

International Import Competition and the Decision to Migrate: Evidence from Mexico

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Abstract

We analyze the effects of the increase in China's import competition on Mexican domestic and international migration. We exploit the variation in exposure to competition from China, following its accession to the WTO in 2001, across Mexican municipalities and estimate the effect of international competition on the individual decision to migrate. Controlling for individual and municipality features, we find that individuals living in municipalities more exposed to Chinese import competition are more likely to migrate to other municipalities within Mexico, while a negative effect is found on the decision to migrate to the US. In particular, we find that Chinese import competition reduces migrants' negative self-selection: the rising international competition lowers the likelihood of low-educated, low-income people to migrate to the US, by making them more financially constrained.

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1. Introduction

The rapid and substantial increase in China's exports, following its accession to the WTO in 2001, has been a prime example of trade shocks, affecting both developed and developing countries. The share of US spending on Chinese goods went from being 0.6% of total spending on imports in 1991 to 4.6% in 2007; this pattern became particularly accentuated after 2001, the year of its accession to the WTO (Autor et al. 2013).

In this paper we investigate the impact of the rising import competition from China on Mexican domestic and international migration. By exploiting heterogeneous exposure of Mexican municipalities to China's import competition, we examine its effects on the individual decision to migrate and on migrants' self-selection.

The case of the impact of China's accession on Mexico is relevant on various grounds, as it affected Mexico both directly, through an increase in imports from China, and indirectly, through a rise in competition in the US market. First, following its accession to the WTO, China rapidly increased its exports to Mexico. Although exports from China to Mexico started to increase a few years before China's accession to the WTO, it is only after the WTO membership that exports begin to increase at an accelerated rate. Second, Mexico has had a comparative advantage in the production of labor-intensive goods within NAFTA (Iacovone et al. 2013). Given the technological similarity between China and Mexico (di Giovanni et al. 2014), the increase in Chinese exports to the US had a significant negative effect on demand for manufacturing exports from Mexico (Lall and Weiss 2004; Shafaeddin 2004; Devlin et al. 2006; Gallagher and Porzecanski 2007; Feenstra and Kee, 2007; Gallagher et al. 2008; Hanson and

Robertson 2008).¹

It is estimated that about 33,500,000 Hispanics of Mexican origin lived in the United States in 2011, of which about 11,500,000 were born in Mexico, according to the Census Bureau's American Community Survey. According to the Census of Population and Housing (Censo de Poblacion y Vivienda), in 2010, about 1.1% of the Mexican population migrated internationally between 2005 and 2010. Domestic migration seems to be even more relevant, as it is estimated that 6.6% of the Mexican population migrated within Mexico over the same time period. Given the extent of Mexican migration, both domestic and to the US, the aim of this paper is to investigate if and how increases in import competition, following China's accession to the WTO, affected Mexican migration.

In order to measure changes in exposure to Chinese competition in each Mexican municipality we use data from the administrative records of the Mexican Social Security Institute to construct an index of employment composition along with import data from China. We measure the migration decision at individual level by using two rounds of the Mexican Family Life Survey (MxFLS), which provides an extensive source of information on migration to the US, migration within Mexico and pre-migration individual and household characteristics. Therefore, we are able to assess the consequences of a trade shock on the individual decision of migrating and on the type of self-selection.

We provide evidence that an increase in import competition from China increases domestic migration. China's accession to the WTO leads to more individuals being displaced from their communities and migrating to other municipalities in Mexico. A one standard deviation increase

¹ Two recent papers have analysed the effect of the increased import competition on Mexican firms. Utar and Ruiz (2013) find a negative impact of China's import competition on employment and plant growth in Mexico. Iacovone et al. (2013) show a heterogeneous effect of import competition on Mexican firms. Smaller plants were negatively affected by the increase in imports from China, while larger plants benefited from the availability of cheaper intermediate products.

in import competition is found to raise the probability of migrating to another municipality by 1.1 percentage points. Our estimates suggest that exposure to Chinese import competition explains over 11% of domestic migration within Mexico between 2002 and 2005.

Next, we analyze the impact of import competition on the probability of migrating internationally. Import competition from China is found to lead to a decrease in the probability of migrating to the US. We further explore the mechanisms at play: we provide evidence that the trade shocks have differential impacts on men and women. While women seem unaffected in their decision to migrate to the US, men appear to be more responsive to environmental factors. We also show the effect of import competition on migrants' self-selection. Increases in exposure to China's competition affect the probability of college-educated individuals and people with access to savings to migrate to the US more positively than lower-educated people and those who do not have savings. This result is particularly relevant in the light of the existing debate on migrants' self-selection. China's import competition effectively reduces the negative self-selection of Mexican migrant to the US, as it decreases low-skilled and less affluent people's probability to migrate.

This paper mainly contributes to two strands of the literature. First, we add to the literature that investigates the impact of Chinese import competition on labor markets. Autor et al. (2013) provide evidence of an increase in unemployment and a decrease in labor market participation in the US following the surge in Chinese imports. Similarly, Pierce et al. (2012) show a negative relationship between manufacturing employment in the US and the value of imports from China. Acemoglu et al. (2014) provide evidence of the role played by Chinese import competition in explaining the employment slump in the US in the 2000s. Using individual level data, Autor et al. (2014) investigate the impact of China's import competition on lowering earnings of workers

in the US, in particular for individuals with initial low wages and low initial tenure. In a recent study, Mendez (2014) analyzes the impact of Chinese import competition on local labor markets in Mexico. He provides evidence that the trade shock leads to a decrease in the employment share in manufacturing and an increase in workers' mobility across local labor markets.

We show that import competition may affect migration decisions for individuals living in a country that is directly and indirectly, i.e. through a third market, affected by a trade shock. Given the extent of Mexican migration to the US and the relevance of these migration flows for the US and the Mexican economies, this study makes a significant contribution on the effects of trade on the individual decision to migrate and the extent of migrants' self-selection.

We also contribute to the extensive literature on migrants' self-selection. In his seminal paper, Borjas (1987) argues that negative selection of migrants is more likely to emerge when the origin country shows higher returns to skill compared to the destination country. Using Mexican and US census data, Chiquiar and Hanson (2005) test Borjas' hypothesis and provide evidence of intermediate or positive selection of Mexican immigrants, with respect to education and wage distribution. Ibarrran and Lubotsky (2007) replicate the analysis of Chiquiar and Hanson (2005) taking into account potential over-reporting of education and find a negative selection of migrants with respect to education. Fernandez-Huertas Moraga (2011) provides evidence of a negative selection of Mexican migrants, both in observables and unobservables, using the Mexican Labor Survey. McKenzie and Rapoport (2010) investigate the relationship between migration networks and self-selection of Mexican migrants to the US. They provide evidence of a positive-neutral self-selection for migrants with weaker migration networks in the US; however, self-selection is found to be negative for migrants with strong existing migration networks. In a recent study, Kaestner and Malamud (2014) analyze the characteristics of

Mexican migrants to the US using the Mexican Family Life Survey (MxFLS). The authors provide evidence that Mexican migrants to the US are more likely to be young, male, from rural areas, from the middle of the education distribution. They are also more likely to come from the bottom-half of the earning distribution. Our paper adds to the literature, by showing how import competition from China affects the extent of self-selection of Mexican migrants.

This paper is structured as follows. Section 2 presents the motivation and the empirical model. Section 3 describes the data, while Section 4 presents the results. Section 5 investigates the mechanism through which increases in import competition could affect migration decisions. Robustness of the findings is explored in Section 6. Finally, Section 7 concludes.

2. Motivation and Empirical model

China's accession to the WTO had a considerable effect on Mexico, as import competition affected Mexico both directly and indirectly, i.e. through its effect in the US market. Exports from China to Mexico increased rapidly after its accession to the WTO and showed great resilience even during the recent economic crisis. Following a dip in 2009, exports resumed even more strongly after 2010 (Figure 1). As for the indirect channel, a few empirical studies have provided evidence that the increase in Chinese exports to the US led to a significant decrease in demand for Mexican products (Lall and Weiss 2004; Shafaeddin 2004; Devlin et al. 2006; Gallagher and Porzecanski 2007; Gallagher et al. 2008; Hanson and Robertson 2008).

[Insert Figure 1 here]

We treat China's accession to the WTO as a trade shock that led to a shift in the labor demand in Mexico. Theory predicts that, following a sector-specific labor demand shock, workers respond by relocating to other employers, other sectors, or by geographically relocating (Topel, 1986). Bound and Holzer (2000) and Notowidigdo (2013) provide evidence that lower educated workers usually show lower migration rates in response to labor demand shocks in the US. We analyze a reduced form and estimate the effect of import competition on the individual decision to migrate within Mexico and to the US as a mechanism of adjustment, and on the resulting migrants' self-selection.

The increase in Chinese exports, following its accession to the WTO, did not happen uniformly across industries; consequently, Mexican municipalities experienced differential trade shocks, depending on their initial sector specialization. We exploit the variation in exposure to competition from China, after China joined the WTO in 2001, across Mexican municipalities, and estimate the effect of international competition on the individual decision to migrate. China's accession to the WTO provides a unique set-up to analyze how labor demand shocks affect the individual decision to migrate and the extent of migrants' self-selection.

Empirically, we measure the municipality-specific trade shocks by constructing an index that measures changes in exposure to Chinese competition at the municipality level, as follows:

$$E_{ms} = \sum_{k=1}^K \gamma_{k,ms} \eta_k^{MEX} \quad (1)$$

where E_{ms} is the change in China's import competition between 2000 and 2005 for Mexican municipality m in state s . K is the number of 4-digit industries within the manufacturing sector, $\gamma_{k,ms}$ is the fraction of labor working in industry k in municipality m in state s in year 2000.

Finally, η_k^{MEX} is the change in the share of imports from China to Mexico in industry k between 2000-2005.²

If increases in imports from China to Mexico are the results of demand shocks in these countries, a rise in our measure of exposure could be correlated with other local changes that could ultimately affect migration decisions. To get around this potential endogeneity issue we follow the existing literature and build an instrument for our measure of import exposure by substituting the change in the import share of China in Mexico in an industry between 2000-2005 with the change in the import share of China in the rest of the world (i.e. excluding Mexico, US and EU) in that industry during the same period. In other words, we use:

$$EW_{ms} = \sum_{k=1}^K \gamma_{k,ms} \eta_k^{WLD} \quad (2)$$

where we replace the change in the share of imports from China to Mexico in equation (1) with the change in the share of import from China to the rest of the world, for industry k between 2000-2005, η_k^{WLD} .

Our baseline specification is as follows:

$$migrant_{ims} = \beta_0 + \beta_1 E_{ms} + \mathbf{X}_{ims}' \boldsymbol{\gamma} + \mathbf{Z}_{ms}' \boldsymbol{\theta} + \delta_s + \varepsilon_{ims} \quad (3)$$

where $migrant_{ims}$ is an indicator variable that takes the value 1 if individual i living in municipality m in state s in Mexico has migrated between 2002 and 2005.³ We create three measures of the migrant indicator. First, we consider a general migrant binary variable, mig_{ims} , which takes the value 1 if individual i living in municipality m in state s in 2002 migrated between 2002 and 2005, irrespective of the destination. Second, we consider the domestic

² Iacovone et al. (2013), Utar and Ruiz (2013) and Majlesi (2015) use similar measures.

³ China joined the WTO on December 21st 2001, therefore we consider year 2002 as the base year for measuring migration afterwards. We will discuss this issue in more details in the next section,

migration decision, by considering an indicator variable $migrant\ Mex_{ims}$ that takes the value 1 if individual i moved from municipality m in state s to another municipality in Mexico. Finally, we consider the indicator variable $migrant\ US_{ims}$ which takes the value 1 if individual i migrated from municipality m in state s to the US between 2002 and 2005. E_{ms} is the import competition measure for municipality m in state s , as defined in equation (1). The coefficient β_1 captures the impact of China's import competition at municipality level on the individual decision to migrate, either domestically or internationally. \mathbf{X}_{ims} represents a vector of controls at the individual level, such as age, gender, education, having a relative in the US, work status in 2002, savings, previous migration experience, income tercile and asset ownership in 2002. \mathbf{Z}_{ms} is the set of controls at the municipality level, capturing a rural/urban location, the share of manufacturing in a municipality's composition of employment in year 2002 and the share of households in the municipality with access to electricity in year 2002. Finally, δ_s represents state fixed effects.⁴

3. Data

The import competition measure is based on two sources of data. The information regarding the fraction of labor working in industry k in municipality m comes from the Mexican Social Security Institute (IMSS). The IMSS provides data on each employee's age, gender, and salary as well as industry of activity (up to 4-digit), and the state and municipality for all formal private-sector establishments.⁵ The universal coverage of this dataset originates from the fact that

⁴ We also use the period 2002-2005 to estimate changes in exposure to import from China, so that it corresponds to the migration period. The results of our analysis are consistent when using either measure.

⁵ The aggregations from the firm to industry-municipality level were carried out at the central office of IMSS in Mexico City where the data is held. The employment data are classified according to a system of classification

all employees must register with IMSS since it provides health insurance and pension coverage.⁶ The information on the import share of China in Mexico (and the rest of the world) comes from COMTRADE database and it is at 4-digit level of the ISIC-rev. 3 classification.

The migration information is taken from the first two rounds of the Mexican Family Life Survey (MxFLS). The first round was completed between April and July 2002 and the second round of the survey was conducted between mid-2005 and 2006. Given the timing of China's WTO accession, which took place on December 21st 2001, the 2002 survey is considered to represent the *status quo* at the time of China's accession. Indeed, we would expect the effect of China's WTO accession not to have an instantaneous effect on the decision to migrate.

We aggregate four types of migration for individuals surveyed in 2002: 1) Individual migrants who moved out of their municipality of origin between the first and the second round of the survey and do not live with their households anymore; 2) return migrants who moved out of their municipality of origin for less than 12 months between the two surveys; 3) return migrants who moved out of their municipality of origin for more than 12 months between the two surveys; and 4) households that migrated as a whole to a different municipality/country between the two surveys. We define a change in location as a migration episode if a person moves to a different municipality within Mexico or to a different country. One should note that these categories are not exclusive and an individual could belong to more than one category. Also, a migrant could have had more than one episode of migration between the two surveys. The MxFLS provides

similar to the ISIC-rev 3. The authors created a concordance table between the system of classification adopted by IMSS and the 4-digit ISIC-rev 3 classification.

⁶ Official data on the extent of the informal sector are not available at the municipality level. As long as the extent of the informal sector is not a function of having a certain manufacturing industry then this lack of information should not lead to a particular bias in our analysis.

information about migration between the two rounds of the survey and tracks migrants, even those who migrated to the US.⁷

Table 1 provides the summary statistics separately for men and women in our sample of analysis extracted from the MxFLS.⁸ About 93% of men had a job in 2002, while 37% of women worked in 2002. The average number of years of schooling is similar between men and women, around 7. About 8 percent of men and 7 percent of women in our sample migrated between 2002 and 2005, while about 5 percent of men and women migrated within Mexico. These numbers were respectively 3 and 2 percent for migrating to the US. The MxFLS also contains information about the existing network in the US; over one third of men and women had a relative who lived in the US. Regarding previous migration, about 9% of men and 6% of women had a pre-2002 migration experience, either domestic or international. Annual earnings for men were greater than earnings for women (over 22,000 pesos versus 18,000 pesos), while the level of assets was around 207,000 and 180,000 pesos respectively.⁹ About 15% of the households saved in 2002. Finally, approximately a fifth of the sample lived in rural areas, and the vast majority of households had access to electricity.

[Insert Table 1 here]

Table 2 reports the summary statistics for exposure to China's import competition, on the basis of the indices described in equation (1) and (2) for the period 2000-2005. On average,

⁷ The re-contact rate of the MxFLS is very high, around 90% of the respondents in 2002 were interviewed in the second round. However, for those who reside in the US in the second round, we only know their country of residence (US), but not if they have had any other type of migration between the two rounds.

⁸ We restrict our sample to individuals over the age of 20 in year 2002.

⁹ In January 1, 2002, the exchange rate between USD and Mexican Peso was about 9.2.

exposure to import competition from China went up by 2.6 percentage points across Mexican municipalities between 2000-2005 (standard deviation is 5.3 percentage points).

[Insert Table 2 here]

4. Estimation results

Did China's WTO accession play a role in Mexicans' migration decision? Column 1 of Table 3 shows the impact of import competition on the individual decision to migrate, using a linear probability model. In the first three columns we consider the general dependent variable, $Migrant_{ims}$, which takes the value 1 if individual i migrated from municipality m in state s between 2002 and 2005, irrespective of the migration's destination. We find no impact of import competition on the decision to migrate in any of the specifications. Controlling for individual specific or municipality specific characteristics in columns 2 and 3 does not change the results. Next, we consider the dependent variable $Migrant\ Mex_{ims}$, which takes the value 1 if individual i migrated from municipality m in state s to another municipality in Mexico between the two surveys. We find that import competition has a positive and statistically significant impact on the decision to migrate to another municipality. This is evidence of the push factor associated to China's accession to the WTO. As import competition from China increases, more individuals are displaced from their communities and migrate to other municipalities. Similar results hold also when we control for individual and household characteristics. Younger and more-educated individuals are more likely to migrate domestically, while women are as likely as men to move within Mexico. Previous migratory experience has a positive and statistically significant impact

on migrating again between 2002 and 2005. Having savings does not affect the probability of migrating, while being employed in 2002 increases the likelihood of moving within Mexico. Individuals in the bottom tercile of the asset distribution are more likely to move to another municipality. Adding municipality controls, i.e. access to electricity, location and the share of manufacturing, does not alter the results. The coefficient estimates in column 6 suggest that a change from zero to full exposure to competition from China raises the probability of migrating to another municipality by 21 percentage points. In other words, one standard deviation increase in exposure to imports from China resulted in 1.1 percentage point higher probability of migration to a different municipality. Given that the unconditional probability of migrating to a different municipality within Mexico was around 5 percent and the average increase in exposure to the import competition across municipalities (2.6 percentage points), the estimates here suggest that increases in exposure to trade with China can explain around 11 percent of migration within Mexico occurring between 2002 and 2005.

Next, we analyze the impact of import competition on the likelihood of migrating to another country. Column 7 presents the results of the basic specification. Import competition from China decreases the individual probability of migrating to the US. The effect is statistically significant at the 1% level. A similar result holds when we control for individual characteristics. Again, import competition is found to reduce the probability of migrating to the US. Older individuals and women are found to be less likely to move internationally. Migration networks play a positive role in affecting the probability to move to the US, indeed having a relative in the US increases the probability of migrating by 1.7 percentage points. Past migration has a positive impact on the probability of moving again. Being employed in 2002 does not seem to affect the probability of moving, nor do savings, assets and earnings in 2002. Column 9 presents the results

of the specification which include also the municipality controls, i.e. electricity, share of manufacturing and rural location. Once we add municipality controls, we find that import competition still has a negative and statistically significant impact on the probability of migrating to the US. Overall, we can conclude that on average, after controlling for individual and municipality characteristics, import competition from China has a sizeable effect on the probability of migrating to the US. We provide some intuition on why this might be the case in the following sections.¹⁰

[Insert Table 3 here]

4.1. Instrumental Variable analysis

If increases in imports from China to Mexico and its major export market, the United States, are the results of demand shocks in these countries, increases in our measure of exposure could be correlated with other local changes that could affect migration decisions. To get around this potential endogeneity issue we follow the existing literature and build an instrument for our measure of exposure by substituting the change in the import share of China in Mexico in an industry between 2000-2005 with the change in the import share of China in the whole world in that industry during the same period, as shown in equation 2.

Table 4 presents the results of the instrumental variable estimation. The first three columns indicate no statistically significant effect of changes in exposure to competition from China, when the aggregate measure of migration is used as the dependent variable. The coefficient estimates reported in columns 4 to 6, on the other hand, show that increases in exposure to the

¹⁰ Results hold when we consider the alternative 2002-2005 measure.

Chinese competition had a positive and statistically significant effect on the individual decisions for moving to another municipality in Mexico. More specifically, controlling for individual and municipality characteristics (column 6), the coefficient estimate suggests that a one standard deviation increase in exposure to competition from China, instrumented by increases in Chinese imports in the rest of the world, raises the probability of migrating to another municipality by almost 0.8 percentage points. Although it is smaller than the OLS estimate, the effect is still statistically significant.

[Insert Table 4 here]

The estimates in the last three columns of Table 4 confirm the earlier results by showing that, even when individual and municipality features are controlled for, increases in being exposed to the Chinese competition negatively affect the probability of migrating to the US.

5. Who migrates?

In a series of regressions, with results presented in Tables 5 to 7, we explore the features of the groups of people who are more likely to be affected by the changes in exposure to the Chinese competition. In doing so, we investigate the mechanisms through which increases in import competition could affect migration decisions. In Table 5, we explore whether the increases in import competition had a differential impact on men and women. We add the interaction between a dummy representing female respondent and the change in exposure to trade as a control variable. The results suggest that more exposure to import competition has a

more negative effect on males' probability of migrating to the US. In other words, although it seems that exposure to Chinese competition does not affect the possibility of women migrating to the US, it negatively affects that of men. Kaestner and Malamud (2014) show that Mexican migrants to the US are more likely to be male. Similarly, we show that in our sample men are twice as likely to migrate to the US compared to women. Consequently, it could be the case that men are more responsive to environmental factors when it comes to migrating to the US.

[Insert Table 5 here]

Table 6 repeats a similar exercise by interacting a dummy for college education with changes in exposure to import competition.¹¹ In columns 1 and 2 the dependent variable is migration within Mexico. Although the LPM estimates imply that increase in import competition has relatively less of an effect on college-educated people's decision to migrate, the instrumental variable analysis does not generate a statistically significant effect. This supports the hypothesis that trade competition mostly results in unemployment (or fear of it) and shocks to the labor income among those employed in manufacturing industries or with ties to the manufacturing sector, who are predominantly low-skilled workers. This is also consistent with the results in Autor et al. (2014) who find that labor adjustment costs following import shocks are unevenly distributed across workers according to their skill levels. They find that in response to trade shocks earnings losses are larger for individuals with low wages who are in some way connected to the manufacturing sector and that high-wage workers are less likely to leave their firm during a mass layoff, and are more likely to move out of manufacturing conditional on leaving their

¹¹ For ease of interpretation, we use a dummy variable which takes the value 1 for individuals with a college degree and 0 otherwise. Similar results hold when we consider years of education ranges.

initial firm.

[Insert Table 6 here]

The results in columns 3 and 4, in which the dependent variable is migration to the US, show that although, controlling for everything else, college-educated people are less likely to migrate to the US, increases in exposure to trade affects higher educated people's likelihood to migrate to the US more positively compared to that of lower-educated people. These results support the hypothesis previously mentioned: that exposure to trade shocks limit low-skilled, less-affluent, people's ability to migrate to the US by making it more difficult to finance the move.

The results so far indicate that China's import competition has affected the type of self-selection. The trade shock effectively reduced the negative self-selection that has been documented in other studies. The next step is to try to understand who are the people who move to the US in response to a trade shock. Table 7 explores the role of savings in decision to move to another municipality or to migrate to the US.

[Insert Table 7 here]

We interact the dummy capturing whether the household had savings in 2002 with the import competition measure. While we do not find any statistically significant impact on the decision to migrate domestically, columns 3 and 4 of Table 7 do highlight that import competition negatively affects the probability of migrating of those who have not accumulated

savings before the trade shock. This result further reinforces the previous findings that China's import competition has reduced the negative self-selection of Mexican migrants to the US.¹²

6. Robustness Checks

6.1. Earnings, Employment and Sector change

Labor demand shocks could result in outcomes other than migration. In Table 8, we look at the effect of our constructed trade shocks on other potential outcomes, namely earnings, the likelihood of being employed, and change in the sector of employment for those who remain in the same municipality. Combined with what we have found so far, it looks like Mexicans responded mainly to these shocks by either migrating to other municipalities or changing sectors, if they remained in the same municipality.

[Insert Table 8 here]

6.2. Spatial Effects

Throughout the analysis so far, we have implicitly assumed that municipalities and local labor markets overlap. However, it is possible that people commute to neighboring municipalities to work and shocks to those municipalities affect people's decision to migrate. To address this we take an average of changes in exposure to imports from China for each municipality represented in our sample of analysis and control for that in our regressions to see if and how it affects our estimates. The results are presented in Appendix Table A1. While the

¹² There is no correlation between having a relative abroad, which could be a proxy for receiving remittances, and having savings.

effect of increases in import competition in the neighboring municipalities on migration within Mexico is positive and significant, controlling for it in the regressions does not lower the impact of increases in import competition in the municipality of residence. The point estimates for migration to the US is still negative, although it is no longer statistically significant.

6.3. Correlated Shocks in Mexico and The U.S.

As discussed before, China's export share surged after 2001 in both Mexico and the US and it happened in very similar manufacturing sectors. Because of this, one might think that people who would have migrated to the US to work in manufacturing sectors, that were subsequently affected by the import shocks, migrated within Mexico instead and that is why we observe an increase in migration within Mexico and a decrease in migration to the US as a result of trade shocks in Mexico. In other words, the total number of migrations would be the same even in the absence of trade shocks.

One way to check this possibility is to look at what Mexican migrants do in the US and if they work in the sectors that are hit by Chinese import competition. The Mexican Migration Project lists the last occupation in the United States if the year of migration is between 1990 and 2005. We have looked at the distribution of Mexican migrants across 3-digit industrial sectors in the US and the results suggest that a very small percentage of Mexican migrants work in the manufacturing sector in general and in the sectors that were negatively affected by imports from China, in particular.¹³ This finding does not support the hypothesis that Mexican migrants substituted migrating to the US by moving within Mexico.

¹³ Results are available upon request.

7. Conclusion

This paper analyzes the effects of increases in import competition in Mexico, following China's WTO accession in 2001, on individuals' decisions to migrate, both within Mexico and to the US. The increase in Chinese exports had differential effects across industries that held different levels of importance in various municipalities' composition of employment. Consequently, municipalities experienced differential exposure to competition from China. We exploit the variation in exposure to competition from China across Mexican municipalities to estimate the effect of international competition on the decision to migrate.

To the best of our knowledge, this is the first paper that uses a panel of individual level data to look into how an exogenous external trade shock affects migration in a middle-income country.¹⁴ Controlling for individual and municipality features, we find that individuals living in municipalities in which exposure to import competition increased to a greater degree are more likely to migrate to other municipalities within Mexico. To get around the potential endogeneity of the decision to migrate to imports from China in different industries, we use an instrumental variable strategy to proxy for increases in Chinese imports in Mexico with increases in Chinese imports globally in the same period.

We also find that, on average, import competition reduces the likelihood of migrating to the US. However this effect is heterogeneous. As it has been shown before in the literature, most of the migrants to the US are from rural areas in which manufacturing sector is not considered a major employer and, therefore people are not directly prone to the shocks in that sector. It has also been shown that it is mostly lower income people who migrate to the US. We find that

¹⁴ Dix-Carneiro and Kovac (2015) study the effect of the trade liberalization in Brazil and find almost no effect on migration.

increases in import competition lowers the chance of lower-educated people or those with limited access to savings to migrate to the US. This could be the result of a much higher cost of migrating to the US (compared to migrating within Mexico) and the fact that shocks to the manufacturing sector mostly affects low-skilled workers and makes them more financially constrained.

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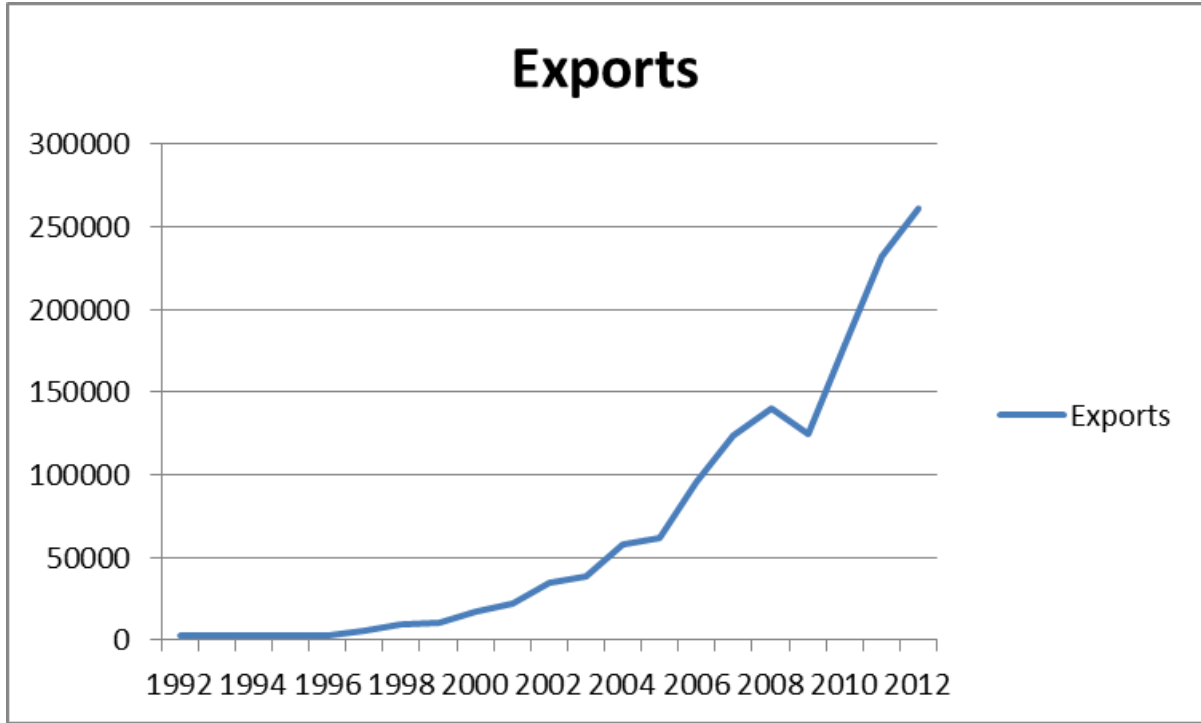
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Figure 1: Exports from China to Mexico



Exports from China to Mexico, in 2000 US\$ ('000s). Source: WITS and World Development Indicators.

Table 1: Summary statistics

	Men			Women		
	Mean	S.D.	Obs.	Mean	S.D.	Obs.
Age	39.31	12.16	4592	38.62	11.72	5941
Married	0.78	0.41	4592	0.74	0.44	5941
Years of schooling	7.34	4.31	4592	6.71	4.05	5941
College degree	0.12	0.32	4592	0.07	0.26	5941
Migrant	0.08	0.28	4592	0.07	0.25	5941
Migrant – US	0.03	0.17	4592	0.02	0.12	5941
Migrant - MEX	0.05	0.23	4592	0.05	0.21	5941
Relative in the U.S.	0.35	0.48	4592	0.37	0.48	5941
Work in 2002*	0.93	0.26	4592	0.37	0.48	5941
Savings 2002**	0.15	0.36	4592	0.15	0.36	5941
Migration prior 2002	0.09	0.28	4592	0.06	0.24	5941
Household Assets 2002***	207,127	398,294	4592	180,886	349,543	5941
Earnings 2002***	22,906	39,950	3893	18,100	34,904	2020
Share of manufacturing 2002****	0.30	0.20	4592	0.30	0.20	5941
Electricity 2002****	0.94	0.12	4592	0.94	0.12	5941
Rural****	0.23	0.42	4592	0.23	0.42	5941

* Dummy equal to 1 if an individual works in year 2002

** Dummy equal to 1 if an individual has access to saving at the household level in year 2002

*** Monetary values in Mexican Pesos

**** Variables presented for the municipality of residence

Table 2: Summary statistics – Import competition across municipalities

	Δ Import Competition MEX 05-00	Δ Import Competition WLD 05-00
Mean	0.026	0.022
Standard Deviation	0.053	0.045
90 th percentile	0.08836	0.0781087
75 th percentile	0.02367	0.0197418
50 th percentile	0.00132	0.0014614
25 th percentile	0.00014	0.0001429
10 th percentile	0.00004	0.000000549

Table 3: Baseline analysis

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		<i>Migration</i>		<i>Migration within Mexico</i>				<i>Migration to the US</i>	
ΔImport competition	0.025 [0.079]	0.042 [0.075]	0.073 [0.087]	0.223*** [0.065]	0.208*** [0.060]	0.210*** [0.070]	-0.198*** [0.056]	-0.166*** [0.052]	-0.136** [0.058]
Age		-0.003*** [0.000]	-0.003*** [0.000]		-0.002*** [0.000]	-0.002*** [0.000]		-0.001*** [0.000]	-0.001*** [0.000]
Female		-0.009 [0.007]	-0.009 [0.007]		0.007 [0.006]	0.007 [0.006]		-0.015*** [0.004]	-0.015*** [0.004]
Years of Education		-0.004 [0.003]	-0.004 [0.003]		-0.005** [0.002]	-0.005** [0.002]		0.001 [0.002]	0.001 [0.002]
Years of Education-squared		0.000* [0.000]	0.000* [0.000]		0.0004*** [0.000]	0.0004*** [0.000]		-0.000 [0.000]	-0.000 [0.000]
Relative in US		0.022*** [0.008]	0.022*** [0.008]		0.005 [0.007]	0.004 [0.007]		0.017*** [0.004]	0.017*** [0.004]
Migration pre-2002		0.105*** [0.020]	0.105*** [0.020]		0.074*** [0.016]	0.074*** [0.016]		0.031*** [0.011]	0.031*** [0.011]
Assets - bottom tercile		0.017* [0.009]	0.017* [0.009]		0.022** [0.008]	0.022** [0.008]		-0.005 [0.005]	-0.005 [0.005]
Savings - dummy		-0.012 [0.010]	-0.012 [0.010]		-0.005 [0.008]	-0.005 [0.008]		-0.007 [0.005]	-0.007 [0.005]
Work in 2002		0.010 [0.012]	0.010 [0.012]		0.017* [0.010]	0.017* [0.010]		-0.007 [0.008]	-0.006 [0.008]
Earnings – bottom tercile		0.002 [0.008]	0.001 [0.008]		-0.001 [0.007]	-0.001 [0.007]		0.003 [0.005]	0.002 [0.005]
Share of manufacturing Electricity			0.002 [0.029]			-0.020 [0.021]			0.022 [0.019]
			-0.011 [0.021]			0.007 [0.023]			-0.018 [0.021]
Rural			0.009 [0.011]			0.002 [0.010]			0.007 [0.007]
Observations	5913	5913	5913	5913	5913	5913	5913	5913	5913
Adjusted R-squared	0.005	0.035	0.034	0.007	0.030	0.029	0.016	0.028	0.028

Notes: All regressions include state fixed effects. Migration pre-2002 is a dummy equal to 1 if a person has migrated before. Assets (Earnings)-bottom tercile is a dummy equal to 1 for those in the bottom third of asset (earnings) distribution. Standard errors are clustered at municipality level.

* Significant at 10%.

** Significant at 5%.

*** Significant at 1%.

Table 4: Instrumental variable analysis

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		<i>Migration</i>		<i>Migration within Mexico</i>				<i>Migration to the US</i>	
Δ Import competition	-0.030 [0.085]	-0.018 [0.081]	0.004 [0.095]	0.181*** [0.069]	0.160** [0.065]	0.154** [0.077]	-0.211*** [0.064]	-0.178*** [0.059]	-0.150** [0.071]
Age		-0.003*** [0.000]	-0.003*** [0.000]		-0.002*** [0.000]	-0.002*** [0.000]		-0.001*** [0.000]	-0.001*** [0.000]
Female		-0.009 [0.007]	-0.008 [0.007]		0.007 [0.006]	0.007 [0.006]		-0.015*** [0.004]	-0.015*** [0.004]
Years of Education		-0.004 [0.003]	-0.004 [0.003]		-0.005** [0.002]	-0.005** [0.002]		0.001 [0.002]	0.001 [0.002]
Years of Education-squared		0.000* [0.000]	0.000* [0.000]		0.0004*** [0.000]	0.0004*** [0.000]		-0.000 [0.000]	-0.000 [0.000]
Relative in US		0.021*** [0.008]	0.021*** [0.008]		0.004 [0.007]	0.004 [0.007]		0.017*** [0.004]	0.017*** [0.004]
Migration pre-2002		0.105*** [0.020]	0.105*** [0.020]		0.073*** [0.016]	0.073*** [0.016]		0.031*** [0.011]	0.031*** [0.011]
Assets - bottom tercile		0.017* [0.009]	0.016* [0.009]		0.022** [0.008]	0.022** [0.008]		-0.005 [0.005]	-0.005 [0.005]
Savings - dummy		-0.011 [0.010]	-0.011 [0.010]		-0.004 [0.008]	-0.004 [0.008]		-0.007 [0.005]	-0.007 [0.005]
Work in 2002		0.010 [0.012]	0.010 [0.012]		0.017* [0.010]	0.017* [0.010]		-0.007 [0.008]	-0.006 [0.008]
Earnings – bottom tercile		0.001 [0.008]	0.001 [0.008]		-0.001 [0.007]	-0.001 [0.007]		0.003 [0.005]	0.002 [0.005]
Share of manufacturing			0.003 [0.029]			-0.019 [0.021]			0.022 [0.019]
Electricity			-0.006 [0.022]			0.011 [0.022]			-0.017 [0.021]
Rural			0.006 [0.012]			-0.000 [0.010]			0.006 [0.008]
Observations	5913	5913	5913	5913	5913	5913	5913	5913	5913
Adjusted R-squared	0.005	0.034	0.034	0.007	0.030	0.029	0.016	0.028	0.028

All regressions include state fixed effects. Migration pre-2002 is a dummy equal to 1 if a person has migrated before. Assets (Earnings)-bottom tercile is a dummy equal to 1 for those in the bottom third of asset (earnings) distribution. Standard errors are clustered at municipality level. Instrumented variable: Δ Import Competition. The instrument for Δ Import Competition is the change in the Chinese share of imports into the rest of the world (i.e. excluding Mexico, US and EU) interacted with the fraction of Mexican labor in municipality m in year 2000.

* Significant at 10%.

** Significant at 5%.

*** Significant at 1%.

Table 5: Gender and Import competition

VARIABLES	(1) <i>Migration within Mexico</i>	(2)	(3) <i>Migration to the US</i>	(4)
Δ Import Competition	0.266*** [0.084]	0.222** [0.090]	-0.159** [0.064]	-0.174** [0.073]
Female* Δ Import Competition	0.013 [0.008]	0.014* [0.008]	0.060 [0.058]	0.066 [0.062]
Female	0.013* [0.008]	0.015** [0.008]	-0.018*** [0.005]	-0.018*** [0.005]
Age	-0.002*** [0.000]	-0.002*** [0.000]	-0.001*** [0.000]	-0.001*** [0.000]
Years of Education	-0.005** [0.002]	-0.005** [0.002]	0.002 [0.002]	0.002 [0.002]
Years of Education - squared	0.0004*** [0.000]	0.0004*** [0.000]	-0.000 [0.000]	-0.000 [0.000]
Relative in US	0.004 [0.007]	0.004 [0.007]	0.017*** [0.004]	0.017*** [0.004]
Migration pre-02	0.074*** [0.016]	0.073*** [0.016]	0.031*** [0.011]	0.031*** [0.011]
Assets - bottom tercile	0.022** [0.008]	0.021** [0.008]	-0.005 [0.005]	-0.005 [0.005]
Savings - dummy	-0.004 [0.008]	-0.004 [0.008]	-0.007 [0.005]	-0.007 [0.005]
Work in 2002	0.017* [0.010]	0.017* [0.010]	-0.007 [0.008]	-0.007 [0.008]
Earnings – bottom tercile	-0.001 [0.007]	-0.001 [0.007]	0.002 [0.005]	0.002 [0.005]
Share of manufacturing	-0.020 [0.021]	-0.020 [0.020]	0.022 [0.019]	0.023 [0.019]
Electricity	0.007 [0.023]	0.010 [0.022]	-0.018 [0.020]	-0.017 [0.021]
Rural	0.003 [0.010]	0.000 [0.010]	0.007 [0.007]	0.006 [0.008]
Estimation method	LPM	IV	LPM	IV
Observations	5913	5913	5913	5913
Adjusted R-squared	0.030	0.029	0.028	0.028

All regressions include state fixed effects. Migration pre-2002 is a dummy equal to 1 if a person has migrated before. Assets (Earnings)-bottom tercile is a dummy equal to 1 for those in the bottom third of asset (earnings) distribution. Standard errors are clustered at municipality level. Instrumented variable (columns 2 and 4): Δ Import Competition. The instrument for Δ Import Competition is the change in the Chinese share of imports into the rest of the world (i.e. excluding Mexico, US and EU) interacted with the fraction of Mexican labor in municipality m in year 2000.

* Significant at 10%.

** Significant at 5%.

*** Significant at 1%.

Table 6: Education and Import Competition

VARIABLES	(1) <i>Migration within Mexico</i>	(2)	(3) <i>Migration to the US</i>	(4)
Δ Import Competition	0.264*** [0.068]	0.189*** [0.071]	-0.173*** [0.062]	-0.190*** [0.072]
College* Δ Import Competition	-0.292* [0.150]	-0.190 [0.154]	0.195*** [0.071]	0.206*** [0.068]
College	0.057*** [0.014]	0.052*** [0.014]	-0.025*** [0.006]	-0.025*** [0.006]
Age	-0.002*** [0.000]	-0.002*** [0.000]	-0.001*** [0.000]	-0.001*** [0.000]
Female	0.007 [0.006]	0.007 [0.006]	-0.015*** [0.004]	-0.015*** [0.004]
Relative in US	0.004 [0.007]	0.004 [0.007]	0.017*** [0.004]	0.017*** [0.004]
Migration pre-02	0.074*** [0.016]	0.073*** [0.016]	0.031*** [0.011]	0.031*** [0.011]
Assets - bottom tercile	0.023*** [0.008]	0.022*** [0.008]	-0.006 [0.005]	-0.006 [0.005]
Savings - dummy	-0.005 [0.008]	-0.005 [0.008]	-0.006 [0.005]	-0.006 [0.005]
Work in 2002	0.017* [0.010]	0.017* [0.010]	-0.006 [0.008]	-0.006 [0.008]
Earnings – bottom tercile	0.000 [0.007]	-0.000 [0.007]	0.001 [0.005]	0.001 [0.005]
Share of manufacturing	-0.021 [0.021]	-0.020 [0.021]	0.023 [0.019]	0.023 [0.019]
Electricity	0.006 [0.023]	0.010 [0.022]	-0.017 [0.021]	-0.016 [0.021]
Rural	0.004 [0.010]	0.001 [0.010]	0.006 [0.007]	0.005 [0.008]
Estimation method	LPM	2SLS	LPM	2SLS
Observations	5913	5913	5913	5913
Adjusted R-squared	0.031	0.031	0.029	0.029

All regressions include state fixed effects. Migration pre-2002 is a dummy equal to 1 if a person has migrated before. Assets (Earnings)-bottom tercile is a dummy equal to 1 for those in the bottom third of asset (earnings) distribution. Standard errors are clustered at municipality level. Instrumented variable (columns 2 and 4): Δ Import Competition. The instrument for Δ Import Competition is the change in the Chinese share of imports into the rest of the world (i.e. excluding Mexico, US and EU) interacted with the fraction of Mexican labor in municipality m in year 2000.

* Significant at 10%.

** Significant at 5%.

*** Significant at 1%.

Table 7: Savings and Import Competition

VARIABLES	(1) <i>Migration within Mexico</i>	(2)	(3) <i>Migration to the US</i>	(4)
Δ Import Competition	0.170** [0.080]	0.115 [0.082]	-0.178*** [0.059]	-0.194*** [0.069]
Savings* Δ Import Competition	0.151 [0.156]	0.146 [0.160]	0.159* [0.095]	0.165* [0.099]
Savings - dummy	-0.012 [0.010]	-0.012 [0.010]	-0.015** [0.006]	-0.015** [0.006]
Age	-0.002*** [0.000]	-0.002*** [0.000]	-0.001*** [0.000]	-0.001*** [0.000]
Female	0.007 [0.006]	0.007 [0.006]	-0.015*** [0.004]	-0.015*** [0.004]
Years of Education	-0.005** [0.002]	-0.005** [0.002]	0.002 [0.002]	0.002 [0.002]
Years of Education - squared	0.0004*** [0.000]	0.0004*** [0.000]	-0.000 [0.000]	-0.000 [0.000]
Relative in US	0.004 [0.007]	0.004 [0.007]	0.017*** [0.004]	0.017*** [0.004]
Migration pre-02	0.074*** [0.016]	0.073*** [0.016]	0.031*** [0.011]	0.031*** [0.011]
Assets - bottom tercile	0.022** [0.008]	0.021** [0.008]	-0.005 [0.005]	-0.005 [0.005]
Work in 2002	0.017* [0.010]	0.017* [0.010]	-0.006 [0.008]	-0.006 [0.008]
Earnings – bottom tercile	-0.001 [0.007]	-0.002 [0.007]	0.002 [0.005]	0.002 [0.005]
Share of manufacturing	-0.019 [0.021]	-0.019 [0.021]	0.023 [0.019]	0.023 [0.018]
Electricity	0.007 [0.023]	0.011 [0.022]	-0.018 [0.021]	-0.017 [0.021]
Rural	0.002 [0.010]	-0.001 [0.010]	0.006 [0.007]	0.005 [0.008]
Estimation method	LPM	IV	LPM	IV
Observations	5913	5913	5913	5913
Adjusted R-squared	0.030	0.029	0.029	0.029

All regressions include state fixed effects. Migration pre-2002 is a dummy equal to 1 if a person has migrated before. Assets (Earnings)-bottom tercile is a dummy equal to 1 for those in the bottom third of asset (earnings) distribution. Standard errors are clustered at municipality level. Instrumented variable (columns 2 and 4): Δ Import Competition. The instrument for Δ Import Competition is the change in the Chinese share of imports into the rest of the world (i.e. excluding Mexico, US and EU) interacted with the fraction of Mexican labor in municipality m in year 2000.

* Significant at 10%.

** Significant at 5%.

*** Significant at 1%.

Table 8: Earnings, Employment and Sector change

VARIABLES	(1) <i>Earnings</i>	(2) <i>Employment</i>	(3) <i>Sector change</i>
ΔImport Competition	1.757 [1.321]	0.144 [0.117]	0.857*** [0.234]
Age	-0.037*** [0.007]	0.000 [0.001]	-0.001* [0.001]
Female	0.116 [0.090]	-0.222*** [0.012]	0.019 [0.022]
Years of Education	0.062 [0.050]	0.008* [0.004]	0.043*** [0.006]
Years of Education - squared	0.001 [0.003]	0.000 [0.000]	-0.002*** [0.000]
Relative in US	-0.088 [0.141]	-0.003 [0.011]	-0.001 [0.017]
Migration pre-02	0.394* [0.210]	-0.023 [0.018]	0.001 [0.031]
Assets - bottom tercile	0.118 [0.123]	0.015 [0.012]	-0.001 [0.017]
Savings - dummy	0.126 [0.143]	0.016 [0.012]	-0.016 [0.023]
Work in 2002	0.793** [0.322]	0.256*** [0.025]	-0.080* [0.044]
Earnings – bottom tercile	-1.405*** [0.128]	-0.067*** [0.012]	0.033* [0.019]
Share of manufacturing	-0.631 [0.546]	-0.010 [0.042]	0.083 [0.070]
Electricity	0.339 [0.437]	-0.014 [0.030]	-0.150** [0.068]
Rural	-0.315 [0.229]	-0.004 [0.014]	-0.057* [0.034]
Observations	3461	5817	4016
Adjusted R-squared	0.128	0.147	0.035

All regressions include state fixed effects. Migration pre-2002 is a dummy equal to 1 if a person has migrated before. Assets (Earnings)-bottom tercile is a dummy equal to 1 for those in the bottom third of asset (earnings) distribution. Standard errors are clustered at municipality level.

* Significant at 10%.

** Significant at 5%.

*** Significant at 1%.

Appendix

Table A1: The Role of Import Exposure in the Neighboring Municipalities

VARIABLES	(1) <i>Migration within Mexico</i>	(2)	(3) <i>Migration to the US</i>	(4)
Δ Import Competition	0.326*** [0.077]	0.275*** [0.088]	-0.107 [0.077]	-0.119 [0.097]
Δ Import competition - Neighbouring municipalities	0.107*** [0.032]	0.116*** [0.029]	-0.003 [0.025]	-0.009 [0.029]
Estimation method	LPM	IV	LPM	IV
Observations	3963	3963	3963	3963
Adjusted R-squared	0.031	0.031	0.028	0.028

All regressions include state fixed effects, individual and municipalities controls. The usual controls are included. Standard errors are clustered at municipality level. All regressions include state fixed effects. Standard errors are clustered at municipality level. Instrumented variable (columns 2 and 4): Δ Import Competition. The instrument for Δ Import Competition is the change in the Chinese share of imports into the rest of the world (i.e. excluding Mexico, US and EU) interacted with the fraction of Mexican labor in municipality m in year 2000.

* Significant at 10%.

** Significant at 5%.

*** Significant at 1%.