Reversed Migration Trends and Local Labor Markets *

Emily Conover Melanie Khamis Sarah Pearlman

July 30, 2018

Abstract

We estimate the effects of the unprecedented decline in Mexican net migration from 2006 to 2012 on labor markets in Mexico among non-migrants. We use an instrumental variable strategy that isolates demand for Mexican labor in U.S. labor market and relies on historical migration patterns. We find that the decline in migration reduced employment for lower skilled men and increased wages for high skill men and women. We also find a decline in self-employment for men, a sign that informal markets did not absorb the increase in labor supply. Meanwhile, we find that women increasingly shift into salaried work, in line with a story in which reduced remittances leads remaining household members to seek higher paid work.

JEL Classification: J21, J16, J31, O15.

Keywords: Migration, Mexico, labor force participation, informality.

* Contact information: Emily Conover, Department of Economics, Hamilton College, econover@hamilton.edu; Melanie Khamis, Department of Economics, Wesleyan University and IZA, mkhamis@wesleyan.edu; Sarah Pearlman (corresponding author), Department of Economics, Vassar College, sapearlman@vassar.edu. We thank participants in Vassar's seminar and the Western Economic Association for feedback. We also thank Remy Beauregard for research assistance. Comments welcome. ©by Emily Conover, Melanie Khamis and Sarah Pearlman. All rights reserved.

1 Introduction

The majority of the literature on the labor market effects of migration focus on periods of rising migration and receiving countries. In this paper we do the oppositie, examining a period of falling migration and its impacts on the sending country. We do this using the case of Mexico, which is one of the largest migrant sending countries in the world (World Bank, 2016), but experience a dramatic decline in out migration since the middle of the 2000s.[1] Evidence of this comes from Mexican surveys, which find that the five year migration rate fell by more than one million individuals, or more than fifty percent, from 2009 to 2014.[2] Evidence also comes from the United States, the destination for approximately 90% of all Mexican migrants (ENADID 2009). As shown in Figure 2, there is a sharp leveling off of the Mexican born population in the U.S. around the year 2007, indicative of large declines in net migration.[3] This complements work by Passel and Cohn (2016), who document that over the time span of 2007 to 2014 net migration rates fall below zero, with the number of new arrivals no longer outpacing the number of migrants who return home.[4]

In this paper we examine the unprecedented decline in net migration from Mexico and its impacts on Mexican labor markets. There are several channels through which reverse migration trends can impact labor market activity in the sending country. First, there is the direct impact of would-be migrants, or people who would have migrated in earlier periods. Numerous papers using Mexican and U.S. data find that out migrants tend

[1] According to the *Instituto de los Mexicanos en el Exterior* an estimated 12 million people, or 10% of the population, lived abroad in 2016

[2] Author's calculations from the ENADID 2009 and ENADID 2014.

[3] Author's calculations from the monthly Current Population Survey.

[4] Meanwhile Norlander and Sorensen (2016) find that growth in the *general* immigrant population declines sharply, and that this decline is the largest witnessed in over one hundred years.

to be male, young, rural, and drawn from the lower to middle portion of the education distribution (Chiquiar and Hanson 2005, Orrenius and Zavodny 2005, Fernández-Huertas Moraga 2011, Rendall and Parker 2014).[5] Thus the stock of workers that likely has grown the most with the decline of out migration is young men with a primary or some secondary education.[6] These increases also affect the relative scarcity or abundance of different types of workers, potentially leading to changes in wages. For example, Mishra (2007) finds that emigration increases wages overall in Mexico, but that the increases are larger for workers with high levels of education than low levels of education. She attributes this to higher *rates* of migration for more educated workers.[7]

Second, there is the direct impact of return migrants, who differ from non-migrants as they may return to the home country with human capital and savings acquired abroad (Dustmann and Goerlach 2016). For example, Reinhold and Thom (2012) find that experience abroad leads to higher wages for return migrants in Mexico, and that this likely is due to occupation specific skills. Meanwhile, Woodruff and Zenteno (2007) find that migration networks are associated with increased investment and profits for Mexican microenterprises. The investment in enterprises highlights how, in some cases, return migrants may be complements to, rather than substitutes for, non-migrant labor. This

[5]Several authors also argue that the type of educational selection depends on other factors. For example, McKenzie and Rapaport (2010) find that the degree of educational selection depends on the size of the migration network, with stronger networks exhibiting more negative selection than weaker ones. Meanwhile, Villarreal (2016) argues that an education-occupation mismatch may drive migration, as he finds that international migrants in Mexico are more educated than their peers within an occupation.

[6]There also is evidence that the educational selection of migrants changed as a result of the Great Recession, although there is disagreement over the direction of change. Villarreal (2014) finds evidence of more positive selection after the Great Recession, and argues that this is because the industries with the largest negative demand shocks, like construction, hire less educated workers. Thus migration declines the most for groups seeking low skill jobs in the U.S. Fajardo et al. (2017), however, argue that low income families are more likely to send *more* family members abroad in the face of shocks, while high income families are more likely to have migrants return home.

[7]In terms of employment, Villarreal and Blanchard (2013) find that informal and unemployed workers are more likely to migrate.

may occur if return migrants use the capital acquired abroad to start firms that hire non-migrants. For example, Hausmann and Nedelkoska (2018) study the impact of return migrants to Albania following the economic crisis in Greece, and find that it leads to an increase in labor force participation and wages for low skilled non-migrants, particularly in industries where return migrants are more likely to start new businesses.

Third, there is the indirect impact of remittances, which can fall as a result of fewer individuals living abroad and negative income shocks in the U.S.[8] The decline in remittances constitutes a negative income shock, and thus may lead individuals to seek out or intensify their work. For example, examining a period of rising migration, Amuedo-Dorantes and Pozo (2006) and Hanson (2007) find that women decrease their labor market activity when remittances increase. Amuedo-Dorantes and Pozo (2012) find that increasing volatility of remittances leads to increased employment among men and women, and an increase in the intensity of work for women. Amuedo-Dorantes and Pozo (2006) also find that remittances change the composition of work, with non-migrant men moving out of formal sector work and into informal sector work. This complements theoretical work by Shapiro and Mandelman (2016), who find that remittances not only affect whether or not individuals are employed, but also whether they are in salaried or self-employment.

In sum, the literature suggests that the direct and indirect effects of declining migration operate in opposite directions, as increased competition for jobs within Mexico may lower employment for non-migrants, while the decline in remittances may push remaining household members to work more. We therefore empirically estimate individual

[8]For exmaple, data from the Central Bank of Mexico shows a decline in nominal remittances of approximately 20% from December 2005, well before the Great Recession, to December 2009. Source`http://www.banxico.org.mx/SieInternet/consultarDirectorioInternetAction.do?accion=consultarCuadro&idCuadro=CE81&locale=en`

responses using repeating, nationally representative surveys on employment and occupation in Mexico (Mexican National Survey of Occupation and Employment, or the ENOE). This dataset is the only one from Mexico with detailed labor market information, information on out and return migration, wide geographic coverage (state level representation) and high frequency time variation (quarterly). This allows us to examine changes in net migration rates and labor market activity at the state level over time.

The challenge to identifying the effects on labor market outcomes stems from the possible endogeneity of migration rates. Namely, local labor market conditions may affect non-migrant outcomes and migration rates. To address this concern, following the literature we use a demand-pull instrument that relies on demand for Mexican born labor across different U.S. states and historic migration patterns. The exogeneity of our instrument partially rests on the argument that due to the persistence of migration networks, weights from periods earlier than our sample predict migration from sending Mexican states but are uncorrelated with contemporaneous local shocks. We provide various tests of this assumption, showing that the relationship is robust to several measures of migration networks, different measures of demand for Mexican labor, and the inclusion of numerous controls for local economic shocks. We also find limited evidence of bias from internal migration or covariate shocks, as the correlation between industrial employment across sending Mexican and receiving U.S. states is quite low.

Overall we find that falling net migration leads to significant declines in employment for non-migrant men, and that these declines are concentrated among individuals with less than a college education. In line with a story of increased competition for low to medium skill jobs, we find that the decline in male employment is a result of increasing

unemployment and decreasing labor force participation. We find little evidence that informal labor markets absorb the increase in the supply of potential workers, a result that might be expected given the size and flexibility of informal labor markets in Mexico. There is no significant change in the incidence of informal work, and the incidence of self-employment among men decreases. Meanwhile, for women we find significant increases in salaried work and decreases in unpaid work. This aligns with a story in which declining remittances lead remaining household members, particularly women, to seek more stable and higher paid employment.

Despite evidence that individuals shift into different types of jobs, we find no evidence that they intensify their work in the form of hours. We do, however, find a significant impact of net migration on real hourly wages, but the effect is opposite than expected. Wages do not decline for less well educated men, as would be expected if the only change is an outward shift in labor supply. Furthermore, we find that wages increase significantly for college educated men and women and for high school educated women.

Finally, we examine non-market activities and find that declining net migration does not increase human capital investments in the short term, as there is no rise in the incidence of being in school full time or in the number of hours spent studying or in training. Instead we find that men increase the number of hours spent on asset repair and community service, while women increase hours spent on household chores. Meanwhile both men and women spend less time on dependent care, an outcome that may result from shifting into less flexible work.

The rest of the paper is structured as follows: in section 2 we describe our main data source, the *Encuesta de Ocupación y Empleo*, or the ENOE; in section 3 we discuss our

instrumental variables (IV) strategy; in section 4 we present our first stage results followed by the second stage IV results in 5; in section 6 we check the robustness of our results to internal migration and covariate shocks. In section 7 we show outcomes by educational category. In section 8 we estimate non-market outcomes, and section 9 concludes.

2 Data

The data on migration rates and labor force outcomes come from the Mexican National Survey of Occupation and Employment (the *Encuesta de Ocupación y Empleo*, or the ENOE), a rotating labor force survey conducted by the National Institute for Statistics and Geography (INEGI).[9] The ENOE began in the first quarter of 2005 and is designed to provide a representative picture of labor markets at the national and state level in any given quarter. In our analysis we start with the first quarter of 2006, in order to use four quarter migration rates, and end in the fourth quarter of 2012. This yields a sample of more than 5 million individuals. Given the lagged nature of our migration variable (detailed below), we do not exploit the panel nature of the ENOE, instead using a repeated cross-section.

The ENOE measures migration rates on a quarterly rather than a yearly basis. In the first survey round respondents are asked to list all household members, and then are asked to repeat the list in each subsequent survey quarter. Anyone listed as absent from the household after the first survey because they moved abroad is counted as an out-migrant. Anyone listed as an addition to the household because they returned from abroad is

[9]We use the latest ENOE in which the survey weights have been adjusted following the 2010 Census. Data and documentation for the ENOE are on INEGI's website, `www.inegi.gob.mx`

counted as a return migrant. These migration measures are short-term and only capture migration over the five quarter period in which a household appears in the sample. As such individuals who were return migrants before the survey are not coded as return migrants, while individuals who leave after the survey are not coded as out migrants. Nevertheless, these migration rates match those from other data sources. Rendall et al. (2011) find that the ENOE generates similar out and return migration rates as other Mexican datasets that document migration over longer time periods, such as the ENADID (the National Survey of Demographic Dynamics). They conclude that the ENOE is a valid data source on migration to and from the U.S.

In Figure 1 we show out and return migrant flows at the national level. The flows are calculated by dividing total out or return migration by the non-migrant population, calculated from the ENOE using population weights. A vertical line is placed in the fourth quarter of 2007, the official start of the Great Recession in the U.S. The graph shows the steady and steep decline in net migration from the beginning of the series, in the first quarter of 2005, to the initiation of the Great Recession.[10] The graph also shows that the decline in net migration is driven by declines in out migration rather than increases in return migration. Indeed, at a national level return migration rates remain fairly constant over the Q12005 to Q42013 time period. These trends in both out and return migration are the same as those found by Rendall et al. (2011), Villarreal (2014), and Chort and de la Rupelle (2016). They highlight that the larger impact is through reduced out migration rather than through increased return migration.

We next turn to the labor market outcomes of non-migrant, working age adults. To

[10]For example, the net migration rate falls from 0.3% in the first quarter of 2005 to 0.005% in the first quarter of 2009– a 98% decline.

capture this we limit the ENOE sample to individuals age 18 to 65 who are not recorded as out or return migrants during the survey period. While these individuals could have migrated abroad and returned in a previous period, they are non-migrants when they appear in the sample. Summary statistics are provided in Table 1. All values are population weighted, and we show results for the full sample as well as for men and women separately. The reasons for the separation by sex emerge in the first row, which show large differences in employment rates. While 84% of men are employed in any given quarter, only 47% of women are.[11] We also see gender differences in hours worked and wages for those who are working. For employed men, the average number of hours worked for men is 45, while for employed women the average is only 36. Meanwhile, average hourly wages, measured in Q12005 real pesos, are 19.01 pesos for men, but 17.92 for women.[12]

We also examine the composition of work, starting with formality. We use a common definition for formality in Mexico, defining a job as formal if the worker is registered with the Mexican Institute for Social Security (IMSS).[13] Along this dimension we find no differences across women and men. Approximately 38% of each is formally employed, a low number which speaks to the high rate of informality in Mexico.

We see larger differences by gender when we look at job type, defined as salaried, self-employed or unpaid work. Salaried individuals are defined as those with a boss, and can include formal and informal employees. Self-employed individuals are defined as those without a boss, include firms with no employees or employees, and also can be formal

[11] A person is defined as employed if they report working in any capacity outside of home production. Thus those with zero values are non-employed, and include unemployed individuals (in the labor force and looking for work) as well as those not in the labor force. We group the last two together given low rates of unemployment.

[12] We deflate all income values to Q12005, the first period in the ENOE, using CPI values from INEGI

[13] Mexican labor regulation requires employers to register workers with IMSS when they are hired (Levy 2008 and Cano-Urbina 2015)

or informal. Unpaid individuals largely work for family firms. There is a high degree of overlap between formality and job type, as 57% of salaried workers are formal, while less than 1% of self-employed and unpaid workers are. In terms of the composition of the labor force, 68% of workers are salaried, 27% are self-employed and only 5% are unpaid. Women have higher rates of unpaid work and lower rates of self-employment and salaried work than men.

3 Empirical Strategy

We use the ENOE data to estimate the coefficients in the following model:

$$Outcome_{isqy} = \beta_0 + \beta_1 \Big(\frac{NetMigration}{Population} \Big)_{sqy-4} + X'_{sy}\gamma + Z'_{iqy}\lambda + \delta_s + \delta_q + \delta_y + \epsilon_{isqy} \quad (1)$$

The dependent variable is the labor market outcome for individual i living in state s, quarter q and year y. This is modeled as a linear function of the net migration rate for the previous 4 quarters for a given state, year and quarter. It also is a function of quarter, year, and state fixed effects, and individual time varying controls (Z_{iqy}), including marital status and household size. We also include state time varying controls (X_{sy}) to capture local economic shocks in the sending locations. We use state-year real GDP per capita and state-quarter measures of employment rates and an index of industrial activity from INEGI. We use population weights and, following Abadie et al. (2017), cluster standard errors at the primary sampling unit level.

We instrument for the net migration rate given concerns that it is linked to factors that simultaneously change the incentives for Mexican workers to leave Mexico or return home from abroad and labor market outcomes for those who remain. In other words,

despite our state-time controls, net migration may be endogenous because it is linked to factors that push individuals to migrate. We thus use an instrument based on a key pull factor, which is demand for Mexican labor in U.S. labor markets, the destination for approximately 90% of Mexican migrants (ENADID 2009 and 2014). Several papers document that U.S. pull factors are the strongest predictor of out-migration from Mexico. For example, Norlander and Sorensen (2016) estimate that more than 60% of the decline in migration is due to pull rather than push factors. Villarreal (2014) shows that out-migration closely tracks changes in Mexican-American employment in the U.S. and job gains in construction, which hires a large percentage of Mexican born labor. He also finds that the Mexican born employment rate in the U.S. and employment gains in the top 5, 3 and 1 sectors that employ Mexican born labor are significant predictors of migration.

3.1 Instrumental Variable Strategy

We create a measure of predicted migration following that developed by Card (2001). [14] Key to the feasibility of our demand measure is the fact that Mexican states have historically sent migrants to different locations in the U.S. and labor demand, in turn, varies across these locations. The instrumental variable is defined as:

$$PredictedNetMigration_{sqy} = \frac{\sum_{g=1}^{51} M_{gqy}\lambda_{gs}}{N_{sqy}} \tag{2}$$

Where: M_{gqy} is a measure of demand for Mexican labor in U.S. state g as of a given quarter q and year y. The combination of sending Mexican state and U.S. receiving state is determined by λ_{gs}, or the fraction of Mexicans in U.S. state g that are from Mexican state s. These weights are time invariant and rely on the persistence of migration patterns

[14] This also is similar to the instrument used by Theoharides 2014, Conover et al. 2017 and Amuedo-Dorantes and Pozo 2006.

over time, thus isolating the demand pull shock. To generate a migration rate we divide this total by N_{sqy}, the number of non-migrants in Mexican state s in a given quarter and year. We describe how M_{gqy} and λ_{gs} are calculated below.

3.2 Measure of U.S. Demand for Mexican Labor

To construct the measure of demand for Mexican labor in the U.S. (M_{gqy}) we use monthly data from the Current Population Survey (CPS), the U.S. labor survey, as accessed through IPUMS (Flood et al. 2017). We construct quarterly values by taking the average for the three months in a quarter. We then construct a measure called "potential jobs", which is the stock of employment in different U.S. states and industries weighted by Mexican born individuals' historic presence in each industry. Specifically, we calculate the number of all men and women age 18-65 in each U.S. state, quarter and year employed in each industry, defined by two digit code. For example, we calculate the number of men age 18-65 who work in different industries in California in the first quarter of 2005. This captures total jobs by industry, state and time. Whether or not these jobs can be considered a *potential* job for Mexican born men or women, however, depends on their historic presence in those industries. For example, if Mexican born men historically worked in construction but not finance, then jobs in construction would be considered as potential jobs while those in finance would not. To figure out which jobs can be considered potential jobs we calculate the importance of each industry as a source of employment historically for Mexican born workers. To ensure that our weights are not driven by contemporaneous shocks in Mexico that drive workers into particular industries, we use data from the year 2000 Census, which pre-dates our sample. We then calculate the percentage of Mexican born individuals that work in different industries, and do this separately by gender as the

industries where Mexican born men and women work differ.

Formally, we define demand for Mexican labor as:

$$M_{gqy} = \sum_{i=1}^{I} w_{if} * J_{gift} + \sum_{i=1}^{I} w_{im} * J_{gimt} \tag{3}$$

Where w_{im} (or w_{if}) is the percentage of Mexican men (or women) age 18-65 in the U.S. that work in industry i, according to the year 2000 Census and J_{gimt} (or J_{gift}) are male (or female) workers in U.S. state g, industry i, and time period t. We re-emphasize that the weights are time invariant and do not vary across U.S. states, reducing concerns that they reflect supply shocks in Mexico that drive Mexican workers into specific industries in specific years.[15]

Given that individuals likely do not respond simultaneously to demand conditions, we take the average of a specific M_{gqy} over the previous 4 quarters. To ensure that contemporaneous migration rates do not affect the measure of demand (as the level of employment will be affected if individuals return to Mexico) we exclude the current quarter from the measure. For example, for the first quarter of 2006, potential jobs are measured as the average for Q42005, Q32005, Q22005 and Q12005. This stock is then allocated to different Mexican states using our historic migration weights, described below.

3.3 Weighting Matrix Data Source

We allocate the demand for Mexican labor using a weighting system based on historic migration patterns for all Mexican states going to all receiving states in the U.S. To

[15]For example, let i=construction, g=California, d=men, and t=Q12005. Suppose there are 30,000 18-65 year old men working in construction in California in this period. Also suppose that 30% of 18-65 year old Mexican men in the U.S. work in construction in 2000. So for Mexican men there are 0.3*30,000=9,000 potential construction jobs in California in 1Q12005. These jobs are then summed across all industries for each state, quarter and year to create an aggregate measure of potential jobs for each state and time period.

estimate the weights we use total migration flows from the EMIF Norte Survey (*Encuestas sobre Migración en las Fronteras Norte y Sur de México*, or Surveys on Migration to the Northern and Southern borders of Mexico) (EMIF).[16] Using a probabilistic sampling methodology for mobile populations, this dataset collects information on migrants, 15 years old and older, in transit to the U.S. and who are coming from Mexico. Migrants are interviewed in locations in the northern Mexican border and at airports during 12 months of the year. In the survey, migrants are asked the state where they were born, and the US state to which they plan to travel. The data are collected in several years, but in order to abstract from the idiosyncrasies of any given year, we use an aggregate collected for all years prior to out outcome data (1995, 2001 and 2002). We calculate a matrix of the percentage of Mexican migrants in each U.S. state that are from a given Mexican state. These percentages pre-date our outcome data, and should help generate an instrument that is not correlated with contemporaneous factors in Mexico that determine both migration and labor market outcomes. We provide more tests of this assumption in section 6.[17]

[16] According to EMIF methodology document, 94 percent of migrants travel through one of 8 locations `http://www.colef.mx/emif/metodologia/docsmetodologicos/Metodologia%20Emif%20Norte%20y%20Sur.pdf`

[17] Given that we use both male and female migrants to construct the EMIF weights, one concern that arises is that the EMIF is more representative of male migration than female migration (Rendall et al. 2005). To address the possibility that the EMIF creates unrepresentative weights we also estimate the first and second stage using the ENE, which we describe in more detail in section 4. We present first state results that use the ENE weights in Appendix Table A1 and second stage results in Appendix Table A2. In both cases the results are very similar to those using our EMIF weights, alleviating concerns that the EMIF does not generate representative numbers on migration patterns.

4 First Stage

The first stage regression is:

$$\begin{aligned}\left(\frac{NetMigration}{Population}\right)_{sqy-4} &= \alpha_0 + \alpha_1 \frac{1}{4}\sum_{j=1}^{4} PredictedNetMigration_{sqy-j} \\ &+ X'_{sy}\gamma + Z'_{iqy}\lambda + \delta_q + \delta_y + \delta_s + u_{isqy}\end{aligned} \tag{4}$$

The first stage results are shown in Panel A, column 1 of Table 3. They show that our instrument is a significant predictor of net migration across states and time. The coefficient on the instrument of 0.0275 suggests that a one standard deviation increase in predicted migration (0.32%) is associated with an increase in net migration of 0.8%, which is quite large relative to the mean of 0.3%. Furthermore the F statistic is high enough to reject the null that our instrument does not predict net migration rates.

The validity of our instrument rests on the argument that potential jobs capture demand shocks in the U.S., and that these shocks vary across U.S. states over time. To assess the strength of these claims we check the robustness of our instrument to alternative measures of demand for Mexican labor. We consider the following alternative measures from the CPS: (1) the total number of individuals employed in a given state, quarter and year; (2) and employment rates for all individuals in a given U.S. state, quarter and year. These results are presented in columns two and three of Table 3, and show that while these alternative demand measures are not as strong as the original one, they are significant predictors of net migration.

Meanwhile, the exogeneity of our instrument partially rests on the argument that due to the persistence of migration networks, weights from an earlier period help predict migration from sending Mexican states but are uncorrelated with contemporaneous

local shocks. We assess the strength of this claim by looking at the persistence of migration networks across different data sources.[18] We consider two alternative sources for our weighting matrix between U.S. and Mexican states. The first is from a module on international migration included in the 2002 National Survey of Employment (ENE), conducted by INEGI. This survey captures migration flows over the five year period spanning 1997 to 2002. The second comes from information from the Instituto de los Mexicanos en el Exterior on the issuance of identification cards, known as *matrículas consulares* (MC) or consular registration card. *Matrículas consulares* are issued to individuals living abroad, follow the same security standards as the Mexican passport, and can serve as identification in the United States (Riosmena and Massey 2010).[19] As shown in columns one and two of Appendix Table A1, the alternative instruments generate first stage coefficients that are very close to those from the EMIF. We also find that an instrument constructed using random weights, reported in column three, generates a first stage coefficient that is negative rather than positive. The fact that three different data sources result in similar predictions of net migration provides strong evidence of the persistence of migration networks. It also shows that that the instrument only predicts net migration where the networks exist.[20]

Finally, there might be concerns that our instrument does not predict migration across all time periods due to evidence that migration routes, and thus the importance of historic

[18]We also note that there is a high level of correlation in the weights across different years in the EMIF. The correlation in the weights between the first year in the EMIF (1995) and one of the later years we do not use (2011) is .83.

[19]Mexican consulates began issuing these certificates in 1871. `http://www.ime.gob.mx/es/estadisticas-de-mexicanos-en-estados-unidos`. Both legal and illegal immigrants can apply for them, and it is estimated that 40% of all Mexicans living in the U.S. have one. Correspondence from Direccion IME Global on 17th July 2014.

[20]We also assess the robustness of our instrument to removing the largest sending Mexican states and the largest receiving U.S. states. As shown in Appendix Table A1, we continue to find positive and significant first stage coefficients, suggesting our results are not driven by a few states.

migration networks, changed after the economic downturn (Chort and de la Rupelle, 2016). We therefore split the sample and estimate the first stage from 2006 to 2009 and from 2010 to 2012. The results are shown in columns four and five of Appendix Table A1. While we do find our instrument is a stronger predictor of net migration in the first period, it remains a significant predictor in the second period. This suggests that our first stage is not entirely identified off of the earlier part of our sample.

5 Second Stage

5.1 Main Results

The second stage results are shown in Figure 4 and Table 4. The coefficients capture the changes in labor market outcomes in a given quarter to predicted migration over the previous four quarters. We have not re-scaled net migration, such that a value of 1 constitutes a net migration rate of 100%. Thus to interpret all coefficients we use a one standard deviation change in 4 quarter net migration, which is 0.003, or 0.3% (the mean value is 0.23%). We also use the example of a *decrease* in net migration, as this is the trend we are analyzing.

Starting with employment, we find evidence that would-be and return migrant men are substitutes for rather than complements to non-migrant men. As shown in Table 4 column 1, a decrease in net migration leads to a significant decrease in employment among non-migrant *men* but no significant change in employment for non-migrant *women*. Specifically, we find that a one standard deviation decrease in net migration leads to a decrease in employment of 2.0% for non-migrant men. This result is unsurprising given that out and return migrants are overwhelmingly male. What is more surprising, however,

is that we find no change in formality for those who are employed. As shown in column 2, we find that declining net migration does not significantly change whether or not men or women have formal jobs. This means that the informal sector does not appear to absorb the increase in male labor from reduced net migration. Given the size and flexibility of the informal sector, *ex-ante* it might be expected that increased competition for all jobs would push more non-migrants into this sector. We find little evidence, however, that this occurs over the time period considered.

We also find little evidence that employed individuals intensify their work in the form of hours, as the coefficient on weekly hours worked is insignificant for both men and women. However, we do find a significant effect on wages. As shown in column 4, we find that declines in net migration lead to significant increases in wages for both men and women. Specifically, a one standard deviation decrease in net migration leads to an increase in real hourly wage of of 2.75 pesos for men and 2.08 pesos for women. This constitutes 14% of mean values for both. The increase in wages is unexpected, as previous research finds that wages rise in the face of *increased* net migration instead of it's opposite (Mishra 2007). Given the segmentation in labor markets by skill, the extent to which this happens likely varies by worker type. To illuminate the story further we therefore investigate differences by education level in Section 7 below.

5.2 Job Type

To further explore how labor markets are affected by net migration, we estimate the impact of net migration on job type, defined as having salaried, self-employed or unpaid work. The results are shown in columns one through three of Table 5. As shown in Panel A, they show that declining net migration leads to significant changes in job type, with the

incidence of salaried work increasing, while the incidence of self-employment and unpaid work declines. We also see differences in changes in job type by sex, as shown in Panels B and C of Table 5. Increases in salaried work and decreases in unpaid work are much larger for women, while the decline in self-employment is larger for men. Specifically, the increase in salaried work is almost twice as large for women than men, while the decrease in unpaid work is more than seven times larger. Meanwhile the decline in self employment is twice as large for men than women. The relative size differences for self-employment and unpaid work may be a result of gender sorting into job type, as men have a higher incidence of self-employment while women have a higher incidence of unpaid work. Overall the shifts aligns with a story in which individuals, particularly women, in households that rely on remittances must obtain more stable and highly paid work to make up for lost income from abroad. It also provides further evidence that informal labor markets do not absorb the increase in labor supply from would-be and return migrants.

5.3 Unemployment and Labor Force Participation

To gain a more detailed picture of the decline in employment we estimate the two possible reasons someone is not employed; 1) they are not in the labor force; or 2) they are unemployed (in the labor force but looking for work). We also estimate being in school full time as one alternative outcome to being in the labor force. The results are shown in columns four through six in Table 5, and provide further evidence of increased competition for jobs. Decreasing net migration leads to significant increases in unemployment for non-migrant men and women and significant declines in labor force participation for men. Meanwhile, we do not find evidence that individuals who exit the labor market enter school full time, as the coefficients on being in school (column six) are positive and insignificant.

This suggests that declining net migration does not lead to increased human capital investment for working age adults. We investigate other possible uses of time in section 8.

6 Robustness Checks

6.1 Internal Migration

Before continuing we address several concerns regarding the exclusion restriction in our model. We start by examining internal migration, which can be a confounding factor if individuals with particular labor market outcomes move in response to net migration rates. Our results therefore may reflect selection into areas with specific migration rates rather than the impact of migration itself. Changing internal migration also raises the question of how local labor markets are. Workers whose abundance increases as a result of declining net migration (say less well educated men) may move to states where there has been no change in the number of workers in a particular group. If this happens on a large scale the relevant labor market to examine is at the national rather than the state level. Our results which focus on state level outcomes therefore may not estimate the true impact of return migration.

To beging, we use the ENOE to examine if there have been changes in internal migration, particularly from high migration states. Internal migrants are defined as individuals who do not live in their state of birth. This is the only way to categorize internal migrants as the ENOE does not contain residency history. We follow Hanson (2007) and define high migration states as the 6 states with the highest historic rates of international migration (Aguascalientes, Durango, Guanajuato, Michoacán, San Luis Potosí and Zacatecas).[21]

[21]To clarify, internal migrants from high migration states are individual who were born in Aguas-

The first graph in Figure 5 shows total internal migrants overall and internal migrants from high-migration states to *non high migration* states. It shows that while internal migration has grown, the total from high migration states have not. This shows there has been no systematic increase in internal migrants from high migration states over the time period we consider. This finding is further corroborated in the second graph in Figure 5, which shows total population and internal migration rates for high migration states. The figure shows a clear increase in total population for these states, but a steady *decline* in internal migrants as a percentage of the population. This provides further evidence that internal migration did not increase in response to declining net international migration.[22]

Finally, we test if internal migration is a confound by re-estimating the model on the sample of individuals who live in their state of birth. The results of the second stage are shown in Panels A and B of Table 6. In general we find no change in our results, which means that internal migrants do not drive our findings.

6.2 Covariate shocks

A second concern is that our instrument is endogenous if demand shocks in different U.S. states are correlated with employment conditions in the sending Mexican states. In other words, employment by industry in U.S. states may be linked to employment by industry in Mexican states, even after controlling for real GDP, overall employment rates, and an index of industrial activity. It is important to highlight that a violation of the exclusion restriction stems from possible correlations between sending and receiving *states* in the demand shocks by industry, not correlations between the U.S. and Mexico *overall*. This

calientes, Durango, Guanajuato, Michoacán, San Luis Potosí or Zacatecas but currently live in a non-high migration state.

[22]We also estimate internal migration total and rates at the state level as a function of a linear and quadratic time trend and find that neither trend is significant.

is because industry employment changes are not the same across all U.S. states, and Mexican states do not send migrants equally to all U.S. states. Thus each Mexican states is exposed to different demand shocks in the U.S.

We therefore want to estimate the correlation between employment by industry in sending Mexican states and the U.S. states that receive their migrants. We begin by calculating employment trends from the first quarter in 2006 for the top four industries that employ Mexican born men in the U.S.; agriculture, construction, manufacturing and retail. We then graph these trends for the two largest receiving states in the U.S.– California and Texas– and the two largest sending states for each of these U.S. states. These are Michoacán for California and Guanajuato for Texas. The results are presented in Figure 3. A horizontal line is placed at 1 to represent no change in employment from the beginning of our sample in a given industry. Overall the graphs show very little correlation in employment trends across any of the 4 states, as there is no systematic expansion or contraction in employment for any time period considered. This provides anecdotal evidence that the correlation between demand shocks is low.

We next formally estimate correlations between industry employment across sending a receiving states. In addition to the employment trends described above, we also calculate the percentage of employment by industry (industry employment shares) for each Mexican state in each quarter and year using the ENOE. We next calculate the employment shares by industry, quarter and year using the monthly CPS for each U.S. state. We then create a composite receiving state industry-employment trend and industry-employment share by allocating these variables based on the EMIF weights used to construct the instrument.[23]

[23]For example, we calculate the portion of total jobs that are in construction for every U.S. state and time period. How much each construction employment share matters, however, depends on how many

We then regress each Mexican state employment share or trend on the composite receiving state employment share or trend, respectively. The regression coefficient captures the correlation between between employment shares or trends in a particular Mexican state, industry and time period and employment shares or trends in those industries in the U.S. states where migrants from that state are received.[24] The results of these regressions are shown in Appendix Table A4 and provide further evidence that there is little correlation between industry employment in sending and receiving states. For employment shares we find a coefficient that is positive but quite low. A one standard deviation change in the composite employment share for an industry in receiving states (0.033 or 3.3%) is associated with an increase in that industry's share in a sending state of 0.0006, or 0.06%. This constitutes only 1.3% of the mean, and thus is not very large.[25] For employment trends we find a negative and small coefficient. A one standard deviation decrease in the composite employment trend (relative to Q12006) is associated with an 0.003 increase, a value that is 0.3% of the mean. This further shows that employment trends do not follow each other, and that changes in industry employment in the U.S. constitute local demand shocks that largely are uncorrelated with employment shocks in sending Mexican states.[26]

Finally, we test for co-variate shocks by adding state-quarter-year employment shares constructed for the analysis above and a linear time trend to the model. The second stage

migrants from a given Mexican state are in that particular U.S. state. We construct employment shares to abstract from the relative size of labor markets. We need to control for the size of a U.S. state so that large states, like California, do not dominate the measure. Without doing this, given the large relative size of Californian labor markets, it is possible that sectors with low levels of employment can dominate the measure, even for states that send few migrants to California.

[24] We estimate: $EmploymentShare_{isqy}=\beta_0+\beta_1 CompositeReceivingEmploymentShare_{isqy} + u_{isqy}$

[25] For example, the standard deviation in industry employment shares for one year (2005) is 3.64%.

[26] We find a coefficient of 0.186 if we use weights summed by Mexican state. This means that a one standard deviation change in the composite employment share is associated with a sending state's employment share of 0.6%, or 13% of the mean.

results are shown in Panel C of Table 6. We find no changes in our results, indicating that our findings our robust to additional measures for local employment conditions.

7 Heterogeneity by Education

Given that labor markets likely are segmented, we investigate heterogeneity in responses by educational attainment. Migrants, and thus would-be migrants- are not equally drawn from the education distribution, and while the measurement of education and the implications for the type of selection varies across papers, the general consensus is that migrants come from the lower to middle of the education distribution. For Mexico, this means they have completed primary school and may have some secondary school (Mexico has 6 years of compulsory primary schooling and 3 years of lower secondary schooling).[27] In the ENOE there are four education categories: less than a primary education; primary education completed; secondary education completed; and tertiary education.[28] Would-be migrants should be more likely to have completed a primary or secondary education. We find evidence of this when we look at the characteristics of out-migrants, return migrants and non-migrants during the period of highest out migration in the ENOE (2005 and 2006). As shown in Table 2, in the ENOE out-migrants are more likely than non-migrants to have a primary or secondary education, but less likely to have less than primary or tertiary education.

We also examine the composition of migrants by education as a portion of total mi-

[27]IPUMS International, EDUMX description.

[28]These are the same categories used for IPUMS International for educational attainment. We use these categories for educational attainment in lieu of years of education, as it is difficult to map the latter into attainment given that individuals may skip or repeat grades. For reference, the summary statistics on years of education for each category is as follows: in the ENOE the mean years of education is 1.3 for less than primary school, 6.6 for primary completed, 9.8 for secondary completed, and 14.7 for tertiary completed.

grants and the remaining population for the period of the sample. The results are shown in Appendix Figure A1 and provide further evidence that migrants largely come from the lower to middle end of the education distribution. As shown in Panel A, those with a primary education or less make up the largest percentage of out migrants and, for the earlier part of the sample, constitute a larger percentage of those left behind. The first graph in Panel A also shows that while the rates of out migration relative to the population were higher for those with a primary education or less, they decline more for this group than for those with a secondary or tertiary education. This means the population with a primary education or less likely increases the most over our sample period, leading to increased competition for jobs.

We next estimate outcomes separately by education level, showing the second stage results in Table 7. They show clear differences in labor market responses to net migration by education level. For employment we find that decreases in net migration only have a significant effect on those who have completed a primary education. This is exactly the group who, ex-ante, is expected to most affected by increased competition for jobs. Meanwhile, while we find no significant impacts on formality or hours worked, we do find significant impacts on hourly wage. We find that wages increase significantly *only* for those with a tertiary education. Furthermore, the estimated increase in income is seven times larger for those with a tertiary education than those with a secondary or primary education. The larger wage gains for those at the upper end of the education distribution aligns with a story in which the relative scarcity of college educated increases.

Finally, we estimate results by sex and education. The results are presented in Figure 6 and corroborate many of those above. The declines in employment and labor force

participation are entirely among less well educated men. We see no change in employment for college educated men, or women at any education level. Meanwhile the increases in wages are the highest for college educated men, followed by college educated women. We also see no change in wages for men or women with less than a secondary education.

8 Time Use on Non Market Activities

To better understand what happens to non-migrant men and women, we look at time spent on non market activities. We estimate the impact of declining net migration on weekly hours spent on: (a) studying or training; (b) caring for dependents; (c) household chores; (d) repair or maintenance of home, furniture, appliances or cars (asset repair); (e) services to the community. The results are presented in Table 8. We find that for men, decreased net migration significantly lowers the number of hours spent on education and dependent care and increases the hours spent on asset repair and community service. This suggests that men who work less do not spend more time on education or child care, but instead on home repair and community service. In particular they do not appear to take over the home production of women who may work more than before.

For women we find no impact on hours spent studying, but do find a decline in hours spent on dependent care and an increase in household chores. The opposite signs on the last two are interesting, and suggest that some outsourcing of child care may happen as a result of women working more. Meanwhile, no outsourcing of household chores seems to occur.

9 Conclusion

In this paper we examine the unprecedented decline in out migration and its impacts on Mexican labor markets. The combination of more individuals in Mexico and the decline in remittance income may impact whether or not non-migrants work, as well as the type of work they do, the number of hours they work, and the wages they earn. Furthermore, since migrants are not drawn equally from the population, they degree of these impacts likely varies across individuals based on their characteristics and reliance on remittances.

We use data from the rotating labor force surveys (the ENOE) to estimate the impacts of declining net migration. A key challenge to estimating these impacts stems from the possibility that local labor market conditions determine both out-migration and the outcomes of non-migrants. We therefore use an instrumental variables strategy that isolates demand for Mexican labor in U.S. labor markets. Our instrument relies on historical migration patterns from sending Mexican states to receiving U.S. states and uses the variation in labor demand and locations to predict exogenous net migration rates.

Our findings indicate that the decline in migration reduced employment for lower educated men and increased wages for higher educated men and women. These results are in line with a model where migrants are substitutes of less educated non-migrant men and complements of higher educated men and women.

We also find little evidence that informal labor markets absorb the increase in the supply of labor stemming from reduced net migration, as informality does not change and self-employment actually declines. Instead we find that women switch from unpaid to salaried jobs, which aligns with a story in which declining remittances lead other family members, particularly women, to seek more stable and well paid employment.

Interestingly this does not happen through increased hours worked, but rather through a change in job type. Going forward we also plan to explore this explanation in more detail, assessing if the results are driven by areas that are more likely to receive remittances.

References

Abadie, Alberto, Susan Athey, Guido W. Imbens, and Jeffrey Wooldridge, "When Should You Adjust Standard Errors for Clustering?," *NBER Working Paper 24003*, 2017.

Amuedo-Dorantes, Catalina and Susan Pozo, "Migration, Remittances and Male and Female Employment Patterns," *American Economic Review*, 2006, *92* (2), 222–226.

_ **and** _ , "Remittance Income Volatility and Labor Supply in Mexico," *Southern Economic Journal*, 2012, *79* (2), 257–276.

Cano-Urbina, Javier, "The Role of the Informal Sector in the Early Careers of Less-Educated Workers," *Journal of Development Economics*, 2015, *112*, 33–55.

Card, David, "Immigrant Inflows, Native Outflows, and the Local Labor Market Impacts of Higher Immigration," *Journal of Labor Economics*, 2001, *19* (1), 22–64.

Chiquiar, Daniel and Gordon H Hanson, "International migration, self-selection, and the distribution of wages: Evidence from Mexico and the United States," *Journal of Political Economy*, 2005, *113* (2), 239–281.

Chort, Isabelle and Maelys de la Rupelle, "Determinants of Mexico-U.S. Outward and Return Migration Flows: A State-Level Panel Data Analysis," *European Economic Review*, 2016, *53*, 1453–1476.

Conover, Emily, Melanie Khamis, and Sarah Pearlman, "Gender Imbalances and Labor Market Outcomes: Evidence from Large-Scale Mexican Migration," 2017.

Dustmann, Christian and Joseph-Simon Goerlach, "The Economics of Temporary Migrations," *Journal of Economic Literature*, 2016, *54* (1), 98–136.

EMIF, "Encuesta sobre Migración en la Frontera Norte de México. El Colegio de la Frontera Norte, Secretaría del Trabajo y Previsión Social, Consejo Nacional de Población, Instituto Nacional de Migración, Secretaría de Relaciones Exteriores."

ENADID, "Encuesta Nacional de la Dinàmica Demogràfica," 2009.

_ , "Encuesta Nacional de la Dinàmica Demogràfica," 2014.

ENE, "Encuesta Nacional de Empleo. INEGI."

Fajardo, Gustavo, Emilio Gutiérrez, and Horacio Larreguy, "Taking One for the Team: Shocks at Destination and Households' Supply of Migrants," 2017.

Flood, Sarah, Miriam King, Steven Ruggles, and J. Robert Warren, "Integrated Public Use Microdata Series, Current Population Survey: Version 5.0 [dataset]," Technical Report, Minneapolis, MN: University of Minnesota 2017.

Group, World Bank, "Discouraged Immigrants and the Missing Pop in EPOP," Technical Report https://openknowledge.worldbank.org/handle/10986/23743, World Bank, Washington, DC 2016.

Hanson, Gordon H., "Emigration, remittances and labor force participation in Mexico," *Integration and Trade Journal*, 2007, *27*, 73–103.

Hausmann, Ricardo and Ljubica Dedelkoska, "Welcome home in a crisis: Effects of return migration on the non-migrants' wages and employment," *European Economic Review*, 2018, *101*, 101–132.

IME, "Instituto de los Mexicanos en el Exterior."

Levy, Santiago, *Good Intentions, Bad Outcomes: Social Policy, Informality and Economic Growth in Mexico*, Brookings Institution Press, 2008.

Matrículas Consulares, "http://www.ime.gob.mx/es/estadisticas-de-mexicanos-en-estados-unidos," 2015.

McKenzie, David and Hillel Rapoport, "Self-selection patterns in Mexico-US migration: The role of migration networks," *The Review of Economics and Statistics*, 2010, *92* (4), 811–821.

Mishra, Prachi, "Emigration and wages in source countries: Evidence from Mexico," *Journal of Development Economics*, 2007, *82*, 180–199.

Moraga, Jesùs Fernàndez-Huertas, "New Evidence on Emigrant Selection," *The Review of Economics and Statistics*, 2011, *93* (1), 72–96.

Norlander, Peter and Todd A. Sorensen, "Discouraged Immigrants and the Missing Pop in EPOP," 2016, (9668).

Orrenius, Pia M. and Madeline Zavodny, "Self-selection among undocumented immigrants from Mexico," *Journal of Development Economics*, 2005, *78*, 215–240.

Passel, Jeffrey S. and D'Vera Cohn, "Overall Number of U.S. Unauthorized Immigrants Holds Steady Since 2009," Technical Report, Pew Research Center, September 2016.

Reinhold, Steffen and Kevin Thom, "Migration Experience and Earnings in the Mexican Labor Market," *Journal of Human Resources*, 2012, *48*, 768–820.

Rendall, Michael S and Susan W Parker, "Two decades of negative educational selectivity of Mexican migrants to the United States," *Population and development review*, 2014, *40* (3), 421–446.

Rendall, Michael S., Emma Aguila, Ricardo Basurto-Dàvila, and Mark S. Hancock, "Migration between Mexico and the U.S. estimated from a border survey," *Working paper*, 2009.

_ , Peter Brownell, and Sarah Kups, "Declining Return Migration from the United States to Mexico in the Late-2000s Recession: A Research Note," *Demography*, 2011, *48*, 1049–1058.

Riosmena, Fernando and Douglas S Massey, "Pathways to El Norte: Origins, Destinations, and Characteristics of Mexican Migrants to the United States," *International Migration Review*, 2012, *46* (1), 3–36.

Shapiro, Alan Finkelstein and Federico S. Mandelman, "Remittances, entrepreneurship, and employment dynamics over the business cycle," *Journal of International Economics*, 2016, *103*, 184–199.

Theoharides, Caroline, "Manila to Malaysia, Quezon to Qatar: International Migration and the Effects on Origin-Country Human Capital," Technical Report, working paper, Amherst College 2014.

Villarreal, Andrés, "Explaining the Decline in Mexico-U.S. Migration: The Effect of the Great Recession," *Demography*, 2014, *51*, 2203–2228.

_ , "The Education-Occupation Mismatch of International and Internal Migrants in Mexico, 2005-2012," *Demography*, 2016, *53*, 865–883.

_ **and Sarah Blanchard**, "How Job Characteristics Affect International Migration: The Role of Infomality in Mexico," *Demography*, 2013, *50*, 751–775.

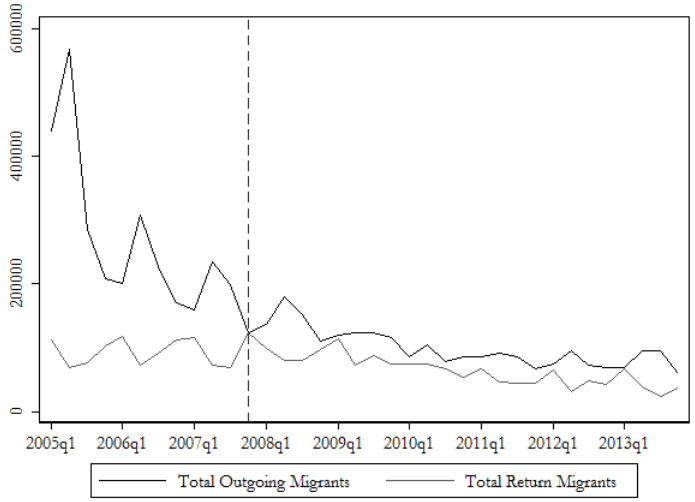
Woodruff, Christopher and Rene Zenteno, "Migration networks and microenterprises in Mexico," *Journal of Development Economics*, 2007, *82*, 509–528.

10 Figures and Tables

Figure 1: Working Age Mexican Born Population in the U.S., Q12000 to Q42013

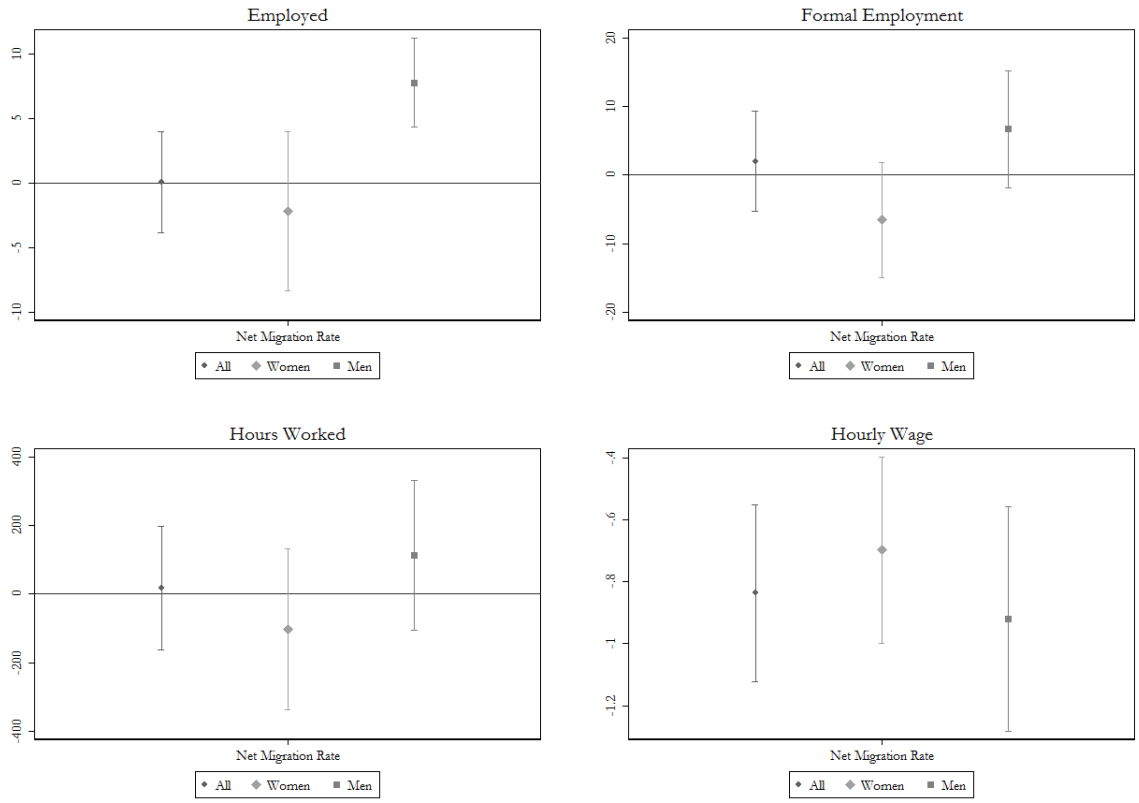
Note: Working age defined as 18 to 65. Vertical line placed in Q42007, which marks the beginning of the Great Recession.
Source: Current Population Survey, as accessed by IPUMS CPS.

Figure 2: Out and Return Migration in Mexico, Q12005-Q42013



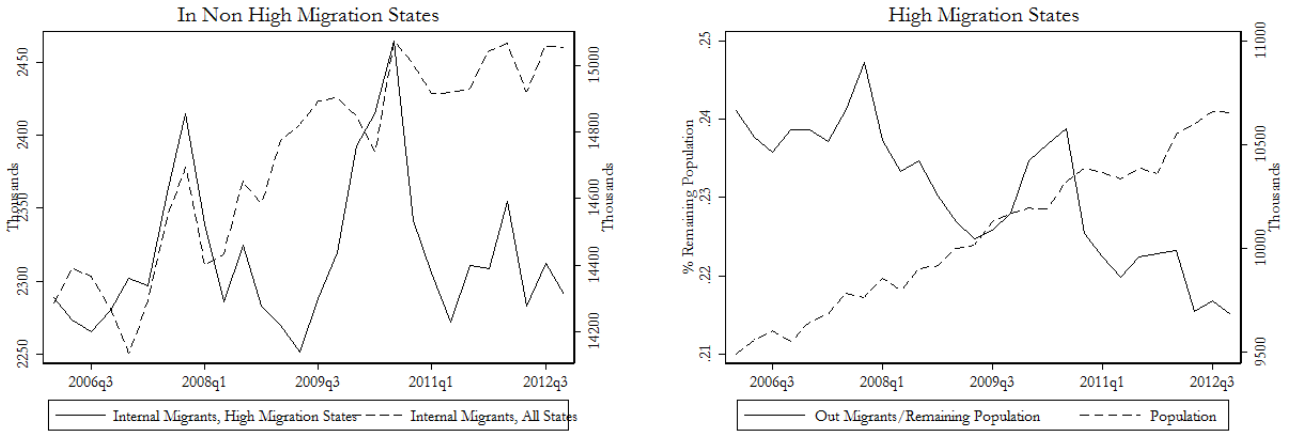
Note: Net migration rate calculated as (out migration-return migration)/non-migrant population for a given quarter. Vertical line placed in Q42007, which marks the beginning of the Great Recession.
Source: ENOE.

Figure 3: Second Stage IV Results



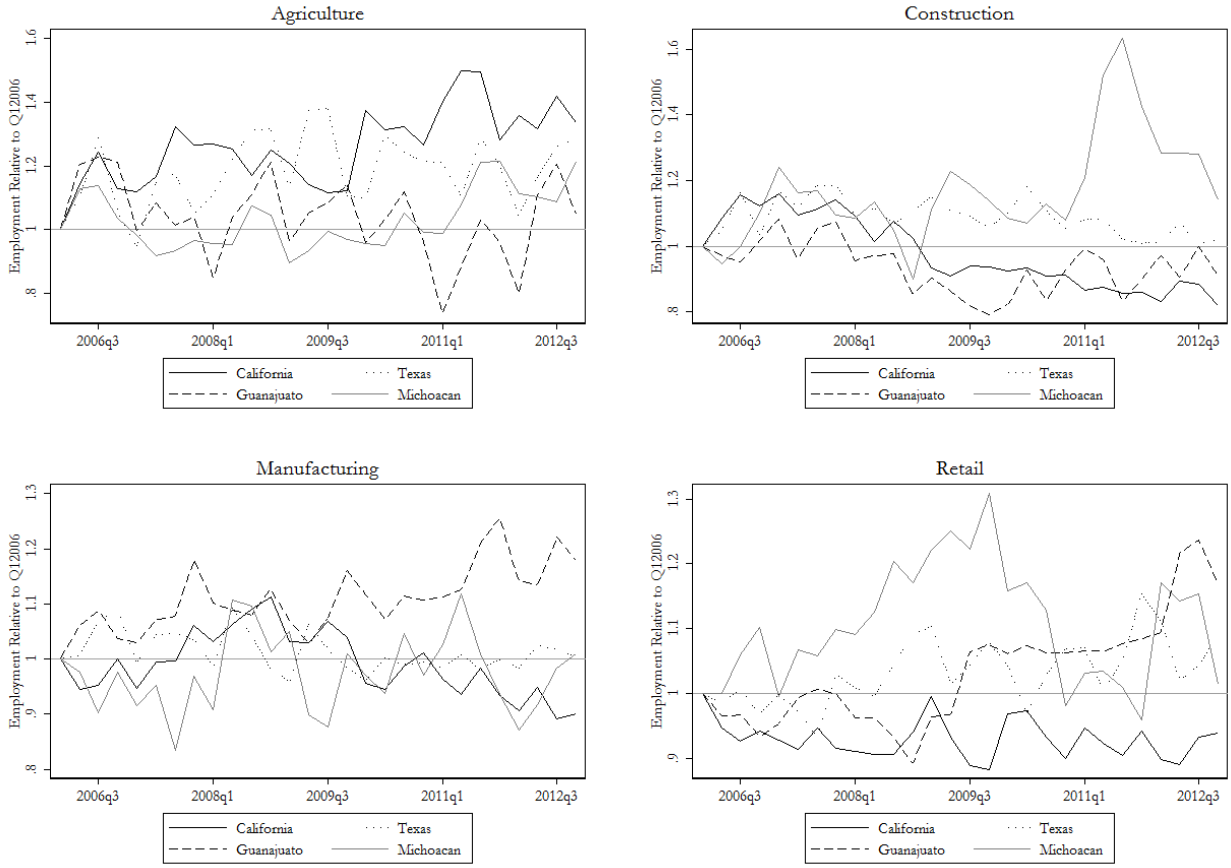
Note: Dots represent second stage IV coefficient on the net migration rate for a given time period. The instrument uses potential demand and EMIF weights. Lines show the 95% confidence intervals. Controls include state, quarter and year fixed effects, individual-time varying controls and state-time varying controls. In all cases population weights are used and standard errors are clustered at the primary sampling unit level.
Source: ENOE, INEGI, CPS and U.S. Census, as accessed by IPUMS, and the EMIF.

Figure 4: Trends in Internal Migration



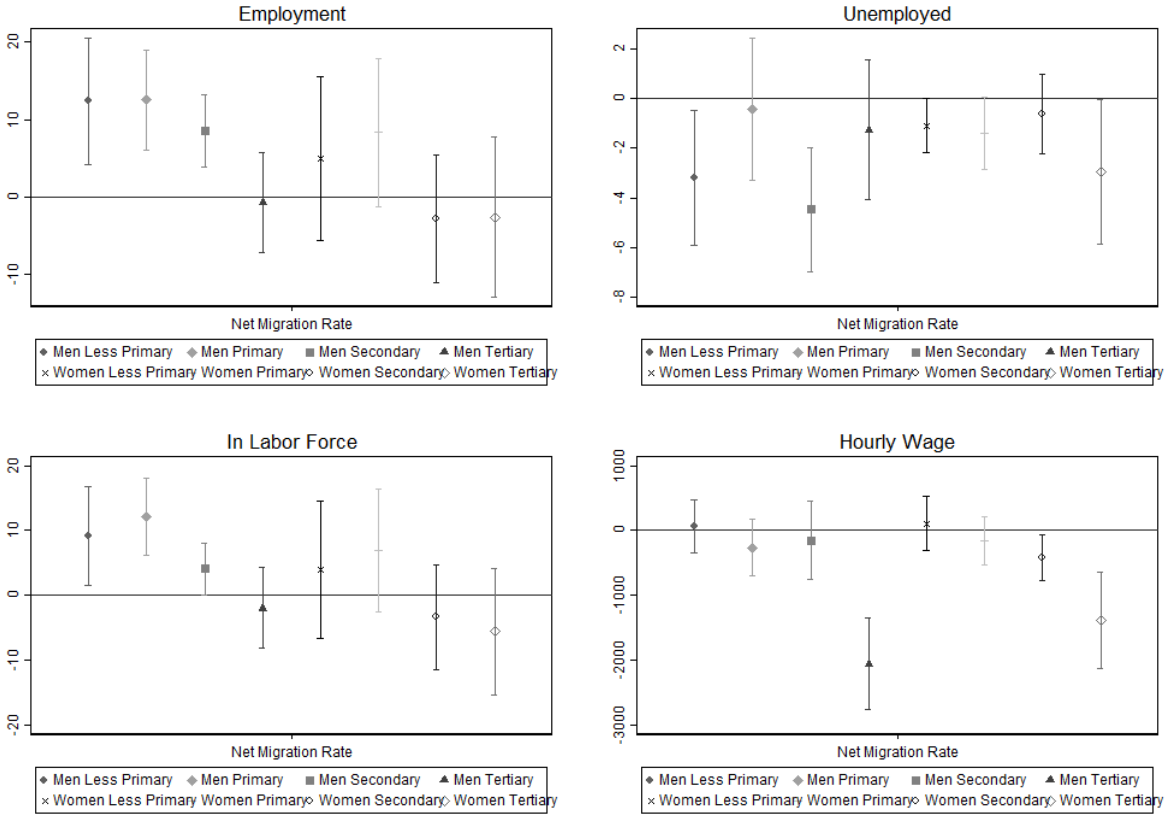
Note: The list of high migration states is taken from Hanson (2007). They are: Aguascalientes, Durango, Guanajuato, Michoacán, San Luis Potosí and Zacatecas.
Source: ENOE.

Figure 5: Trends in Employment for top 4 Industries for Mexican born men



Source: CPS and ENOE.

Figure 6: Response to Net Migration Rates by Education and Sex



Note: Dots represent second stage IV coefficient on net migration rates. Lines show the 95% confidence intervals. Controls include state, quarter and year fixed effects, individual-time varying controls and state-time varying controls. In all cases population weights are used and standard errors are clustered at the primary sampling unit level.
Source: ENOE, INEGI, EMIF, CPS and U.S. 2000 Census.

Table 1: Summary Statistics Labor Force

	(1) All	(2) Men	(3) Women
Employed	0.64	0.84	0.47
	(0.48)	(0.37)	(0.50)
Of Those Employed			
Formal worker	0.38	0.38	0.39
	(0.49)	(0.49)	(0.49)
Weekly hours worked	41.93	45.18	36.58
	(18.42)	(17.75)	(18.25)
Hourly wage (2005 pesos)	18.60	19.01	17.92
	(31.21)	(32.05)	(29.77)
Type of Job			
Salaried	0.68	0.69	0.66
	(0.47)	(0.46)	(0.47)
Self employed	0.27	0.29	0.25
	(0.45)	(0.45)	(0.44)
Unpaid	0.05	0.03	0.08
	(0.22)	(0.16)	(0.28)
Education			
Less than primary education	0.18	0.16	0.20
	(0.38)	(0.37)	(0.40)
Completed primary education	0.22	0.21	0.23
	(0.41)	(0.41)	(0.42)
Completed high school	0.31	0.30	0.32
	(0.46)	(0.46)	(0.46)
More than high school	0.28	0.31	0.26
	(0.45)	(0.46)	(0.44)
Observations	5,112,200	2,458,658	2,653,542

Population weighted mean values reported. Standard deviations in parentheses
Source:ENOE

Table 2: First Stage IV Results

	Demand Measure		
	(1) Potential Jobs	(2) Total Employment	(3) Employment Rates
Predicted Migration	0.0275	0.0025	0.0088
	(0.0007)***	(0.0001)***	(0.0003)***
Observations	5,111,922	5,111,922	5,111,922
A-P F stat	1643.43	1810.96	780.41

* p < 0.1, ** p < 0.05, *** p < 0.01. Standard errors in parentheses.

Note: Coefficients on the instrumental variable for net migration shown. Controls include state, quarter and year fixed effects, marital status and household size, and state-year real GDP per capita and state-quarter employment rates. In all cases population weights are used and standard errors are clustered at the primary sampling unit level.

Source: ENOE, CPS and the US Census 2000, as accessed through IPUMS, the EMIF, and INEGI.

Table 3: Second Stage IV Results

		Of Those Who Are Employed		
	(1) Employed	(2) Formal Employment	(3) Hours Worked	(4) Hourly Wage
PANEL A: ALL				
Net Migration Rate	0.092	2.028	17.815	-836.367***
	(1.993)	(3.740)	(92.773)	(145.382)
Observations	5,111,922	3,346,904	3,346,904	3,346,904
PANEL B: MEN				
	(1)	(2)	(3)	(4)
Net Migration Rate	7.809***	6.734	114.255	-919.035***
	(1.752)	(4.346)	(111.631)	(185.141)
Observations	2,458,508	2,040,264	2,040,264	2,040,264
PANEL C: WOMEN				
	(1)	(2)	(3)	(4)
Net Migration Rate	-2.152	-6.548	-102.926	-697.707***
	(3.152)	(4.287)	(119.576)	(152.856)
Observations	2,653,414	1,306,640	1,306,640	1,306,640

* p < 0.1, ** p < 0.05, *** p < 0.01. Standard errors in parentheses.

Note: Coefficients on the IV individual fixed effects estimate on the net migration rate over the previous four quarters are shown. Controls include state, quarter and year fixed effects, marital status and household size, and state-year real GDP per capita and state-quarter employment rates and industrial activity. In all cases population weights are used and standard errors are clustered at the primary sampling unit level.

Source: ENOE, CPS and the US Census 2000, as accessed through IPUMS, the EMIF, and INEGI.

Table 4: Heterogeneity by Job Type and Other Outcomes

	Role in Main Job			Other Outcomes		
	(1) Salaried	(2) Self Employed	(3) Unpaid	(4) In Labor Force	(5) Unemployed	(6) In School
PANEL A: ALL						
Net Migration Rate	-7.502**	4.906**	2.597**	-1.751	-1.843***	0.956
	(3.169)	(2.486)	(1.117)	(1.990)	(0.476)	(1.024)
Observations	3,346,904	3,346,904	3,346,904	5,111,922	5,111,922	5,111,922
PANEL B: MEN						
	(1)	(2)	(3)	(4)	(5)	(6)
Net Migration Rate	-5.924	6.081*	-0.157	5.504***	-2.305***	1.938
	(3.603)	(3.193)	(0.958)	(1.559)	(0.769)	(1.432)
Observations	2,040,264	2,040,264	2,040,264	2,458,508	2,458,508	2,458,508
PANEL C: WOMEN						
	(1)	(2)	(3)	(4)	(5)	(6)
Net Migration Rate	-10.452***	3.345	7.107***	-3.436	-1.284***	0.170
	(4.041)	(3.169)	(2.196)	(3.162)	(0.487)	(1.264)
Observations	1,306,640	1,306,640	1,306,640	2,653,414	2,653,414	2,653,414

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses.

Note: Coefficients on the IV individual fixed effects estimate on the net migration rate shown. Controls include state, quarter and year fixed effects, marital status and household size, and state-year real GDP per capita and state-quarter employment rates. In all cases population weights are used and standard errors are clustered at the primary sampling unit level.

Source: ENOE, CPS and the US Census 2000, as accessed through IPUMS, the EMIF, and INEGI.

Table 5: Robustness Checks

		Of Those Who Are Employed		
	(1) Employed	(2) Formal Employment	(3) Hours Worked	(4) Hourly Wage
PANEL A: Non Movers Men				
Net Migration Rate	8.230***	7.224	38.208	-791.763***
	(1.996)	(4.752)	(122.571)	(204.056)
Observations	1,932,359	1,600,458	1,600,458	1,600,458
A-P F statistic	1311.43	1329.30	1329.30	1329.30
PANEL C: Non Movers Women				
	(1)	(2)	(3)	(4)
Net Migration Rate	-2.539	-4.861	-84.574	-709.415***
	(3.497)	(4.666)	(135.400)	(170.266)
Observations	2,100,089	1,029,757	1,029,757	1,029,757
A-P F statistic	1389.40	1227.59	1227.59	1227.59
PANEL C: Industry Controls				
	(1)	(2)	(3)	(4)
Net Migration Rate	0.115	3.630	-1.669	-139.652***
	(1.884)	(3.579)	(87.564)	(23.625)
Observations	5,111,922	3,346,904	3,346,904	3,346,904
A-P F statistic	1410.47	1356.25	1356.25	1356.25

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses.

Note: Panel A excludes potential movers, defined as individuals who do not live in their state of birth. Panel B links individuals to homicides in their state of birth rather than their current state of residence. Coefficients on the IV fixed effects estimate on the net migration rate over the previous four quarters are shown. Controls include state, quarter and year fixed effects, marital status and household size, and state-year real GDP per capita and state-quarter employment rates and industrial activity. In all cases population weights are used and standard errors are clustered at the primary sampling unit level.

Source: ENOE, CPS and the US Census 2000, as accessed through IPUMS, the EMIF, and INEGI.

Table 6: Characteristics of Migrants in the ENOE

	(1) Non-Migrants	(2) Out Migrants	(3) Return Migrants
Woman	0.52	0.02	0.17
	(0.50)	(0.14)	(0.37)
Age	36.63	29.51	32.08
	(16.36)	(11.70)	(12.20)
Employed	0.57	0.81	0.56
	(0.49)	(0.39)	(0.50)
In Labor Force	0.59	0.86	0.67
	(0.49)	(0.35)	(0.47)
Years of Education	8.11	7.59	7.63
	(4.56)	(3.67)	(3.61)
Education Level			
Less than Primary	0.23	0.21	0.19
	(0.42)	(0.40)	(0.39)
Primary Completed	0.27	0.33	0.33
	(0.45)	(0.47)	(0.47)
Secondary Completed	0.30	0.33	0.34
	(0.46)	(0.47)	(0.47)
Tertiary Completed	0.20	0.13	0.14
	(0.40)	(0.34)	(0.35)
Observations	1,334,074	8,644	985

Population weighted mean values reported. Standard deviations in parentheses
Source:ENOE, Years 2005 and 2006

Table 7: Heterogeneity by Education Level

		Of Those Who Are Employed		
	(1) Employed	(2) Formal Employment	(3) Hours Worked	(4) Hourly Wage
PANEL A: Less Primary				
Net Migration Rate	3.098	0.704	-69.051	63.526
	(4.040)	(4.065)	(200.755)	(159.854)
Observations	782,402	443,129	443,129	443,129
PANEL B:Primary				
	(1)	(2)	(3)	(4)
Net Migration Rate	12.557***	4.190	228.885	-262.309
	(3.320)	(6.092)	(199.605)	(223.218)
Observations	477,187	414,719	414,719	414,719
PANEL C:Secondary				
	(1)	(2)	(3)	(4)
Net Migration Rate	2.288	6.359	-15.546	-252.956
	(2.804)	(4.592)	(125.029)	(194.549)
Observations	1,589,949	1,086,000	1,086,000	1,086,000
PANEL D: Tertiary				
	(1)	(2)	(3)	(4)
Net Migration Rate	-2.278	4.558	1.377	-1823.071***
	(3.029)	(4.681)	(139.349)	(300.101)
Observations	1,635,894	1,165,132	1,165,132	1,165,132

* p < 0.1, ** p < 0.05, *** p < 0.01. Standard errors in parentheses.

Note: Coefficients on the IV individual fixed effects estimate on the net migration rate shown. Controls include state, quarter and year fixed effects, marital status and household size, and state-year real GDP per capita and state-quarter employment rates and industrial activity. In all cases population weights are used and standard errors are clustered at the primary sampling unit level.

Source: ENOE, CPS and the US Census 2000, as accessed through IPUMS, the EMIF, and INEGI.

Table 8: Weekly Hours on Unpaid, non Work Activities

	Weekly Hours Spent On				
	(1) School or Training	(2) Dependent Care	(3) Household Chores	(4) Asset Repair	(5) Community Service
PANEL A: ALL					
Net Migration Rate	52.552*	158.764***	22.974	-35.412***	-5.677**
	(27.721)	(45.326)	(50.596)	(4.322)	(2.861)
Observations	5,111,922	5,111,922	5,111,922	5,111,922	5,111,922
PANEL B: MEN					
	(1)	(2)	(3)	(4)	(5)
Net Migration Rate	77.506*	52.025**	14.997	-66.724***	-10.652***
	(40.343)	(23.906)	(26.103)	(8.328)	(3.863)
Observations	2,458,508	2,458,508	2,458,508	2,458,508	2,458,508
PANEL C: WOMEN					
	(1)	(2)	(3)	(4)	(5)
Net Migration Rate	35.837	169.744**	-198.531**	-5.126	-1.915
	(33.125)	(72.272)	(80.087)	(3.264)	(3.764)
Observations	2,653,414	2,653,414	2,653,414	2,653,414	2,653,414

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses.

Note: Coefficients on the IV individual fixed effects estimate on the net migration rate shown. Controls include state, quarter and year fixed effects, marital status and household size, and state-year real GDP per capita and state-quarter employment rates and industrial activity. In all cases population weights are used and standard errors are clustered at the primary sampling unit level.

Source: ENOE, CPS and the US Census 2000, as accessed through IPUMS, the EMIF, and INEGI.

Appendix

Table A1: Robustness Checks, First Stage IV Results

	Alternative Weights			Time Period		Excluding States	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	ENE	MC	Random	2006-2009	2010-2012	No Main Receiving State	No Main Sending State
Predicted Migration	0.0347***	0.0613***	-0.0029***	0.0851***	0.0061**	0.0325***	0.0189***
	(0.0008)	(0.0009)	(0.0002)	(0.0021)	(0.0028)	(0.0009)	(0.0007)
Observations	5,111,922	5,111,922	5,111,922	2,925,619	2,186,303	5,111,922	4,802,673
A-P F stat	2044.27	4744.80	198.08	1614.81	4.85	1456.80	838.30

* p < 0.1, ** p < 0.05, *** p < 0.01. Standard errors in parentheses.

Note: Coefficients on the instrumental variable for net migration shown. Controls include state, quarter and year fixed effects, marital status and household size, and state-year real GDP per capita and state-quarter employment rates and industrial activity. The regressions in column two include controls for the percentage of a state's workforce, by quarter and year, that is employed in one of 11 industries, as defined by two digit code. The regressions in column three includes a linear time trend as well as an index of industrial activity, measured by state, quarter and year. In all cases population weights are used and standard errors are clustered at the primary sampling unit level.

Source: ENOE, CPS and the US Census 2000, as accessed through IPUMS, the EMIF, and INEGI.

Table A2: Second Stage IV Results, ENE Weights

		Of Those Who Are Employed		
	(1) Employed	(2) Formal Employment	(3) Hours Worked	(4) Income
PANEL A: ALL				
Net Migration Rate	0.082	-0.147	-12.095	-158.842
	(1.722)	(3.433)	(85.790)	(23.107)***
Observations	5,111,922	3,346,904	3,346,904	3,346,904
PANEL B: MEN				
	(1)	(2)	(3)	(4)
Net Migration Rate	5.146	4.289	69.965	-172.145
	(1.588)***	(4.046)	(104.837)	(29.620)***
Observations	2,458,508	2,040,264	2,040,264	2,040,264
PANEL C: WOMEN				
	(1)	(2)	(3)	(4)
Net Migration Rate	-0.121	-7.976	-58.226	-126.731
	(2.768)	(3.766)**	(110.018)	(20.701)***
Observations	2,653,414	1,306,640	1,306,640	1,306,640

* p < 0.1, ** p < 0.05, *** p < 0.01. Standard errors in parentheses.

Note: Coefficients on the IV individual fixed effects estimate on the net migration rate over the previous four quarters are shown. Controls include state, quarter and year fixed effects, marital status and household size, and state-year real GDP per capita and state-quarter employment rates and industrial activity. In all cases population weights are used and standard errors are clustered at the primary sampling unit level.

Source: ENOE, CPS and the US Census 2000, as accessed through IPUMS, the ENE, and INEGI.

Table A3: Time Trends Internal Migration

	From High Migration States				In Non High Migration State			
	(1) Total Internal Migrants	(2) Total Internal Migrants	(3) Internal Migrants to Population	(4) Internal Migrants to Population	(5) Total Internal Migrants	(6) Total Internal Migrants	(7) High migration Total Internal Migrants	(8) High migration Total Internal Migrants
Linear time trend	38.299	334.548	-0.000	0.000	1243.722	2060.633	-0.000	0.001
	(502.074)	(2082.018)	(0.000)	(0.001)	(3934.264)	(16314.962)	(0.001)	(0.002)
Time squared		-10.215		-0.000		-28.169		-0.000
		(69.672)		(0.000)		(545.959)		(0.000)
Observations	728	728	728	728	728	728	728	728
R^2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses.

Source: ENOE. Results from regressing outcome at the state-quarter level on a state specific time trend.

Table A4: Correlation of Industrial Employment

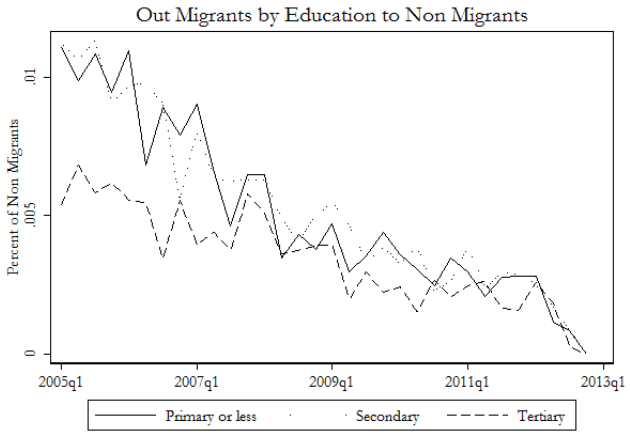
	Industry Employment Share		Industry Employment Trends	
	(1)	(2)	(3)	(4)
	Same Quarter	1 Quarter Lag	Same Quarter	1 Quarter Lag
Average Receiving State				
Employment Share	0.018	0.018		
	(0.002)***	(0.002)***		
Employment Trend			-0.010	-0.010
			(0.002)***	(0.002)***
Observations	9,856	9,504	9,856	9,504
R^2	0.01	0.01	0.00	0.00

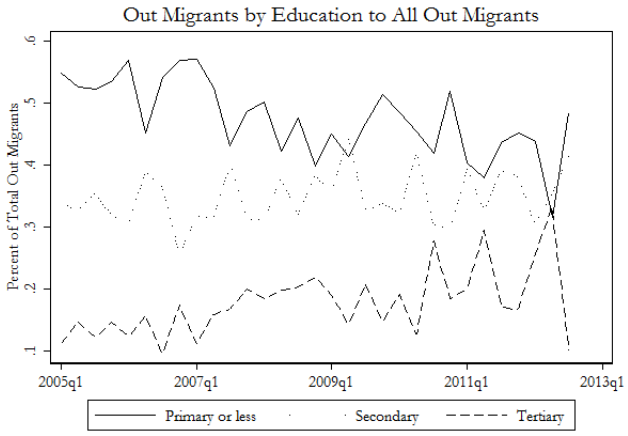
* p < 0.1, ** p < 0.05, *** p < 0.01. Standard errors in parentheses.

Source: ENOE, CPS and the US Census 2000, as accessed through IPUMS, the ENE, and INEGI.

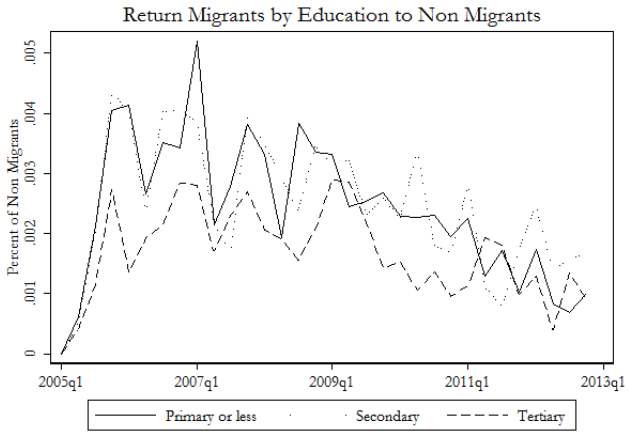
Figure A1: Composition of Out and Return Migrants by Education

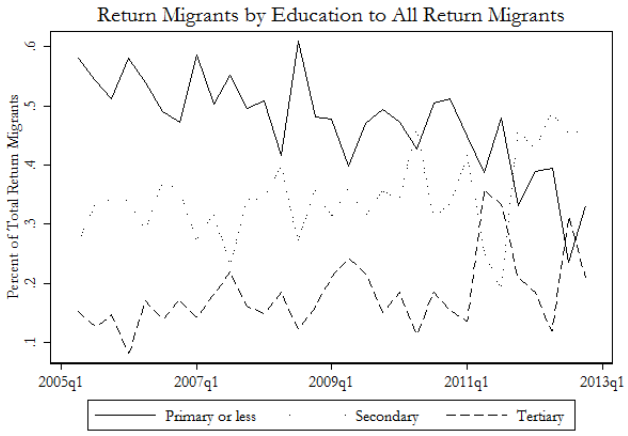
Panel A: Out Migrants





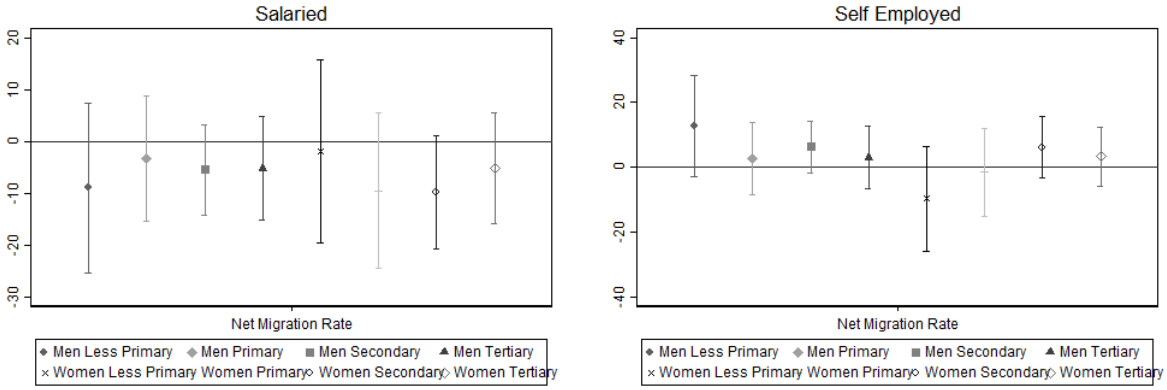
Panel B: Return Migrants





Source: ENOE.

Figure A2: Job Type by Sex and Education



Note: Dots represent second stage IV coefficient on net migration rates. Lines show the 95% confidence intervals. Controls include state, quarter and year fixed effects, individual-time varying controls and state-time varying controls. In all cases population weights are used and standard errors are clustered at the primary sampling unit level. Source: ENOE, INEGI, EMIF, CPS and U.S. 2000 Census.