fertility rates, how much of a gain (or fall) is enough? In other words, at which point does the initial positive relationship with respect to migration begin to level off? By taking the partial derivative of wages with respect to migration, we find that the inflection point is around 31 pesos, slightly above the average real wage for all Mexican states in 2007, when migration rates peak. Indeed, because real wages for poorer states fell by less from 2008 to 2015, the income distribution tightens, hastening states' movement to the second, downward half of the mobility curve (see Chart 9). Cross-country studies suggest that migration begins to decline as per capita incomes converge to the global mean, and we find a similar relationship between convergence in wages and declining migration rates at the Mexican state level.

Although we conduct the same exercise for fertility rates, we find that the inflection point is higher relative to its average. At nearly three births per woman, this threshold is nearly one-third higher than the national average in 2007. This suggests that the negative relationship between fertility rates and migration begins to kick in much sooner, but that other factors such as wages could postpone the effect. While fertility rates also converge over the sample period, the distribution is initially tighter than that of wages (see Chart 10).

Chart 9: State Income Disparities Narrow

Sources: INEGI, Moody's Analytics

Chart 10: And State Fertility Rates Converge



Sources: Inegi, Moody's Analytics

The EMIF data also allow us to test the impact of U.S. economic conditions that could influence individuals' decision to migrate. We also test alternative specifications using destination-weighted averages of U.S. labor market and income measures, including the unemployment rate, total construction employment, and per capita income, all measured at the U.S. state level. Each measure is constructed by taking a weighted average of U.S. state variables based on the share of migrants from Mexican state *i* that settle in U.S. state *j* as reported by the EMIF survey. To our surprise, none of the pull factors measured proved significant in our model, and the pull factors were not significant even in a bivariate regression with the migration rate as the dependent variable (see Tables 2 and 3).

Table 2: Panel Analysis of Migration Rates with U.S. State Per Capita Income

Method: Least Squares, Random Effects
Method: Least Squares
Sample: 1998-2015
Included Observations: 576

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Real avg hourly earnings	0.124502	0.051351	2.420	0.015
Real avg hourly earnings squared	-0.001804	0.000906	-1.990	0.046
Fertility rate	4.776736	1.714776	2.790	0.005
Fertility rate squared	-0.761355	0.294124	-2.590	0.010
Real per capita remittances	0.000091	0.000041	2.230	0.025
Real per capita income	-0.000023	0.000017	-1.4	0.162
		R-squared	0.3141	
		Mean dependent var	0.5082	
		S.D. dependent var	0.5209	

Sources: EMIF, INEGI, CONAPO, Banco de Mexico, Moody's Analytics

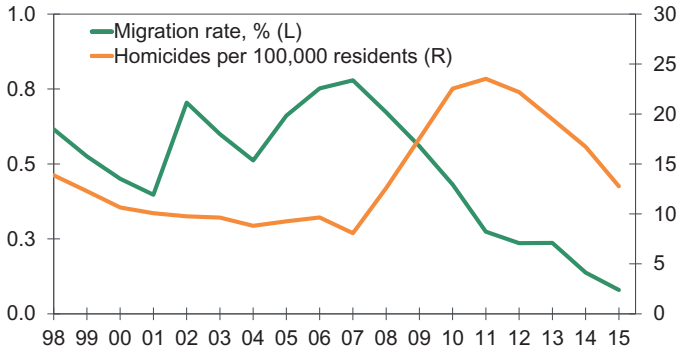
Table 3: Panel Analysis of Migration Rates with U.S. State Construction Employment

Dependent Variable: Migration Rate
Method: Least Squares, Random Effects
Sample: 1998-2015
Included Observations: 576

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Real avg hourly earnings	0.1381121	0.0520769	2.65	0.008
Real avg hourly earnings squared	-0.0020562	0.0009412	-2.18	0.029
Fertility rate	5.3363770	1.3327420	4	0.000
Fertility rate squared	-0.8407922	0.2361625	-3.56	0.000
Real per capita remittances	0.0000495	0.0000338	1.47	0.143
U.S. state construction employment	0.0003867	0.0002511	1.54	0.124
		R-squared	0.2783	
		Mean dependent var	0.5082	
		S.D. dependent var	0.5209	

Sources: EMIF, INEGI, CONAPO, Banco de Mexico, Moody's Analytics

Chart 11: Crime Surges After Drop in Migration



Sources: EMIF, INEGI, Moody's Analytics

One possible explanation is the low variation in destinations among Mexican states: According to author tabulations of the EMIF survey, nearly three-quarters of migrants from each Mexican state migrate to the West Coast or the U.S. Southwest. Even so, the fact that Mexican immigration has remained so low despite a resurgent U.S. economy suggests that U.S. pull factors are likely of declining relevance.

A less secure path

Economic and demographic factors are not the only ones migrants consider when choosing to migrate. There are also measures of wellbeing like security, political representation, and the general quality of life that can impact migration decisions but are less easily measured. One of the most important of these is the large increase in violent crime beginning in 2007. If crime has increased as a result of the Mexican government's decision to deploy the armed forces in a fight against the cartels, we could see some permanent effects on migrants' decisions.

What of the large increase in crime coinciding with Mexico's crackdown on drug trafficking organizations beginning in 2007? According to estimates by the Mexican Migration Project, the inflation-adjusted cost of crossing the border illegally has increased nearly threefold over the past decade.[6] In addition to the monetary cost, the stark increase in violence is likely to have an impact on individuals' risk preferences as well. To this effect, we separately estimate the impact of the homicide rate on migration.

Although we find a negative relationship between homicide rates and decisions to migrate, it is not statistically significant. This owes, in large part, to the fact that there is little correlation between states that saw the largest decline in migration post-2007 and states that saw the largest increase in violent crime. Moreover, the increase in migration in the mid-2000s predated the large increase in crime rates (see Chart 11). A closer look at homicide rates shows that the timing, if not the magnitude, of the increase was uniform across states. This does not mean, however, that security has not played an important role in migration trends. The large increase in drug-related violence may well increase the fixed cost of migrating and serve as a deterrent. However, the data do not suggest that individuals fleeing violence are an important driver of recent migration trends.

The future of Mexican immigration

Given improved economic outcomes and declining fertility rates in Mexico's poorest states—which accounted for an outsize share of Mexican migrants in the runup to the global financial crisis—prospects for a resurgence in Mexican migration to the U.S. are dim. Though wages have fallen for all Mexican states since 2007, Mexico's poorest states are still better off than they were a decade ago. And while there is no hard and fast measure of when the positive relationship between wage gains and migration begins to reverse, we note that the timing of this transition has coincided with a tightening of the income distribution across states. With better wage gains for Mexico's poorest states narrowing the difference between the most and least well-off states, we expect Mexican immigration to remain at current low levels in the coming years.

The finding that family size factors into Mexicans' decisions to migrate echoes recent research on Mexican immigration. However, while falling fertility rates may reduce the pressure to migrate in the long run, we believe that family size matters because it reflects families' expectations of lifetime income and of that of their offspring rather than changes in labor supply. For one, we find that the share of the prime working-age population, those age 15 to 44, grew faster for poorer states over the last two decades. While this is likely because fertility rates in poorer states were higher to begin with, faster growth in the prime-age population experienced by poorer states suggests that wage gains had little to do with changes in labor supply. Moreover, the decline in fertility rates over the past 18 years is unlikely to affect labor supply for at least another decade.

Rather, we argue that family size matters because it reflects individuals' attempts to maximize lifetime earnings. This result is of no small consequence for the future of Mexican immigration. Since fertility rates change only slowly and tend to fall as incomes rise, the decline in fertility rates across states points to a more permanent decline in Mexican immigration.

Although our findings suggest that a good deal of the slowdown in Mexican immigration owes to permanent changes in state-level economies, it is possible that a stronger U.S. economy may yet revive immigration. For example, the incomplete recovery of some U.S. sectors that employed Mexican migrants intensely such as construction, or in sectors that have seen a secular employment decline such as agriculture, may play a role in explaining the fall in migration. Indeed, it is possible that the pull factors tested in this article do not show up as significant because there is little variation in the U.S. states that receive Mexican immigrants. However, given that Mexican immigration has continued to decline despite the vitality of the U.S. expansion, it is not unreasonable to assume that pull factors have weakened.

6 Annual data on the cost of crossing the Mexican border accessed via the Mexican Migration Project, http://mmp.opr.princeton.edu/results/results-en.aspx

Of course, any study of immigration carries certain limitations. To examine the incentives that drive migrants to relocate to the U.S., we focused our analysis on flows from Mexico to the U.S. and did not consider the determinants of return migration. These could rest on a broad range of economic, demographic and political factors, including immigration policy and law enforcement changes in the U.S. While we do not expect that net Mexican migration to the U.S. would turn positive because of the decline in return migrants alone, understanding the determinants of return migration is just as important and provides fertile ground for future research.

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