

Migration Networks and Mexican Migrants' Spatial Mobility in the U.S.

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Abstract

Mexican low-skilled migrants are found to be highly mobile when they face labor demand shocks. This paper examines the role of migration networks in Mexican-born immigrants' location choices. We rely on the sizable variation in labor demand declines across states during the Great Recession to identify migration responses to demand shocks and use a novel set of data, the *Matrícula Consular de Alta Seguridad* (MCAS) data, to construct migration network measures. We find that migration networks indeed play an important part in Mexican migrants' responsiveness to local demand shocks. In particular, migrants respond to local economic conditions and conditions in network-connected locations when making location decisions.

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1 Introduction

Given the substantial influx of immigrants to the United States over the past decade, the nature and determinants of migrants' location choices are among the key topics in the immigration-related discussion. In particular, social networks are found to be central in migrants' location choices as these connections likely reduce moving costs and improve labor market outcomes in the destination. Another important finding in the recent related literature is that migrants in the U.S., especially Mexican-born ones, respond very strongly to changes in the labor market conditions and are much more geographically mobile than natives (Cadena and Kovak 2016). However, the mechanisms through which features of migration networks facilitate this mobility remain largely understudied due to the lack of adequate data with extensive geographic coverage and detailed network information.

With a novel set of data, the *Matrícula Consular de Alta Seguridad* (MCAS) data, we aim to examine the role of migration networks in Mexican-born migrants' mobility responses to local demand changes. The MCAS data provides extremely detailed and comprehensive source-destination information on Mexican immigrants in the United States. Caballero, Cadena and Kovak (2017) establishes the quality and representativeness of the MCAS data through the comparisons with various data sources including the Mexican census, American Community Surveys (ACS), the *Encuesta Nacional de la Dinámica Demográfica* (ENADID), and the *Encuesta sobre Migración en la Frontera Norte* (EMIF). Our paper is the first to use the MCAS data in empirical estimation and the migration network measures calculated with this data present more reliable and representative information on Mexican immigrants' network connections in the U.S.

In this paper, we focus on the mobility responses of low-skilled Mexican-born immigrants in the depth of the Great Recession, following the finding by Cadena and Kovak (2016) that this group is highly sensitive to changes in the labor market conditions. We first develop a static location choice model, from which we derive our estimation equation. In the estimation, we use the cross-sectional network information right before the Great Recession from the MCAS data to construct network measures and include various control variables to rule out the effect of preexisting migration pat-

terns. We also use a Bartik (1991) instrument to conduct IV estimations to test if the results are robust to different approaches to identify labor demand changes. However, the results are not statistically significant potentially due to the issue of weak instruments. We demonstrate that migrants from different Mexican counties (*municipios*) within the same Mexican state (*entidad*) vary vastly in their destination choices. This feature helps allay concerns that location choices are merely driven by regional preferences over destinations’ characteristics rather than social networks present there. Several placebo tests are included to confirm that other ethnic groups are insensitive to Mexican migrants’ social networks. Our analysis shows that social networks indeed influence migrants’ location decisions. In particular, Mexican migrants respond to both local economic conditions as well as demand shocks in places where they have connections.

The existing literature documents a wide spectrum of migration network effects in relation to international migrants’ experiences. For instance, a large literature confirms that by lowering the costs associated with migration, networks increase the rates of international migration.¹ Bartel (1989), Dunlevy (1991) and Jaeger (2000) observe that international migrants tend to locate in places with high concentrations of immigrants of the same ethnicity and Patel and Vella (2013) finds that they further clustered in particular occupations.² In addition, these social connections tend to improve migrants’ labor market outcomes, as found by Munshi (2003) and Mundra and Rios-Avila (2016). The novel contribution of our paper is that we document the effect of migration networks on migrants’ responsiveness to labor demand shocks. This enriches our understanding of both immigrants’ location choices as well as social network effects.

This paper proceeds as follows. The next section provides an empirical framework with a static discrete choice model. Section 3 describes the data used in this paper and lays out the estimation specification and procedure. The estimation results are discussed in Section 4 and the last section concludes.

¹For literature on network effects on the probability of international migration, see, for example, Massey (1986); Massey and Espinosa (1997); Palloni, Massey, Ceballos, Espinosa and Spittel (2001); Winters, de Janvry and Sadoulet (2001); Curran and Rivero-Fuentes (2003); Fussell and Massey (2004); Liu (2013); and Garip and Asad (2016).

²Other related works include Bauer, Epstein and Gang (2002); Diaz McConnell (2008); and Lafortune and Tessada.

2 Empirical Framework

This section proposes a static discrete choice model of an individual's location choices. The value of living in a location depends on the strength of the labor market, s , and the strength of the social network, n . We assume there are no moving costs incurred. Individuals receive random, independent and identically distributed (i.i.d.) payoff shocks, η , to living in each location, which are drawn from a type I extreme value distribution. In this model, people are from Mexican source locations k and they choose from a set of U.S. destination locations j to live. Thus, the utility of choosing destination j for a migrant from hometown k , u_{jk} , is as specified in equation (1).³

$$u_{jk} = \alpha s_j + \beta n_{jk} + \eta_{jk} \quad (1)$$

Since we assume the payoff shocks are following an extreme value distribution, the probability that such an individual chooses location j takes a logit form as in the following formula (McFadden 1973 and Rust 1987):

$$P_k(j) = \frac{\exp(\alpha s_j + \beta n_{jk})}{\exp(\alpha s_j + \beta n_{jk}) + \sum_{i \neq j} \exp(\alpha s_i + \beta n_{ik})}. \quad (2)$$

We then derive the the following comparative statics to assess the effects of employment shocks in location j and an alternative location, h , on the probability of choosing location j :

$$\begin{aligned} \frac{\partial P_k(j)}{\partial s_j} &= \alpha \frac{\exp(\alpha s_j + \beta n_{jk}) \left[\sum_{i \neq j} \exp(\alpha s_i + \beta n_{ik}) \right]}{\left[\exp(\alpha s_j + \beta n_{jk}) + \sum_{i \neq j} \exp(\alpha s_i + \beta n_{ik}) \right]^2} \\ &= \alpha P_k(j) (1 - P_k(j)) \end{aligned} \quad (3)$$

³As all individuals are assumed to be identical except for their source locations and current residence, individual subscripts are suppressed.

$$\begin{aligned}\frac{\partial P_k(j)}{\partial s_h} &= -\alpha \frac{\exp(\alpha s_j + \beta n_{jk}) \exp(\alpha s_h + \beta n_{hk})}{\left[\exp(\alpha s_j + \beta n_{jk}) + \sum_{i \neq j} \exp(\alpha s_i + \beta n_{ik}) \right]^2} \\ &= -\alpha P_k(j) P_k(h).\end{aligned}\tag{4}$$

We denote the Mexican population from source k living in destination location j as M_{jk} . The total Mexican population in destination location j , $M_j = \sum_k M_{jk}$, is the sum of M_{jk} over all k sources. Taking the total derivative of the total Mexican population in destination location j , we have that the change in the total Mexican population in location j depends on the respective changes in the Mexican population from different sources:

$$dM_j = \sum_k dM_{jk}.\tag{5}$$

If M_k is the total migrant population from source location k , the Mexican population from source k living in destination location j can be calculated by multiplying M_k with the probability of a person from source k choosing location j :

$$M_{jk} = P_k(j) M_k.\tag{6}$$

We assume that the total migrant population from source location k does not vary with shocks, so we can express equation (5) as follows, where the change in total Mexican population in destination j is a function of the total migrant population from source location k and $dP_k(j)$:

$$dM_j = \sum_k M_k dP_k(j).\tag{7}$$

As we assume the existing strength of migration networks to be constant, the total derivative of the choice probability depends on the employment shocks in destination j and the alternative locations, as specified below:

$$dP_k(j) = \frac{\partial P_k(j)}{\partial s_j} ds_j + \sum_{h \neq j} \frac{\partial P_k(j)}{\partial s_h} ds_h.\tag{8}$$

Combining equations (7) and (8), we can express the change in the total Mexican population living in location j as in equation (7) and arrive at a formula for the proportional change in total Mexican population living in location j .

$$dM_j = \sum_k M_k \left(\frac{\partial P_k(j)}{\partial s_j} ds_j + \sum_{h \neq j} \frac{\partial P_k(j)}{\partial s_h} ds_h \right) \quad (9)$$

$$= \sum_k M_k \left(\alpha P_k(j) (1 - P_k(j)) ds_j - \sum_{h \neq j} \alpha P_k(j) P_k(h) ds_h \right) \quad (10)$$

$$= \alpha \sum_k \underbrace{M_k P_k(j)}_{=M_{jk}} \left((1 - P_k(j)) ds_j - \sum_{h \neq j} P_k(h) ds_h \right) \quad (11)$$

$$\frac{dM_j}{M_j} = \alpha \sum_k \frac{M_{jk}}{M_j} \left((1 - P_k(j)) ds_j - \sum_{h \neq j} P_k(h) ds_h \right) \quad (12)$$

Equation (12) relates the proportional change in Mexican population in destination location j to the vector of employment shocks ds across destination locations. This relationship depends first upon the source mix of Mexicans in j , given by M_{jk}/M_j . The effect of the employment shocks also depends upon the destination mix of migrants from the relevant sources given by $P_k(j)$ and the $P_k(h) \forall h \neq j$. The shock in the reference location j matters more when a smaller share of migrants from source k chooses that location. That is, if a migrant in location j has many other options in the U.S., $(1 - P_k(j))$ is large and the response to local shocks will be relatively volatile. The shock in another location $h \neq j$ matters more when more people from source k choose location h , i.e. when $P_k(h)$ is larger.

3 Data Sources and Empirical Approach

As our empirical framework suggests, we study the changes in a state's Mexican-born population as a function of the local demand shock and migration networks in the depth of the Great Recession. We use data from the American Community Survey (ACS) to calculate the changes in the natural

log of the group’s population from 2006 to 2010, which serves as our dependent variable.⁴ Our main sample includes Mexican-born individuals aged 18-64 with no college education, not currently enrolled in school and not living in group quarters.⁵

Our first independent variable is the change in the natural log of employment in a given state from 2006 to 2010, which we derive using employment information from County Business Patterns (CBP) data. We identify changes in labor market conditions as the shocks to the employment levels in different states. This takes reference from previous literature, which finds that employers respond to negative demand shocks through layoffs rather than wage cuts during the Great Recession.⁶ As wages are downward-rigid and all regions face declining labor demand, changes in employment fully capture the shifts in labor demand. We also use an instrument in Bartik (1991) as an alternative way of identifying labor demand shocks.

The other independent variable is the migration network measure of interest. We assume two individuals are connected if both come from the same source *municipio* in Mexico. We use migration network-related information in 2006, before the start of the Great Recession.⁷ These network measures are obtained from the *Matrícula Consular de Alta Seguridad* (MCAS) data. Administered by the Mexican government, the MCAS program issues identity cards to Mexican citizens living in the United States, and all records of approved applications are stored in a centralized database. The recorded information from each issuance includes the recipient’s *municipio* (similar to county) of birth in Mexico and the U.S. state and consular area of current residence. Caballero, Cadena and Kovak (2017) establishes the quality and representativeness of the MCAS data by showing strong accordance on place-to-place migrant distribution patterns between MCAS and a variety of standard data sources, including the Mexican Census and American Community Surveys (ACS). The MCAS data contains more comprehensive migration network information than existing data

⁴ACS data was obtained from the Integrated Public Use Microdata Series (IPUMS) (Ruggles et al. 2010).

⁵We are focusing on this group of individuals because they are more responsive to changes in labor market conditions, according to Cadena and Kovak (2016).

⁶Rothstein (2012) finds that changes in employment levels were substantially larger than adjustments in average wages during the Great Recession.

⁷We only use pre-shock network information as we are unable to confirm that changes in the networks necessarily correlate with changes in the distribution of Mexicans in the U.S. Also, we do not want to include endogenous network shifts in the independent variables.

sources such as the *Encuesta Nacional de la Dinámica Demográfica* (ENADID) and the *Encuesta sobre Migración en la Frontera Norte* (EMIF) as the latter two suffer from small sample issues and relatively aggregate location information (Caballero, Cadena and Kovak 2017). Another popular data source for migration network literature, the Mexican Migration Project (MMP), only covers a small number of Mexican communities, whereas the MCAS data identifies 70 U.S. destinations and more than 2,000 source *municipios* in Mexico with a very large sample size (Massey and Zenteno 2000).

We rearrange equation (12) to derive an estimating equation. We define local labor market shocks as in Cadena and Kovak (2016): ds_j is the change in log employment in destination j , which we will write as $d\ln(emp_j)$. Network measures include the share of immigrants from source k choosing destination j , M_{jk}/M_j , and the probabilities of immigrants from source k choosing a particular location, the $P_k(\cdot)$ terms, where we calculate $P_k(j)$ as M_{jk}/M_k . Finally, we arrive at equation (13) by combining $P_k(j)ds_j$ and $\sum_{h \neq j} P_k(h)ds_h$ in equation (12):

$$d\ln(M_j) = \alpha d\ln(emp_j) - \alpha \sum_k \frac{M_{jk}^{2006}}{M_j^{2006}} \left(\sum_h \frac{M_{hk}^{2006}}{M_k^{2006}} d\ln(emp_h) \right). \quad (13)$$

The first term on the right hand side is the employment shock in the reference location j . The second term is the migration network measure of interest, taking the form of the average destination employment shock faced by the mix of migrants from different sources who live in location j . We generalize this expression by allowing the coefficients on these two terms to vary, adding an intercept term δ , and including an error term ε_j to account for sampling variation in the Mexican population estimate in location j .

$$d\ln(M_j) = \delta + \alpha d\ln(emp_j) - \gamma \sum_k \frac{M_{jk}^{2006}}{M_j^{2006}} \left(\sum_h \frac{M_{hk}^{2006}}{M_k^{2006}} d\ln(emp_h) \right) + \varepsilon_j \quad (14)$$

Equation (14) is our estimating equation and we expect a positive coefficient on the direct shock term and a negative coefficient on the network measure term. A statistically significant coefficient on the migration network measure indicates the relevance of migration networks in driving location

choices of Mexican migrants within the U.S.

We have also taken some additional steps to allow our analysis to be more representative. First, although the CBP data gives us the universal coverage of establishments in most of the industries, it does not cover employment in agricultural production, private household services, or the government services. We have therefore complemented information obtained from CBP with employment calculations using the ACS data for the missing industries. Second, we construct weights for the states to account for the heteroskedasticity in comparing proportional population changes across labor markets of different sizes. Third, we introduce several controls to account for factors that may affect the Mexican mobility and correlate with local changes in demand at the same time. Specifically, we use the Mexican-born share of each state’s population in 2000 to control for the potential decline in the value of traditional enclaves (Card and Lewis 2007) and we include indicators for anti-immigrant employment legislations and new 287(g) agreements that allow local officials to receive delegated authority for immigration enforcement.⁸

Table 1 provides the summary statistics for our key variables.

4 Estimation Results

We first reproduce the estimation in Cadena and Kovak (2016) at the U.S. state level for Mexican-born immigrants, and the results are shown in the first three columns of Table 2. Column (1) reports the results from the basic specification with local demand changes only, while the next two columns progressively add the enclave control and policy controls. These estimated coefficients confirm that Mexican-born immigrants were highly sensitive to labor demand changes during the Great Recession. Our results on local demand shocks differ slightly from those in Cadena and Kovak (2016), mainly due to the fact Cadena and Kovak (2016) conducts analysis at the level of Metropolitan Statistical Areas (MSAs) while we aggregate observations to the state-level. In spite of this change in geographic unit of analysis, the results are remarkably similar.

⁸Information on immigration policies is obtained from the immigration policy database in Santillano and Bohn (2012).

The results with the migration network measure included are presented in column (4) to column (6) in Table 2. Column (4) reports the coefficients for the basic regression specification in equation (15). In line with our expectation, the estimated coefficient on local demand shock is positive and statistically significant. This represents the elasticity of the Mexican-born population with respect to labor demand, holding other things constant, and we find that Mexican-born workers are highly responsive to local demand shocks. To illustrate, we compare Mexican mobility in California, where the demand shock was at the 25 percentile of the shock distribution, and that in Wyoming, where the demand change was at the 75 percentile. Wyoming, facing a 0.119 percentage point higher employment growth than California, is expected to experience 0.103 percentage point larger increase in Mexican-born population, holding other things constant. On the other hand, the coefficient on the migration network measure is negative and statistically significant. This suggests that given demand shocks, Mexican-born immigrants with access to better outside options are more likely to move away from current place of residence. Massachusetts and Oklahoma stand at the 25 percentile and 75 percentile of the network measure distribution respectively. Our estimation implies that Oklahoma, having a 0.0133 percentage point higher network measure, will experience 0.0217 percentage point larger decline in its Mexican-born population.

We then include several controls to account for the possibility that the observed mobility is driven by other determinants of location choice that are associated with local employment changes. First, we add the enclave control that accounts for the decline in value of traditional migrant enclaves, and the results are shown in column (5). We also control for anti-immigrant employment legislation in relevant states and new 287(g) agreements which might encourage migrants to relocate elsewhere. Column (6) presents the estimates when both the enclave control as well as the policy controls added. In both specifications, the coefficients on local demand changes remain statistically significant and comparable to those in column (4). Notably, the coefficient on the network measure becomes larger in magnitude when the controls are included, implying a more significant impact of migration networks on the Mexican-born mobility. One likely explanation is that the additional controls successfully absorb the variation in locations where Mexican-born population prefer to live

regardless of the social networks present there.

Another potential source of bias with our specification is that there still might be unmeasured factors driving population changes, which in turn influence employment, possibly by affecting consumer demand or the number of available workers. We attempt to address this issue by using the standard "Bartik instrument" (Bartik 1991). This measure predicts local demand shocks by proportionally allocating changes in industrial employment at the national level across states, based on each state's industry composition of employment as of 2006.⁹ This Bartik instrument relates closely to employment changes and plausibly exogenous to other potential sources of fluctuations in population. We calculate the instrument as $\psi_j = \sum_i \varphi_{ij}^{t_0} dlnL_i$, where $\varphi_{ij}^{t_0}$ is the fraction of state j employment in industry i in 2006, and $dlnL_i$ is the proportional change in national employment in industry i . As employment changes across states are also used in the calculation of the network measure, we construct another instrument for the network measure, which is derived by replacing the change in log of employment with the Bartik instrument in the calculation of migration networks:

$$Network_j^{IV} = \sum_k \frac{M_{jk}^{2006}}{M_j^{2006}} \left(\sum_h \frac{M_{hk}^{2006}}{M_k^{2006}} \psi_h \right). \quad (15)$$

The results using the Bartik instrument and the network instrument are shown in Table 3. Column (1) present the IV estimates and the first-stage statistics from the basic specification, while column (2) and (3) add in the effects of enclave and policy controls progressively. Although the IV estimates are statistically insignificant, the coefficients on employment changes and the network measure are similar to those OLS estimates. We also notice that the Kleibergen-Paap Wald F statistics associated with these IV estimations are very small, suggesting that we might face an issue of weak instruments that ultimately leads to the insignificant results.

There also remains another concern with our estimation, as Mexican migrants originating from the same region might be choosing destinations simply due to some common preferences over certain characteristics of these locations such as climate or proximity to home. These preferences likely

⁹Other examples of the Bartik instrument include Bound and Holzer (2000); Blanchard and Katz (1992); Autor and Duggan (2003); Wozniak (2010); Notowidigdo (2013); Charles, Hurst, and Notowidigdo (2013); and Cadena and Kovak (2016).

correlate with both the network measure and the population changes, thus introducing bias to the results. To rule out the possibility that the destination distribution only reflects a source region’s preferences over the persistent features of destination locations, we compare migration networks of *municipios* in the same source state. Caballero, Cadena and Kovak (2017) shows that it is very common for two *municipios* within the same state to have very different destination distributions. Figures 1 and 2 illustrate an example of such, where two *municipios*, *Ciudad Hidalgo* and *Tiquicheo*, located in the same Mexican state (*Michoacán*) and only 3 hours’ drive apart, differ sharply in their immigrant destination distributions. In particular, migrants from *Hidalgo* are mostly clustered in Illinois, while those from *Tiquicheo* settle primarily in Texas. Immigrants from these two *municipios* should have very similar preferences due to geographical proximity and the differences in their location choices can be largely attributed to existing social networks in the destination.

Finally, we conduct placebo tests with the group of male white natives as well as non-Mexican male immigrants with similar education background and present the results in Tables 4 and 5. The specifications from column (1) to (6) in both tables resemble those in Table 2, which relate group-specific population changes to group-specific employment changes, Mexican migrants’ network measure (the last three columns) and a combination of controls. The results in the first three columns in both tables are largely comparable to those in Cadena and Kovak (2016), confirming that Mexican-born immigrants are much more mobile than these two groups. In line with our expectation, the coefficients on the network measures are small and none are statistically significant, suggesting that neither group reacts to Mexican migrants’ network measure.

5 Conclusion

In this paper, we demonstrate that migration networks play an important role in Mexican-born migrants’ location choices in the U.S. during the Great Recession, where they were likely hit by local demand shocks. We discover that both the local economic conditions and the conditions in destinations where Mexican-born immigrants have connections matter in their location choices .

We develop a static location choice model to arrive at our estimation equation, which relates population changes to employment changes and a network measure. Using a novel set of data, the MCAS data, we calculate the Mexican migration network measure of interest, which encompasses both the number of connections as well as the demand shocks in the connected destinations. To reduce potential bias, we introduce several controls to account for factors such as the decline in the value of traditional enclaves and immigrant-related policies in different states. We further test the robustness of our results by using the "Bartik instrument" to identify local labor demand shocks and used that to construct an instrument for the network measure. We also conduct placebo tests with other groups and find that neither white native nor non-Mexican immigrants react to Mexican immigrants' network measure.

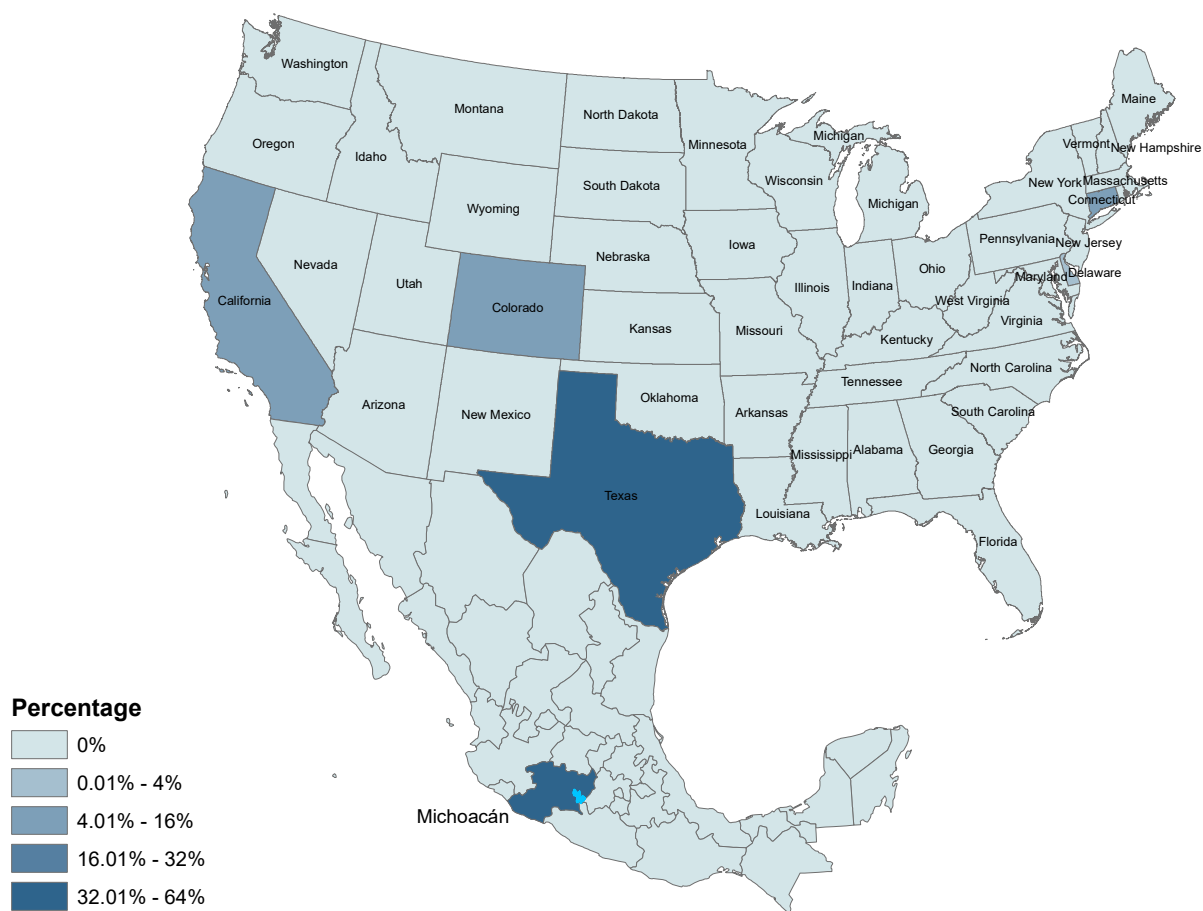
Our analysis documents the effect of migration networks on migrants' responsiveness to local demand changes. The findings in this paper add a novel contribution to the current literature on both migrant location choices as well as social network effects.

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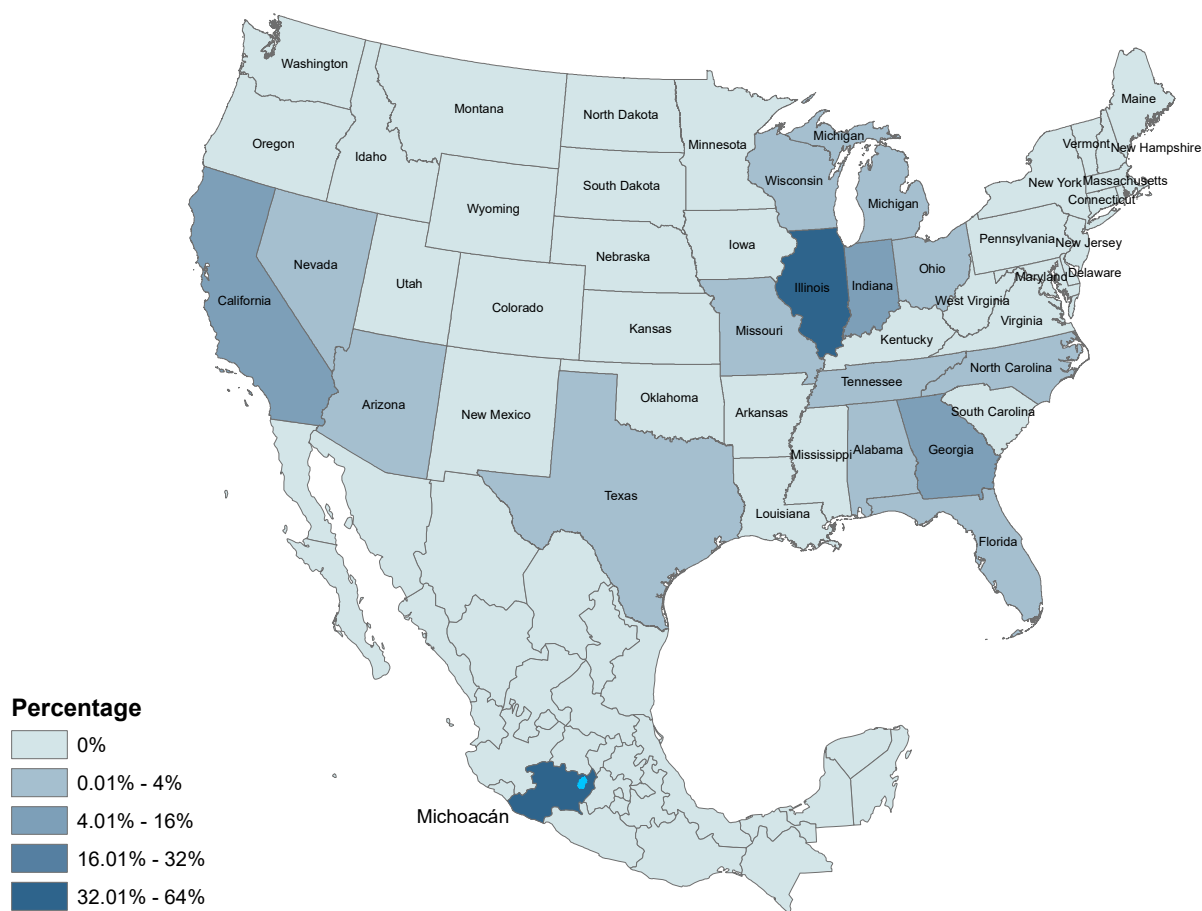
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Figure 1: Distribution of MCAS Card Issuances for Migrants Born in Tiquicheo



This map shows the destination distribution of the share of MCAS identity cards issued to migrants born in the *municipio* of Tiquicheo (shown in bright blue) who had current addresses in each US state. The data source is the universe of MCAS identity cards issued during the 2006-2010 time period. Source: Caballero, Cadena and Kovak (2017).

Figure 2: Distribution of MCAS Card Issuances for Migrants Born in Hidalgo



This map shows the destination distribution of the share of MCAS identity cards issued to migrants born in the *municipio* of Hidalgo (shown in bright blue) who had current addresses in each US state. The data source is the universe of MCAS identity cards issued during the 2006-2010 time period. Source: Caballero, Cadena and Kovak (2017).

Table 1: Descriptive Statistics

	Mean	Std. Dev	Min	Max	Observations
Change in log of Mexican-born population	0.085	0.314	-0.725	1.003	49
Change in log of Mexican-born employment	0.474	0.119	0.200	0.769	49
Network measure	0.443	0.015	0.408	0.496	49
Enclave control	0.026	0.037	0	0.166	49
New 287(g) control	0.184	0.391	0	1	49
Employment policy control	0.224	0.422	0	1	49

The sample includes male Mexican-born working age immigrants with high school or less education. Enclave control is the Mexican-born share of each state's population in 2000. New 287(g) indicator equals 1 if the state has effected the new 287(g) agreement, 0 otherwise. Employment policy indicator equals 1 if the state has enacted anti-immigration employment legislation, 0 otherwise

Table 2: Mexican-born Population Response to Labor Demand Shocks

	Dependent variable: Change in log of population					
	(1)	(2)	(3)	(4)	(5)	(6)
Change in log of Mexican-born employment	0.516** (0.195)	0.504** (0.200)	0.396* (0.206)	0.870*** (0.213)	1.081*** (0.281)	0.968*** (0.323)
Network measure				-1.636** (0.706)	-2.691*** (0.818)	-2.664*** (0.984)
Enclave control	No	Yes	Yes	No	Yes	Yes
Policy controls	No	No	Yes	No	No	Yes
Observations	49	49	49	49	49	49
R-squared	0.235	0.318	0.409	0.276	0.419	0.507

The sample includes male Mexican-born working-age immigrants with high school or less education. It relates the change in log(population) for the group (2006-2010, using the American Community Surveys) to change in log(group-specific employment) from County Business Patterns over the same time period, using the demographic group's industry mix. The specifications include a constant term. There are 49 state observations in total due to missing change in log(group-specific employment) for Vermont and missing change in log(population) for the group for Montana. Observations are weighted by the inverse of the estimated sampling variance of the dependent variable. Heteroskedasticity robust standard errors are shown in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 3: Mexican-born Population Response to Labor Demand Shocks: Bartik (1991) IV Estimates

	Dependent variable: Change in log of Mexican-born population		
	(1)	(2)	(3)
<i>IV estimate</i>			
Change in log of Mexican-born employment	0.753 (0.779)	0.915 (0.833)	0.661 (0.675)
Network measure	-1.053 (2.746)	-2.636 (3.042)	-2.143 (2.619)
<i>First stage</i>			
Predicted change in log of employment	-3.654 (5.500)	-7.307 (5.771)	-7.882 (5.446)
Predicted network measure	40.28*** (14.78)	45.91*** (16.92)	46.14** (17.24)
Kleibergen-Paap Wald F statistic	4.206	2.492	2.642
Enclave control	No	Yes	Yes
Policy controls	No	No	Yes
Observations	49	49	49

The sample includes male Mexican-born working age immigrants with high school or less education. It relates the change in log(population) for the group (2006-2010, using the American Community Surveys) to change in log(group-specific employment) from County Business Patterns over the same time period, using the demographic group's industry mix. The specification includes a constant term. There are 49 state observations in total due to missing change in log(group-specific employment) for Vermont and missing change in log(population) for the group for Montana. Observations are weighted by the inverse of the estimated sampling variance of the dependent variable. The excluded instruments are predicted change in log(employment) and predicted network measure, based on Bartik (1991) and described in the text. The first-stage coefficients on the instrument and the Kleibergen-Paap rk Wald F statistic are reported below the corresponding IV estimate. Heteroskedasticity robust standard errors are shown in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 4: White Natives' Population Response to Labor Demand Shocks

	Dependent variable: Change in log of population					
	(1)	(2)	(3)	(4)	(5)	(6)
Change in log of white natives' employment	0.107 (0.0823)	0.108 (0.0829)	0.113 (0.0902)	0.136 (0.127)	0.138 (0.128)	0.134 (0.138)
Network measure				-0.163 (0.346)	-0.164 (0.349)	-0.113 (0.371)
Enclave control	No	Yes	Yes	No	Yes	Yes
Policy controls	No	No	Yes	No	No	Yes
Observations	51	51	51	50	50	50
R-squared	0.0477	0.0513	0.0986	0.0528	0.0568	0.1009

The sample includes male working-age natives with high school or less education. It relates the change in log(population) for the group (2006-2010, using the American Community Surveys) to change in log(group-specific employment) from County Business Patterns over the same time period, using the demographic group's industry mix. The specification includes migration network measure, enclave and policy controls. There are only 50 state observations from column (4) to (6) due to missing value in the migration network measure for Vermont. Observations are weighted by the inverse of the estimated sampling variance of the dependent variable. Heteroskedasticity robust standard errors are shown in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 5: Non-Mexican Immigrants' Population Response to Labor Demand Shocks

	Dependent variable: Change in log of population					
	(1)	(2)	(3)	(4)	(5)	(6)
Change in log of non-Mexican immigrants' employment	-0.0101 (0.296)	-0.0396 (0.327)	-0.0375 (0.330)	-0.194 (0.282)	-0.150 (0.325)	-0.152 (0.346)
Network measure				0.920 (1.095)	0.573 (1.420)	0.604 (1.508)
Enclave control	No	Yes	Yes	No	Yes	Yes
Policy controls	No	No	Yes	No	No	Yes
Observations	51	51	51	50	50	50
R-squared	0.0000	0.0201	0.0239	0.0116	0.0237	0.0279

The sample includes male working-age non-Mexican immigrants with high school or less education. It relates the change in log(population) for the group (2006-2010, using the American Community Surveys) to change in log(group-specific employment) from County Business Patterns over the same time period, using the demographic group's industry mix. The specification includes migration network measure, enclave and policy controls. There are only 50 state observations from column (4) to (6) due to missing value in the migration network measure for Vermont. Observations are weighted by the inverse of the estimated sampling variance of the dependent variable. Heteroskedasticity robust standard errors are shown in parentheses. *** p<0.01, ** p<0.05, * p<0.1.