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The Effect of NAFTA on Internal Migration in Mexico: A Regional Economic Analysis

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Abstract

Trade facilitates growth in some regions of a country while shrinking others, and therefore to benefit from trade, labour may need to be able to migrate. This mobility is particularly crucial in a developing country with high income inequality like Mexico. We seek to answer the following questions: What characteristics facilitate or hinder that internal migration? Has trade liberalization changed the pattern of internal migration in Mexico? We first predict regional economic growth resulting from changes in Mexico-US tariffs by sector. We find that trade liberalization appears to have largely benefited the manufacturing sector. Next, using a spatial gravity model of migration, we find that while economic growth from trade openness drew workers to urban regions in the northern Border States of Mexico, much of the trade-driven migration occurred before NAFTA. Second, contrary to popular belief, migration from largely rural states appears to have decreased since NAFTA. We also find evidence that migration to the United States increased after NAFTA. Last, we find that income disparity in both the destination and origin region deters migration and that this effect increases after NAFTA. Thus, we see evidence that within-region income disparity can hinder migration, potentially exacerbating income disparity among regions.

Keywords: Migration, Trade, Regional Economic Development, Mexico

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1. Introduction

Trade causes growth in some industries and regions, and contraction in others (Frankel & Romer, 1999, Feenstra, 2015). For people to be able to benefit from trade, they may need to be able to migrate to those areas where new jobs are being created (Todaro & Smith, 2011). However, only a limited number of papers study how internal migration responds to international trade in a developing country like Mexico (Aroca & Maloney, 2005; Aguayo-Tellez, 2005; Flores et al., 2013), and much of the internal migration literature has failed to find a significant impact of international trade on internal migration. Baylis et al. (2012) showed that the NAFTA increased regional disparities in Mexico, which might be mitigated through internal migration. In this paper, we ask whether migration has increased in response to increased U.S.-Mexico trade, and we explore those factors that facilitate and hinder labour mobility within Mexico.

The effects of trade agreements, specifically NAFTA, on worker outcomes and inequality are receiving increased attention, and have spurred recent attempts at renegotiation among the three participant countries. While recent concern has been voiced by U.S. policy-makers, a great deal of prior criticism of the agreement was voiced in Mexico, stemming from arguments that it increased regional disparities. Previous research finds that because of NAFTA, poverty rates of rural Mexican farmers increased, particularly in the states of Oaxaca and Chiapas. Audley et al. (2004) argue that the agricultural sector (where a fifth of the population still work) has assumed the full adverse effects of NAFTA, losing 1.3 million jobs since 1994. One mechanism that is open for people to respond to these changes brought about by trade is to migrate from rural areas in southern states to dynamic states. Understanding who can migrate is key to determining who wins and who loses from trade liberalisation. People migrate to benefit from higher wages caused by trade (Samuelson, 1971; Marshall, 2015). But not all people who want to migrate can do so (Dubey et al., 2006). Literature on credit constraints and migration shows that the poorest unskilled workers have a low propensity to migrate because they cannot finance the move (Bryan et al., 2014). Connell (1983) finds that out-migration of the more skilled workers from rural areas further limits the economic growth in rural areas. Further, poor individuals from rural areas face a barrier to migration, resulting in heightened income disparities within those rural regions exporting labour (Aroca & Maloney, 2005; Lucas, 1997). While the poor have a larger incentive to migrate, wealthier individuals tend to have higher levels of education, increasing their propensity to migrate because the better educated earn higher wages, making it easier to finance the initial migration cost (Levy & Wadycki, 1974; Kasaqi, 2016).Therefore, we expect to find that areas with high levels of inequality, characterized by high proportions of poor people and few middle class people, will show lower rates of outmigration than areas with a high proportion of middle class people who can afford to migrate[4].

Poor farmers grow corn in Mexico, but cannot compete with U.S. producers, who have access to subsidies, better access to technology, and greater economies of scale[5]. Mexico imports corn from the U.S. (Fanjul & Fraser, 2003; Papademetriou, 2004), lowering the price of corn in Mexico and, in turn, lowering the rural poor's income. This has caused Mexican agricultural employment to decline sharply since NAFTA took effect (Polaski, 2003). Prior work argues that as the net losers of trade openness, small corn farmers are forced to adapt by migrating to the north of Mexico (to work in maquiladoras) or the United States, despite increased controls at the U.S.-Mexico border (Papademetriou, 2004).

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[4] Kuznets (1955)'s seminal paper is a standard reference for a detailed explanation of how migration can generate income inequality among regions. In this paper, he develops the well-known Kuznets' inverted U curve and shows how the internal migration of farmers to urban areas, looking for better jobs, can create rural-urban income inequality.

[5] Most of the corn produced in Mexico is white, for human consumption, while most of the corn imported to Mexico from the U.S. is yellow, for livestock feed. Mexican corn farmers complain that livestock were fed white corn before, NAFTA but ranchers switched to (U.S.) yellow corn because it was cheaper, reducing significantly the demand for Mexican white corn (Fanjul & Fraser, 2003).

NAFTA has not been all bad news for the agricultural sector. Producers of vegetables and fruits have benefited from NAFTA, increasing their exports since 1994, in some cases even tripling them by 2000 (Stalker, 2000). But most of the vegetable and fruit production is concentrated in larger-scale, commercially viable, export-oriented firms, mainly in the northern and western states—particularly Guanajuato, Sinaloa and Sonora. Therefore, this agricultural expansion arguably has not benefited most of poor subsistence farmers in Mexico (Papademetriou, 2004; Vaughan, 2003).

Cockburn (2006) analyses the impact of trade liberalisation on Nepalese households from 1986 to 1995 and finds that the rural poor are negatively affected by trade liberalisation. Conversely, using household data on a Computable Generalized Equilibrium (CGE) model, Ianchovichina et al. (2001) study the effects of Mexico's tariff liberalisation on poverty and income distribution predicting that rural poor households should gain from trade liberalisation.

Only a few authors in the last three decades have studied the effects of trade on migration (Martin, 1993; Lucas, 1997; Borjas, 1999; Hufbauer, 2005; Xenogiani, 2006; De Haas, 2007). Three studies using state-level data have explicitly analysed the effect of trade liberalisation on internal migration in Mexico (Aroca & Maloney, 2005; Aguayo-Tellez, 2005; Flores et al., 2013). Unlike earlier work, to identify the effect of NAFTA, we first estimate the effect of trade openness on the economic activity of different sectors in different locations; we then estimate the effect of this activity on migration. Thus, we explicitly measure the effect of NAFTA on migration through its effect on regional economic output. Second, we use migration flows at the state-to-district level (instead of the state-to-state level) to identify the relationship between trade and internal migration. The use of spatial state-district level regressions increases the number of observations and the ability to observe geographic patterns. Finally, we explicitly control for the spatial nature of the data by using a spatial econometric gravity model of origin-destination flows (LeSage & Pace, 2008).

Results suggest that trade increased internal migration in Mexico, but its effect on internal migration has diminished over time with most of the trade-generated migration occurring before Mexico joined NAFTA. Secondly, migration to the United States has increased after NAFTA; thus, the draw of the U.S. economy exceeded the cost of international migration (Luckstead et al., 2012). Thirdly, rural-to-urban migration has decreased after NAFTA. Fourthly, income disparity in either origin or destination location decreases migration, and this effect strengthened after NAFTA. This paper also explores what other factors have contributed to internal migration. Places with higher levels of infrastructure attract workers while places without infrastructure are more likely to generate out-migration. Having a higher fraction of women and homeowners in the state decreases migration. Finally, we find a substantial degree of spatial correlation in the error terms for the spatial-error and spatial-lag cross-sectional models.

In the next section, we look at the background of internal migration in Mexico before and after NAFTA and review the trade and migration literature, which describes which factors might affect internal migration. Next, we present our empirical model followed by a description of the data. Finally, we present the results and provide the conclusions of this paper.

2. Background on Trade and Internal Mexican Migration

Trade with the United States has long influenced labour migration inside of Mexico. In 1965, the United States unilaterally ended the Bracero program, which had allowed Mexican workers into the United States for short periods as temporary farm labour where many former Bracero employees and their families settled close to the northern Mexican border (Durand et al., 2001). To create jobs for former Bracero workers in the border area, the Mexican government established the Maquiladora program to attract foreign direct investment. This maquiladora (or foreign-owned assembly plant) industry is the largest industry on the Mexican side of the Mexico-US border (Cañas et al., 2013; Martin, 2002). Maquiladoras attract people, especially women[6], from the interior of Mexico to the Mexico-US border region to work (Cravey, 1998; Benería et al., 2015).

As with the maquiladoras before, NAFTA was expected to generate employment in Mexico by attracting investment to produce exports for the United States (Martin, 1993; Hausmann et al., 2008). However, this newly created employment has been concentrated mainly in areas with easy access to the U.S. economy, especially in the Mexico-US border region where most of the maquiladoras are located (Aguayo-Tellez, 2005). This trade potential generates a massive internal migration of workers from the southern and central regions of Mexico to the northern region (Hanson, 1996; Head & Mayer, 2004). Many of these migrants may see this move as a step to eventual migration to the U.S. Other internal migrants that come from the agricultural south do not end up in maquiladoras; rather, they end up in the Pacific Northwest of Mexico, where they work in export-oriented agriculture. A share of these workers culminates their trip by working in agricultural fields in the U.S. (Cornelius & Martin, 1993; Stalker, 2000).

Despite the importance of flexible labour markets for distributing gains from trade, the migration literature has not given much attention to the relationship between trade and internal migration (Borjas, 1999). Therefore, the main question addressed in this paper is whether trade liberalisation changed the internal migration pattern, and second, whether community characteristics such as availability of infrastructure facilitate or hinder that migration (Aroca & Maloney, 2005; Cornelius & Martin, 1993; Filipski et al., 2011). To understand who gains and who loses from trade, one needs to understand the relationship between trade and migration. This information can then be used to

[6] In 2000, 60% to 70% of the assembly-line workers in the maquiladoras were women (Martin, 2002).

mitigate inequality that may be exacerbated by trade, either by facilitating internal migration or by location-based policies aimed at decreasing regional disparities.

3. A Migration Model

All sectors and regions of a country do not grow at the same time; sectors in some regions expand first (van den Berg & Kemp, 2008). Once the available local labour supply is employed, these regions require migrant workers to meet their demand for labour, driving internal migration from less-developed regions to growing regions. International trade generates unequal growth by increasing the market for exporting sectors and contracting those of import-competing industries. In the case of Mexico, these industries are in different regions of the country (Baylis et al., 2012).

Consider the decision process of an individual deciding whether to migrate (equation 1). Assume an individual evaluates both economic and non-economic factors before making her decision whether to migrate or not. At time *t-1*, a worker weighed the expected utility of staying against the expected utility from migrating:

$$\text{Staying} \quad \text{Vs.} \quad \text{Migrating}$$

$$EU\,(w_{it} + a_{it}) \quad \text{Vs.} \quad EU\,(w_{it} + a_{it} - TC_{ij}) \qquad (1)$$

In every time period, she considers the expected utility of the wage she will get in time t if she stays in her own region i (w_{it}) against the wage she might receive in time t if she migrates to region j (w_{jt}). The expected utility also includes the amenities she can enjoy by staying (a_{it}) compared to the ones she will enjoy if she migrates (a_{jt}). If she chooses to migrate, she faces a transportation cost moving from region i to j (TC_{ij}), **Error! Reference source not found.** 2. The transportation cost is a function of distance between regions *i* and *j*, d_{ij} and a border crossing variable (b_j) that captures whether she needs to cross the international border to arrive to region *j*:

$$TC_{ij} = f(d_{ij}, b_j) \tag{2}$$

In time *t-1*, the wages for time *t* are unknown and she faces a distribution of jobs, each with a given wage and given probability, in the next period. To estimate the future wages, she calculates the expected value of both wages in time *t*:

$$E(w_{kt}) = \int_{r=1}^{n} (w_{kt-1} + \Delta w_k)\, P(\epsilon_{kt}) dr \qquad \text{where } k = i \text{ and } j \tag{3}$$

The expected value of the wage in region *k* in time *t* is a function of the previous wage in time *t-1* plus the expected change in wages (Δw_k) in region *k* from *t-1* to *t*. This equation is multiplied by the probability of being employed at those wages in region *k* in time *t*, $P(\epsilon_{kt})$. This probability is a function of variables like unemployment and population density. This equation is integrated over the possible jobs (*r*) the individual can have in region *k*. Note that if the individual is risk averse, holding the mean constant, an increase in the variance of wage outcomes in a region will reduce the expected utility associated with living in that region (Stark & Levhari, 1982; Ibáñez & Vélez, 2008).

The expected value of the change in wage in region *k*, from time *t-1* to *t*, is assumed to be a function of changes in regional Gross Value Added (GVA), (ΔGVA_{kt}), which is a function of characteristics of the region, variables such as distance from destination to the U.S. market ($distF_j$)[7], trade openness ($\Delta\tau_{st}$) and industrial structure in region *k* in *t-1* (Z_{kt-1}):

$$E(\Delta w_{kt}) = f(\Delta GVA_{kt}\,(\Delta\tau_{st}, distF_j, Z_{kt-1})) \tag{4}$$

[7] The closer to the market, the higher the wage (Hanson, 1996; Bárcena-Ruiz & Casado-Izaga, 2012).

The subscript *s* refers to the traded sector, commerce, manufacturing or mining. The agricultural sector is not included since its information is not collected by the INEGI in the economic census. To identify the specific effect of trade through its effect on GVA, we use a two-stage-least-squares (2SLS) approach. In the first stage (equation 5), we estimate the 5-year change in regional GVA since 1985[8] caused by trade openness.

$$ln(\Delta GVA_{kt}) = \beta_1 \Delta\tau_{st} * ln(GVA_{skt-5}) + \beta_2 maquila_{kt-5} + \beta_3 maquila_{kt-5} * \Delta\tau_{st} + \beta_4 distF_k * \Delta\tau_{st} + \beta_5 distF_k * \Delta\tau_{st} * ln(GVA_{skt-5}) + \alpha_k + \varepsilon_t + u_{kt} \quad (5)$$

We run this estimation at the district level to predict the change in GVA ($\widehat{\Delta GVA}$) caused by trade with the United States. To control for regions that had a high level of economic activity before NAFTA, we include their GVA for 1985[8]. We also include the estimated change in regional GVA with respect to 1985 explained by trade to observe the effect of NAFTA on internal migration. These data are also obtained from the INEGI's economic censuses. The regression pools data from the economic censuses of 1986, 1989, 1999 and 2004. It should be noted that the censuses reported data from the previous year. Therefore, the actual information corresponds to 1985, 1988, 1998 and 2003, respectively.

Trade openness was not the same across all sectors. Some sectors reduced tariffs faster than others did (Aguayo-Tellez et al., 2010). Therefore, to identify the effect that NAFTA had on internal migration, this paper uses the different tariffs imposed by the United States on Mexican imports available for three different traded sectors (commerce, manufacturing and mining) in period *t-5* (GVA_{skt-5}) multiplied by the change in tariffs in the respective sector ($\Delta\tau_{st}$). This interaction term

[8] The data from 1985 was taken from the 1986 economic census.

captures the potential growth (or contraction) in regional GVA associated with a reduction in tariffs ($\ln((GVA_{skt-5})*\Delta\tau_{st})$.

Because maquiladoras had early tariff-free access to the United States, they have long attracted migrants (Cravey, 1998; Benería, 2015). Therefore, we include a control variable, which is the annual average number of maquiladora establishments by district ($maquila_{kt-5}$), along with variables indicating its interaction with the change in tariff for each sector ($maquila_{kt-5}*\Delta\tau_{st}$). These variables allow changes in tariffs to have varying effects for maquiladora zones compared to other areas.

For the Mexican case, economic growth, and thus internal migration, is correlated with transportation cost to the U.S. border. Therefore, a continuous variable of the road distance (in thousands of kilometres) from the capital of region *k* to the closest U.S. border crossing point is included (*distF*) to capture the influence of the proximity to the U.S. market.

The model also includes the interaction variables of $\Delta\tau_{st}$ and $\Delta\tau_{st}*GVA_{skt-5}$ for every sector with $distF_k$. We control for district-fixed effects α_k, which include the given distance to the border and pre-existing characteristics of the population before NAFTA. Because we include district-fixed effects, we cannot estimate coefficients for variables that are time invariant. Therefore, we exclude variables such as distance to the border (*distF*) and the population in 1985 and only include their interactions with variables that change over time.

$$ln(M_{ijt}) = \gamma_1 O_{it-5} + \gamma_2 D_{jt-5} + \gamma_3 ln(OD_{ij}) + \gamma_4 ln({OD^2}_{ij}) + \gamma_6 \widehat{\Delta GVA_i} + \gamma_7 \widehat{\Delta GVA_j} + \varepsilon_{ijt} \quad (6)$$

In the second stage (equation 6), migration from state *i* to district *j* is estimated using a Gravity Model. The number of migrants that migrate from *i* to *j* within the last 5 years is given as M_{ijt}. The origin-specific factors pushing migrants to the corresponding areas in period *t-5* are given as O_{it-5}.

The destination-specific factors pulling migrants from the corresponding areas in period *t-5* are given as D_{jt-5}.

Greenwood (1997) and Etzo (2011) mention that migration is directly related to the population size of the origin and destination places, since the larger the origin and destination, the higher the probability of finding a job, and, thus, the higher the number of people migrating from that origin to that destination. Thus, we control for the population size because regions with larger concentrations of people will tend to have more in- and out-migration. In this case, we use the total population that districts and states report, including children and elderly, from each population census.

Investment in infrastructure provided by local governments plays an important role in the migration decision since people tend to migrate from places with low levels of infrastructure to places with high levels of infrastructure. This infrastructure reflects the amenities available in the destination area, implying a positive relation with migration decisions. Thus, better infrastructure will shape the decision to migrate (Aroca & Maloney, 2005; Lucas, 1997).

Based on the literature, transportation costs are best approximated by using a logarithmic function of the distance between the origin and destination (Greenwood, 1997; Aroca & Maloney, 2005). Therefore, the distance between *i* and *j*, which affects migration according to some monotonic inverse function *f*( ), is given as $ln(OD_{ij})$ and $ln(OD^2_{ij})$. While a very short distance may encourage commuting and therefore decrease migration, after some point, an increase in distance is expected to deter migration (Partridge et al., 2012).

We include the percentage of the population that owns a house in both origin and destination region. Home ownership in the destination region might affect the probability of migration as it might make it more difficult for newcomers to find a place to rent. Home ownership in the origin region may also increase the transaction cost of moving because people who own their houses will be less likely to migrate and give up the "local capital"[9] when they move, as well as facing the higher transaction costs associated with having to sell a home (Greenwood, 1997; Fackler & Rippe, 2017).

Few studies investigate the correlation of migration with fertility and women's behaviour. However, the literature mentions that destination regions tend to have lower fertility rates than the origin (LaLonde & Topel, 1997) and that migrants tend to go to places with high female labour force participation (Mincer, 1978; Blau et al., 2011). Thus, we use the fertility rate and the percentage of women in the labour force as proxies at the origin and destination at *t-5* to control for opportunities for women and for unobservable regional characteristics such as attitudes towards women working and women's levels of empowerment. This information has been obtained from the INEGI's population census.

We create a dummy variable for those destination places with more than 500,000 inhabitants in *t-5*, District City, and use the percentage of the population living in rural areas, which will allow us to distinguish rural to urban migration.

Finally, the estimated differences in GVA with respect to 1985 caused by trade openness $ln(\widehat{\Delta GVA})$ for the origin (*i*) and the destination (*j*) are included, and ε_{ijt} is an error term. Variables are defined in Table 1.

Combining the different migration and standard trade theories, we generate the following testable hypotheses:

[9] "Local capital may refer to many things, such as knowing one's way around the local job market, establishing contacts and references, owning a house, etc." (Greenwood, 1997, pg. 690)

H1: Internal migrants are attracted to regions with growth spurred by trade. A supplementary hypothesis is that those regions with export-oriented sectors, like manufacturing, were more influenced by NAFTA because they presented more economic growth than non-traded sectors. This effect would be observed by having a positive relationship between destination regions with higher traded sectors and higher openness to trade.

H2: Origin regions that are more negatively affected by trade are more likely to send migrants.

H3: Labour movement from Mexico to the United States dropped after NAFTA because there was more labour demand in Mexico with trade openness, which reduced the incentive to migrate to the United States. Alternatively, as Audley et al. (2004) posit, the agreement *increased* migration after NAFTA due to many Mexican labourers and small farmers being displaced by the economic restructuring.

H4: Finally, income disparities affect internal migration: Origin regions with high income disparities tend to have less out-migration, because poor people cannot afford the costs to migrate, and rich people prefer to stay. Destination places with fewer income disparities tend to attract more migration because of opportunities for poor people to earn higher wages and join the middle class.

4. Data

We observe migration flows from state to district. We observe 32 origin states and 170 recipient districts. The INEGI presents this information at the state and municipal level for the origin and destination, respectively. However, considering the destination at the municipal level produced many zero flows skewing the data, which can bias the estimated coefficients (LeSage & Pace, 2008). The percentage of zero observations at the state-muni level was 54%, whereas at state-district level it dropped to 5%. To aggregate the destination data from the muni to electoral district level, we use the information provided by the Secretariat of Governance (SEGOB, 2005), which maps municipalities to electoral districts.

We collect data on internal migration flows, demographics, infrastructure, distances (proxy for migration cost), GVA, labour markets and on tariffs. These data are collected from the economic and population censuses from the INEGI and the United States International Trade Commission (USITC). Summary statistics are provided in Table 2. The construction of the variables included in the first stage that estimates the change in GVA, followed by the variables used in the second-stage gravity model, are described below.

<u>*First Stage Variables*</u>

Tariffs: These data are obtained from USITC (2014). We use the data available, at an annual frequency, of the U.S. tariffs on Mexican exports at the 1-digit Standard Industrial Classification (SIC) level for the light/heavy manufactured, mining and intermediate goods, which we match to the manufacturing, mining and commerce sectors, respectively. These tariffs are aggregated across different goods for each sector and weighted by their respective national export trade volumes.

Transportation cost (*distF*): To create the border distance variable, d*istF*, we first obtain the names of the district or state capitals (INEGI, 2008). Secondly, we calculate the road distance in 1,000 km from each of the district or state capitals to the different U.S. border crossing points by entering the destination and origin points in the webpage *Traza tu Ruta* provided by the *Secretaría de Comunicaciones y Transportes* (SCT, 2008). Finally, we choose the shortest distance for each district or state capital from the different distances provided by each border crossing point. For district capitals that do not appear as origin points, we calculate the distance of the nearest available city or town and add the road distance from that point to the district capital of interest, which we calculate manually by using a map of Mexico.

Maquiladoras: The maquila variable is created by calculating the annual average from the monthly number of establishments in the relevant region provided by the Maquiladora Export Industry´s Statistics (INEGI, 2007). Although this approach is standard, it has the drawback of failing to account for the size of the maquiladoras.

Second Stage Variables

Migration Flow (M_{ij}): Migration data come from the 1990, 2000 Population Censuses and the 2005 Population Count from a question that asks residents of a district in what states or country they resided 5 years earlier. Though this approach might be standard, these data have the drawback of failing to count migrants who might have left and returned over the 5-year period. Flows to the United States are obtained from the National Population Council (CONAPO) and derived from a question asking whether a member of the household has gone to the United States during the last 5 years and has not returned.

Moving Cost ($OD\_Distance_{ij}$ and $OD\_Distance^2_{ij}$): We define the origin as the state where the person lived 5 years before and the destination as the district where the person migrated during the last 5 years. This measure is intended to proxy for moving cost, which increases as the length of the distance increases, and the communication costs with their family in the place of origin, including the costs of visits.

Labour markets: Remuneration per worker is generated as total remuneration paid[10] in a district/state divided by the number of workers registered in that year for that region. The percentage of the labour force earning X times the minimum salary[11] is generated by taking the number of participating workers earning an X number of minimum salaries and dividing it by the total labour force. This information was collected in the 1989, 1999 and 2004 economic censuses by the INEGI. It is important to note that the remuneration per worker is calculated by taking the total number of people working, whereas the percentage of the labour force earning certain percentages of the minimum salary is calculated by taking the total labour force, which includes the unemployed.

Infrastructure: we include an index of three infrastructure variables (percentage of households with electricity, drainage and tap water) for period *t-5*. This information was obtained from the INEGI's population censuses.

5. Results

5.1 Effect of trade on GVA

In the first stage, we regress the changes in district GVA against drivers associated with trade. Table 3 reports the fixed effect panel regression results from the first stage for GVA at the district level[12]. Column 1 shows the regression at the district level, where most variables are significant at the 1% level. The interaction variable of the sectoral GVA with the change in tariff in that sector ($\Delta\tau_{sector,t}$*$\ln(GVA_{sector,t-5})$) is significant for all the sectors.

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[10] Remunerations are presented in real thousand pesos from 2003.
[11] The minimum salary in Mexico is set by the central government. According to the Ministry of Labor, it represents the minimum remuneration a worker should receive for a day's work and it should be enough to satisfy the basic needs of a household.
[12] To obtain the state results for the origin places, we aggregate the district results to the state level.

To clearly observe the effect of the main variables on the first stage, Table A1, in the appendix, reports the marginal effects of a change in distance (*distF*), tariffs ($\Delta\tau$) and maquiladoras on GVA growth for each sector. The magnitude of the change is a 1% change for distance and tariffs and a one extra manufacturing-plant for maquiladoras.

5.2 Effect of trade-driven growth on migration

Table 4 reports the regression results using multiple spatial cross-sectional data for 5,643 observations related to 170 destination districts, 32 origin Mexican states and the United States over 3 years (1990, 2000 and 2005)[13]. We use an annual spatial cross-section regression of the number of migrants who moved from state *i* to district *j* against various characteristics to observe whether the influence of these characteristics changed after NAFTA. We find substantial spatial correlation in the error terms for both the spatial-error and spatial-lag cross-section regression, with the degree of spatial correlation in the errors (λ) ranging from 0.617 to 0.636. The Robust Lagrange Multiplier test shows that the spatial-error model is the most appropriate model to use. Therefore, the results presented below are generated from the spatial-error model (Table 4).

For this gravity model, the spatial weight matrix we use is a destination-based dependence matrix[14]. Lesage and Pace (2008) find that a single origin may be more likely to send migrants to a cluster of destinations. Griffith & Jones (1980) and Marrocu & Paci (2013) also find that flows related to a destination are 'enhanced or diminished' based on the attractiveness of its neighbouring destination locations. Therefore, this spatial weight matrix W_d shows the relation between an origin and a destination and its neighbours.

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[13] We are not using data from 1995 because the INEGI did not gather information about migration in the *Conteo de Poblacion y Vivienda* 1995.

[14] We also tried an origin-based matrix and found that the spatial effects were quite small (insignificant).

Starting with Model 1, columns 1-3, we can observe that the change in GVA from 1985 explained by trade (*ln(GVA_hat)*) is positive and significant for the destination regions for all the years (1990, 2000 and 2005). This result implies that a 1% increase in the destination´s GVA (caused by NAFTA) results in increases of 0.89%, 0.58% and 0.45% in the number of migrants in 1990, 2000, and 2005, respectively. This result supports our first hypothesis that internal migrants are attracted to regions with growth spurred by trade. Note, however, that the effect decreases substantially over time, showing that most of the trade-driven effect on internal migration happened before NAFTA, perhaps driven by Mexico's participation in GATT. The supplementary hypothesis deals with destination regions with higher-traded sectors. From Stage 1, we observe that in fact, regions with more traded sectors such as manufacturing benefited more from trade openness[15]. Thus, these regions with a higher-traded sector attracted more internal migration.

In Model 2, columns 4-6, we include Mexico-U.S. migration, treating the United States as the 171th Mexican district. The coefficient on international migration increases in 2000, indicating that the United States is a substantial 'destination' relative to the average Mexican district after NAFTA. This result is consistent with the idea that the agreement will create a 'hump' of increased migration after NAFTA due to many Mexican labourers being displaced by the economic restructuring (Martin, 1993; Audley et al., 2004). This increased migration occurred even after the Illegal Immigration Reform and Immigrant Responsibility Act (IIRIRA) of 1996, which significantly tightened border enforcement along the U.S.-Mexico border and was expected to reduce considerably the flow of unauthorized migrants (Hanson, 2007).

[15] See appendix for a more detailed explanation of the magnitude of the results in the first stage.

Turning to the fourth hypothesis, in our third specification, we include the variables to capture income disparity (Models 3 and 4, columns 7-12). Specifically, we include the percentage of the labour force earning less than twice the minimum wage (*D_<2 minimum salaries*) and the percentage of the labour force receiving more than 10 minimum salaries in the destination location (*D_>10 minimum salaries*), omitting the percentage of the labour force receiving between 2 to 10 minimum salaries (*D_2-10 minimum salaries*)[16]. We run two models with the income distribution variables, one with the Mexico-U.S. migration (Model 4) and one without (Model 3), to observe whether the results change when we included the Mexico-U.S. migration flow. Most of the coefficients on the percentage of the labour force earning less than twice and the percentage earning more than 10 times the minimum wage are significant, and their signs are negative in all the specifications involving the destination location. This result indicates that destinations with a higher fraction of the working-age population receiving less than twice or more than 10 minimum salaries are not drawing migrants. For example, in column 7: A 1% increase in the population with less than 2 minimum salaries (or more than 10 minimum salaries) will decrease migration by 1.28% (or 9.46%, respectively). The negative effect of the labour force receiving more than 10 minimum salaries in the destination location loses significance after NAFTA, whereas the effect of the labour force earning less than two minimum salaries increased. This result indicates that recipient regions with a higher percentage of workers earning less than two minimum wages will deter migration more after NAFTA, whereas destination regions with a higher percentage of workers receiving more than 10 minimum salaries start to attract more migrants after NAFTA (columns 10-12).

[16] We do not have detailed individual income data at the district level, so we cannot calculate a more detailed measure of income distribution.

The percent of the population earning less than two or more than 10 times the minimum wage is also significant for the origin locations, with a negative sign in all the specifications. These results imply that a 1% increase in the population with less than 2 minimum salaries (or more than 10 minimum salaries) will decrease migration by 4.96% (or 34.59%, respectively), for column 8. The magnitudes of these income distribution variables, for the origin and destination locations, are the largest of all the explanatory variables. The negative sign is consistent with the hypothesis that a base level of wages is required to be able to leave, and only workers with more than two or less than 10 minimum salaries will migrate to places with less income disparity; that is, places with a higher percentage of the labour force receiving between two to 10 minimum salaries. Further, note that this effect holds for both receiving and sending locations; that is, income disparity appears to not only be a deterrent to moving to a location, it also acts as a barrier to leaving, which differs from Connell's finding (1983).

The difference in remuneration[17] per worker between the destination and origin regions (Models 1 and 2, columns 1-6) shows an interesting effect: destination regions with a higher remuneration attracted more migrants before and after NAFTA, but the coefficient on the variable doubles in the last year, 2005: A 1,000 difference in peso per worker leads to 0.3% more migrants in 1990 and 0.6% in 2005. This increase in magnitude occurred because migrants were more attracted to places where they could find jobs, especially well-paying jobs (Aroca & Maloney, 2005), and because workers had better knowledge about the difference in wages in 2005 than previously due to innovations in communications (i.e., internet and cell phones) and due to growing networks between the origin and the destination.

[17] Remunerations are shown in real thousand pesos from 2003.

The cost of movement variable—distance from origin to destination (*O-D Distance* and *O-D Distance squared*)—is significant in all the specifications, but the coefficients have an opposite sign from those found in previous literature (Borjas, 1999; LeSage & Llano, 2016; Massey, 1990; Fischer & LeSage, 2010). The tipping point increases over time: we calculate a tipping point of about 119 km in 1990, 128 km in 2000 and 130 km in 2005. In the case of Mexico, there is a large labour migration from the south to the north of Mexico, especially from rural to urban regions (Aguayo-Tellez, 2005). The increase in the tipping point from 1990 to 2005 shows that better roads and economical bus services have lowered the cost of movement (Sahota, 1968; Lucas, 2001). The change in the effect of distance may also reflect the increased importance of social networks of former southerners in the north.

Finally, the coefficient on infrastructure is significant in all the specifications and with a positive coefficient for the destination. This result implies that a 1% improvement in infrastructure in destination communities attracts 0.2% more migrants in 1990 (column 1). This evidence supports the literature where the level of infrastructure has a pull effect, which attracts migrants to regions with higher levels of infrastructure. For the case of infrastructure as a push effect (on the origin): the coefficient is significant in all the specifications, but it switches from being positive in 1990 to negative in 2005. This result also supports the literature proposing that people migrate out of regions with low levels of infrastructure, but it only applies after NAFTA. These results reinforce the importance of infrastructure on the migration decision, which gains strength as a push factor after NAFTA.

As far as the demographic variables are concerned, the total population of the destination location in t-5 (*Total Population*$_{t-5}$) is significant and with a positive sign in all specifications, which is a result consistent with the population, capturing market size. This result implies that a 1% increase in the destination population would have attracted 0.94% more migrants in 1990 (column 1). The coefficient on the origin population in t-5 ($O\_Total\ Population_{t-5}$) is stable with a positive sign across all the specifications.

The dummy variable for destination districts with more than 500,000 inhabitants in t-5 ($District\ City_{t-5}$) and the percentage of rural population for the destination districts and origin states are significant and with the expected signs. This result implies that a region that is a city attracts 0.09% more migrants than ones that are not (columns 3, 6 and 12). Migrants are not attracted to destination regions with large percentages of rural population, and they also tend to abandon regions with large rural populations. We can observe these results in column 2: a 1% increase in rural population in a destination decreases migration by 0.49%, and a 1% increase in rural population in an origin region increases migration by 1.66%. This finding agrees with the urban-centric literature that mentions that people tend to migrate from the countryside to cities (Kearney, 1986; Rain, 2018). But the most interesting finding is that this attraction to urban areas gains significance only 10 years after NAFTA (see the District City coefficients in columns 3, 6 and 12), which shows that urban areas gained migrants after NAFTA (Aroca & Maloney, 2005).

The effect of the variable percentage of households that own their homes in t-5 ($Own\ House_{t-5}$) for the destination location is mixed: negative and significant for migration when we include the Mexico-U.S. migration (Models 2 and 4); but positive and significant when we do not include the Mexico-U.S. migration (Models 1 and 3). The finding, when we include the Mexico-U.S. migration, is consistent with the idea that migration flows will tend to go to places where rental housing is more readily available compared to owner-occupied housing.

The effect of the variable percentage of households that own their homes in t-5 ($Own\ House_{t-5}$) for the origin location is negative and significant in all the models (1 to 4). This result implies that a 1%

increase in the number of households in the origin that are homeowners will reduce migration by 0.09% (column 1). This finding is consistent with the idea that migration will tend to happen when the person does not own a house. Transaction costs of moving are lower when migrants do not have to buy or sell a house. The coefficient switched signs in 2000 for the specifications that include indicators of salary inequality (Models 3 and 4, columns 8 and 11), which indicates that salary inequality measures are correlated with the percentages of households that own a home in 2000. Perhaps migrants can use their housing to finance migration costs in 2000. The percentage of households that own their homes is not significant in 2005 for Models 3 and 4 (columns 9 and 12, respectively).

The fertility rate and the percentage of women (both in t-5) are negative and significant across all the specifications and in both types of locations, origin and destination. It does appear that migration flows are largely from and to places with lower percentages of women and with lower fertility rates. A 1% increase in the fertility rate or the % of women decreases migration by 0.89% and 25% (respectively) for destinations and 1.7% and 26% (respectively) for origin regions. This indicates that migrants are more attracted to urban places with good infrastructure, remuneration and economic growth, than to places with high percentages of women. This is contrary to what was first thought due to the large percentage of women hired in manufacturing.

As observed from the magnitudes of the coefficients of each explanatory variable, the most relevant variables are the income disparity variables, for the destination and origin regions, and the percentage of women population. The other variables discussed, although important, have smaller magnitudes compared with the previous two mentioned.

We test for robustness of these results to different specifications. Firstly, we run Model 4 without the U.S. observations, and the results are qualitatively unchanged. Secondly, we run the regression as a spatial-lag model, and the results are again robust. Lastly, we run the regression as a non-spatial regression and obtain qualitatively similar results.

6. Conclusions

This paper contributes to the understanding of the mechanisms of labour adjustment, an important aspect of economic development. It also demonstrates how trade openness has influenced this labour adjustment; specifically, how Mexico's migration increased after NAFTA, particularly to urban areas and to the United States.

At the beginning of this paper, we asked whether NAFTA increased internal migration but reduced migration to the United States. Our results show that trade openness has increased internal migration, but this effect diminishes over time, confirming that much of the trade-generated migration happened before Mexico joined NAFTA. Further, we find that sending regions are also positively affected by trade, perhaps implying that trade helps increase income enough to facilitate out-migration.

The flow of migrants to the United States has increased due to the pull caused by the U.S. economy exceeding the transportation cost to get to the United States, especially in the years following the NAFTA agreement (Luckstead et al., 2012). Thus, we see evidence of a 'hump' of migration to the United States, as proposed by Audley et al. (2004), where the large number of Mexicans displaced by economic restructuring temporarily led to more migration. This finding is opposite to what Aroca and Maloney (2005) found: that FDI and trade deter Mexico's out-migration.

The results indicate that trade liberalisation has not reduced internal migration, but instead has led to a greater labour adjustment within Mexico. Migration to urban areas has also increased as found by Aguayo (2005). Places with higher levels of infrastructure will attract workers since this will provide a better standard of living. Also, income inequality is both a barrier to leaving and a deterrent to in-migration, and this effect persists after NAFTA.

As the debate around the effect of free trade on workers and regions heats up, understanding the role of local characteristics in facilitating or hindering trade-induced labour mobility is increasingly important. The analysis in this paper confirms that trade has indeed increased internal migration and the flow of migrants to the United States. But it also shows what other factors (i.e., the maquiladora project) have contributed to increased internal migration. The management of these factors by local governments will allow the creation of regional development policies to reduce out-migration (from a region concerned with losing human resources) or to increase immigration (into a region interested in attracting more labour supply). In this paper, we find that regions with significant income disparities are not able to attract migration flows, but that local governments that invest in basic infrastructure can attract migration flows and, more importantly, will reduce their net out-migration. This finding may be relevant to the current trade debates in both Mexico and the United States, as concern focuses on those people and regions left behind from trade. Further research is necessary to determine what other factors influence internal migration and are likely to shape the next phase of Mexico's regional development.

>>insert Table 1 here<<
>>insert Table 2 here<<
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Table 1 - Variables Used in the Model

Variable	Description	Unit	Source
M_{ij}	Migration flow from *i* to *j* 5 years before	# of people	(INEGI, 2012)
GVA_{1985}	Total GVA from 1985	real 2003 Mexican pesos	(INEGI, 2013)
$\widehat{GVA}$	Difference in GVA w.r.t. 1985's explained by trade	real 2003 Mexican pesos	(INEGI, 2013)
GVA_comm	GVA in Commerce sector	real 2003 Mexican pesos	(INEGI, 2013)
GVA_mfg	GVA in Manufacturing sector	real 2003 Mexican pesos	(INEGI, 2013)
GVA_min	GVA in Mining sector	real 2003 Mexican pesos	(INEGI, 2013)
τ _comm	Tariff in Commerce Sector	Average Percentage	(USITC, 2014)
τ _mfg	Tariff in Manufacturing Sector	Average Percentage	(USITC, 2014)
τ _ming	Tariff in Mining Sector	Average Percentage	(USITC, 2014)
OD	Distance between receiving and sending regions	kms	(SCT, 2008)
OD^2	Distance between receiving and sending regions squared	kms	(SCT, 2008)
Maquila	maquiladora in the region	# of establishments	(INEGI, 2007)
Diff. remuneration per worker	Difference between Destination and Origin lagged Remuneration per worker	Thousands of real 2003 pesos	(INEGI, 2013)
<2 min. sal.	% labor force with less than 2 Minimum Salaries	% of labor	(INEGI, 2013)
2-10 min. sal.	% labor force with 2 -10 Minimum Salaries	% of labor	(INEGI, 2013)
>10 min. sal.	% labor force with more than 10 Minimum Salaries	% of labor	(INEGI, 2013)
Infrastructure	Principal Component variable of households with electricity, water and sewage	% of households	(INEGI, 2012)
Own House	Households that owned their homes	% of households	(INEGI, 2012)
Fertility Rate	Fertility Rate	Avg. # of Children	(INEGI, 2012)
% Women	Women population	% of population	
District City	Destination Districts>500,000 inhabitants	Dummy variable = 1 if > 500,00 inhabitants	(INEGI, 2012)
Total Pop.	Total Population in region	# of People	(INEGI, 2012)
% Rural Pop.	living in rural areas (< 2,500 inhabitants)	% of population	(INEGI, 2012)

Table 2- Summary Statistics. Reported statistics are mean, (standard errors), and [minimum, maximum] values.

	Destination (district level)			***Origin (state level)***		
Year	1990	2000	2005	1990	2000	2005
Obs	170	170	170	32	32	32
Immigration	637	659	442	3,496	3,614	2,426
	(5,466)	(4,927)	(2,963)	(18,465)	(16,290)	(9,963)
	[0; 311,103]	[0; 269,565]	[0; 166,890]	[16; 548,974]	[15; 448,546]	[10; 280,644]
GVA Total	589	789	877	2,710	3,750	4,210
	(6,740)	(9,310)	(10,400)	(15,400)	(21,200)	(23,700)
	[5; 88,200]	[5; 122,000]	[5; 136,000]	[4,; 88,200]	[6; 122,000]	[6; 136,000]
GVA Commerce	12	14	14	421	570	602
	(17)	(18)	(18)	(2,000)	(2,810)	(2,970)
	[1; 130]	[1; 131]	[1; 133]	[8; 11,400]	[8; 16,000]	[9; 16,900]
GVA Manufacturing	71	72	73	837	923	914
	(99)	(99)	(99)	(2,590)	(3,040)	(2,960)
	[5; 814]	[5; 814]	[5; 814]	[30; 14,700]	[35; 17,300]	[35; 6,900]
GVA Mining	73	73	74	428	427	458
	(104)	(104)	(105)	(556)	(556)	(605)
	[5; 865]	[5; 865]	[5; 865]	[21; 2,920]	[21; 2,920]	[21; 2,920]
Tariff Commerce (%)	0.039	0.026	0.017	0.039	0.026	0.017
	(0)	(0)	(0)	(0)	(0)	(0)
	[0.039; 0.039]	[0.026; 0.026]	[0.017; 0.017]	[0.039; 0.039]	[0.026; 0.026]	[0.017; 0.017]
Tariff Manufacturing (%)	0.052	0.056	0.039	0.052	0.056	0.039
	(0)	(0)	(0)	(0)	(0)	(0)
	[0.052; 0.052]	[0.056; 0.056]	[0.039; 0.039]	[0.052; 0.052]	[0.056; 0.056]	[0.039; 0.039]
Tariff Mining (%)	0.005	0.002	0.002	0.005	0.002	0.002
	(0)	(0)	(0)	(0)	(0.00)	(0.00)
	[0.005; 0.005]	[0.002; 0.002]	[0.002; 0.002]	[0.005; 0.005]	[0.002; 0.002]	[0.002; 0.002]
Border Distance	985	985	985	968	968	968
	(472.74)	(472.74)	(472.74)	(491.96)	(491.96)	(491.96)
	[1; 2,322]	[1; 2,322]	[1; 2,322]	[1; 2,004]	[1; 2,004]	[1; 2,004]
Population Density per km^2	200	228	230	242	267	268
	(1,095.95)	(1,102.14)	(1,065.92)	(960.98)	(1,003.89)	(988.28)
	[1; 13,919]	[1; 13,790]	[2; 13,246]	[4; 5,486]	[6; 5,732]	[7; 5,645]
Maquila	8	12	11	42	61	57
	(44.29)	(66.30)	(59.36)	(121.38)	(181)	(160)
	[0; 487]	[0; 779]	[0; 677]	[0; 609]	[0; 950]	[0; 808]
Remuneration per Worker (real thousand pesos from 2003)	33	28	30	42	37	39
	(20.06)	(16.54)	(17.86)	(12.13)	(12.99)	(13.95)
	[4; 106]	[3; 95]	[5; 101]	[22; 64]	[18; 73]	[17; 71]
% Labor Force with <2 Minimum Salaries	0.666	0.588	0.565	0.630	0.517	0.483
	(0)	(0)	(0)	(0)	(0.13)	(0.15)
	[0.328; 0.901]	[0.213; 0.902]	[0.140; 0.903]	[0.400; 0.801]	[0.222; 0.759]	[0.176; 0.746]
% Labor Force with 2-10 Minimum Salaries	0.265	0.334	0.355	0.302	0.396	0.424
	(0)	(0)	(0)	(0)	(0.11)	(0.13)
	[0.044; 0.544]	[0.067; 0.646]	[0.075; 0.708]	[0.144; 0.512]	[0.178; 0.633]	[0.189; 0.667]
% of Households with Sewers	0.508	0.675	0.804	0.596	0.753	0.863
	(0)	(0)	(0)	(0)	(0.12)	(0.09)
	[0.101; 0.951]	[0.167; 0.975]	[0.295; 0.987]	[0.300; 0.940]	[0.450; 1.000]	[0.620; 1.000]
% of Households with Electricity	0.813	0.910	0.951	0.863	0.929	0.963
	(0)	(0)	(0)	(0)	(0.03)	(0.02)
	[0.264; 0.990]	[0.526; 0.985]	[0.467; 0.990]	[0.670; 1.000]	[0.850; 1.000]	[0.920; 1.000]
% of Households with Water	0.730	0.780	0.835	0.787	0.831	0.882
	(0)	(0)	(0)	(0)	(0.09)	(0.09)
	[0.294; 0.970]	[0.380; 0.971]	[0.415; 0.985]	[0.560; 0.950]	[0.590; 0.960]	[0.640; 1.000]
% Households that owned their homes	0.809	0.804		0.792	0.789	
	(0)	(0)	N/A	(0)	(0.05)	N/A
	[0.625; 0.943]	[0.580; 0.937]		[0.652; 0.883]	[0.680; 0.868]	
Fertility Rate	3	3	3	3	3	3
	(0.37)	(0.37)	(0.35)	(0.26)	(0.24)	(0.22)
	[2; 4]	[2; 4]	[2; 4]	[2; 3]	[2; 3]	[2; 3]
% of Women population	0.505	0.509	0.512	0.506	0.509	0.511
	(0)	(0)	(0)	(0)	(0.01)	(0.01)
	[0.476; 0.530]	[0.473; 0.537]	[0.476; 0.538]	[0.483; 0.522]	[0.488; 0.522]	[0.490; 0.524]

Table 3- 1st Stage: Fixed Effect Panel regression for ΔGVA, using 171 districts over 4 periods (1985, 1990, 2000, 2005) data

	(1)
Place	Destination
$\Delta\tau_{commerce,t} * ln(GVA_{commerce,t-5})$	0.0203**
	(3.04)
$\Delta\tau_{manufacturing,t} * ln(GVA_{manufacturing,t-5})$	-0.0414***
	(-4.66)
$\Delta\tau_{mining,t} * ln(GVA_{mining,t-5})$	0.0777***
	(6.19)
$maquila_{t-5}$	0.00483***
	(5.25)
$maquila_{t-5} * \Delta\tau_{commerce,t}$	-0.00307*
	(-2.41)
$maquila_{t-5} * \Delta\tau_{manufacturing,t}$	0.00663*
	(2.34)
$maquila_{t-5} * \Delta\tau_{mining,t}$	-0.0103*
	(-2.31)
$distF * \Delta\tau_{commerce,t}$	0.232*
	(2.03)
$distF * \Delta\tau_{manufacturing,t}$	-0.545**
	(-2.62)
$distF * \Delta\tau_{mining,t}$	0.986**
	(3.07)
$distF * \Delta\tau_{commerce,t} * ln(GVA_{commerce,t-5})$	-0.0232***
	(-4.26)
$distF * \Delta\tau_{manufacturing,t} * ln(GVA_{manufacturing,t-5})$	0.0482***
	(6.93)
$distF * \Delta\tau_{mining,t} * ln(GVA_{mining,t-5})$	-0.0829***
	(-8.13)
x1990	-0.669*
	(-2.17)
x1995	-0.997**
	(-2.75)
x2000	-0.136
	(-0.35)
Constant	0.643*
	(2.07)
N	680

t-statistics in parentheses * p<0.05, ** p<0.01 , *** p<0.001

Table 4- 2nd Stage: Spatial Cross Section for ln(migration). Significance levels: *** 0.001, ** 0.01, * 0.05

Model	**1** Base Model w/o Mexico-U.S. migration			**2** Base Model w/Mexico-U.S. migration			**3** Model with wage distribution but w/o Mexico-U.S. migration			**4** Model with wage distribution and Mexico-U.S. migration		
Columns	1	2	3	4	5	6	7	8	9	10	11	12
Year	**1990**	**2000**	**2005**	**1990**	**2000**	**2005**	**1990**	**2000**	**2005**	**1990**	**2000**	**2005**
(Intercept)	6.557*	5.179	3.33	8.099**	5.506	2.742	6.064*	3.097	2.386	7.444**	3.244	1.986
ln (OD)	3.004**	2.972**	2.774**	2.987**	2.947**	2.749**	3.018**	2.973**	2.775**	3.003**	2.952**	2.755**
ln (OD^2)	-0.313**	-0.307**	-0.286**	-0.31**	-0.302**	-0.282**	-0.316**	-0.307**	-0.286**	-0.314**	-0.304**	-0.283**
Migrate to US				145.96**	239.82**	203.64**				125.38**	180.13**	150.257**
District City$_{t-5}$	-0.003	-0.048	0.092*	0.02	0.033	0.146**	-0.021	-0.064	0.069	0	-0.002	0.112**
Diff. Remun. per Worker$_{t-5}$	0.003**	0.002**	0.006**	0.0028**	0.0021**	0.0049**	0.001	-0.001	0.003**	0.001	-0.001	0.003*
D_ln(GVA_hat)	0.89**	0.58**	0.446**	0.787**	0.493**	0.381**	0.811**	0.447**	0.36**	0.73**	0.404**	0.324**
D_Infrastructure$_{t-5}$	0.213**	0.166**	0.183**	0.184**	0.122**	0.156**	0.213**	0.091**	0.129**	0.19**	0.072**	0.118**
D_Total Population$_{t-5}$	0.942**	0.97**	0.886**	0.958**	0.983**	0.897**	0.984**	0.982**	0.878**	0.993**	0.989**	0.888**
D_<2 minimum salaries$_{t-5}$							-1.275**	-3.124**	-2.515**	-1.156**	-2.494**	-2.136**
D_>10 minimum salaries$_{t-5}$							-9.458**	0.241	-0.07	-8.764**	0.861	0.122
D_Own House$_{t-5}$	0.17**	0.195**	0.183**	-2.136**	-3.515**	-2.859**	0.231**	0.201**	0.187**	-1.755**	-2.591**	-2.059**
D_Fertility Rate$_{t-5}$	-0.894**	-0.812**	-0.871**	-0.771**	-0.563**	-0.712**	-0.857**	-0.423**	-0.472**	-0.754**	-0.299**	-0.407**
D_% Women$_{t-5}$	-25.385**	-21.251**	-18.991**	-26.988**	-19.321**	-15.379**	-24.965**	-20.036**	-16.919**	-26.47**	-18.931**	-14.579**
D_% Rural Population$_{t-5}$	-0.095	-0.485**	-0.403**	-0.007	-0.295	-0.194	0.026	-0.206	-0.142	0.09	-0.122	-0.029
O_ln(GVA_hat)	0.332**	0.234**	0.267**	0.323**	0.227**	0.258**	0.276**	0.182**	0.214**	0.269**	0.175**	0.21**
O_Infrastructure$_{t-5}$	0.165**	0	-0.192**	0.165**	0.001	-0.193**	0.113*	-0.134	-0.294**	0.115*	-0.131	-0.294**
O_Total Population$_{t-5}$	0.939**	0.996**	1.000**	0.94**	0.995**	0.999**	0.954**	0.963**	0.959**	0.956**	0.964**	0.958**
O_<2 minimum salaries$_{t-5}$							-2.099**	-4.96**	-2.003*	-2.088**	-4.99**	-2.06*
O_>10 minimum salaries$_{t-5}$							-2.75	-34.589**	-9.295	-2.86	-34.48**	-9.743
O_Own House$_{t-5}$	-0.086**	-0.053**	-0.039**	-0.087**	-0.053**	-0.039**	-0.088**	0.152**	0.019	-0.087**	0.151**	0.022
O_Fertility Rate$_{t-5}$	-1.72**	-1.462**	-1.168**	-1.715**	-1.448**	-1.14**	-1.796**	-2.227**	-1.45**	-1.792**	-2.248**	-1.462**
O_% Women$_{t-5}$	-26.277**	-33.427**	-30.504**	-25.543**	-32.062**	-29.644**	-21.894**	-17.108*	-24.691**	-21.355**	-15.757*	-23.701**
O_% Rural Population$_{t-5}$	2.71**	1.66**	0.358	2.707**	1.666**	0.344	2.55**	2.442**	0.778	2.554**	2.478**	0.791
λ	0.633	0.628	0.629	0.636	0.634	0.633	0.617	0.618	0.631	0.619	0.623	0.633
N	5643	5643	5643	5643	5643	5643	5643	5643	5643	5643	5643	5643

8. Appendix

Table A1: Marginal Effects of Change in Distance, Tariffs and Maquiladoras on GVA growth

Marginal Effect	Distance	Tariff	Maquiladoras
Commerce	0.10%	0.16%	0.72%
Manufacturing	-0.60%	-0.38%	-0.82%
Mining	0.47%	0.82%	1.50%

The marginal effect of "distance to the border" are significant for all sectors but with opposite effects: negative for manufacturing but positive for commerce and mining. Thus, manufacturing is the only sector where distance to the US border decreases its growth. This result implies that a region with a large manufacturing sector, close to the border will grow faster than one further away. The positive effect in commerce and mining sectors can be attributed to activities that are tied to the regions endowed with natural resources: Oil, gas, and other mineral resources are found within regions that are located far from the United States border. After trade openness, increased demand for these resources resulted in a boom in investment and commerce in the areas endowed with them (Walter, 2016).

The marginal effect of the maquiladora variable is negative for manufacturing but positive for commerce and mining. This means that one extra maquiladora increases GVA growth by 0.72% and 1.5% in a region with a large commerce and mining sector, respectively. A region with a large manufacturing sector presents an adverse effect, because one extra maquiladora in the region decreased the GVA growth by 0.82%.

Finally, we find that a decrease of one percent of tariffs, *ceteris paribus*, contributes to a 0.16% and 0.82% lower economic growth in commerce and mining, respectively; and a 0.38% higher economic growth in manufacturing. Thus, the manufacturing sector, and those regions with pre-existing manufacturing industry appear to be the primary beneficiaries of tariff reduction.