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Effect of Tariff Liberalization on Mexico's Wage Differential

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Abstract

This paper studies how the North American Free Trade Agreement (NAFTA) affected wage differentials within Mexico, considering internal migration. In low-skilled, labor-abundant developing countries, trade liberalization should theoretically increase the wage of low-skilled workers, decreasing income inequality. However, anecdotal evidence indicates that NAFTA increased the gap between rich and poor in Mexico, and empirical evidence is mixed (Hirte et al., 2020; Brülhart, 2011; Bosch and Manacorda, 2010; Nicita, 2009; Chiquiar, 2008 & 2005; Hanson, 2007; Gonzalez-Rivas, 2007). Because trade may affect wages differently across regions within the country, accurate measures of wage effects must incorporate internal migration; otherwise, apparent wage convergence or divergence might only reflect a geographic resorting of workers. We first find a slight increase in both internal & external migration in the years after NAFTA. Then, we evaluate wage changes by considering rural to urban migration. We find that low-wage men see a wage boost from NAFTA, while the trade agreement has a negative effect on workers with high wages living in urban areas. NAFTA also mitigated some of the wage differentials between the north and south. Trade liberalization has reduced wage differentials among working-age men in urban areas.

Keywords: Wage differential, Regional Disparities, Trade Liberalization; Internal-Migration

JEL codes: J31; R12; F16; R23

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1. Introduction

Developing countries such as Brazil, China, India, and Mexico have made significant policy adjustments to foster globalization since they have experienced rapid economic growth with this trade openness. Some of these countries' policy adjustments include lowering tariffs and other trade barriers, reducing barriers to foreign direct investment (FDI) and entering into complex trade agreements. The main motivation for these changes was the promise of growth, higher wages, and lower-wage differentials (Robertson, 2007; Harrison, 2007). Others argue that globalization has accentuated wage inequality (Anzaldo Gómez et al., 2008). A simple Heckscher-Ohlin model would suggest that if inputs are not completely mobile across sectors and regions, we expect factors employed in the export-oriented sectors to benefit more than those in import-competing industries.

Further, we might expect those regions with lower transport costs to export markets to benefit more. Additionally, the economic effects of trade may increase the concentration of economic activity in certain regions more than others, resulting in increased wage disparities (Krugman, 1991). If trade increases wages in some industries, it might also induce migration among a subset of mobile workers in some locations. This migration can, in turn, either mitigate or exacerbate these wage differentials.

While increased trade may have benefited the Mexican economy, initial evidence shows that NAFTA may have worsened wage differentials in Mexico (Baylis et al., 2012; Nicita, 2009).[4] Nicita (2009) shows that trade benefits have not spread to all households and have primarily gone to more skilled workers, especially in Mexican states close to the US border.[5] Similarly, Hanson (2007) and Baylis et al. (2012) find that Northern states, which face lower transportation costs to the US market than the Southern states, benefit more from trade by obtaining higher prices, translating into higher wages. One disadvantage of these papers is that they do not consider that

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[4] Articles include Esquivel & Rodriguez-Lopez (2003); Airola (2008); Cragg & Epelbaum (1996); Feenstra & Hanson (1996); Feliciano (2001); Hanson (2003); Hanson & Harrison (1995); Revenga (1997); Robertson (2007); Chiquiar (2005).

[5] Robertson (2007) found that the expansion of assembly activities in Mexico increased the demand for less-skilled workers, and Chiquiar (2005) found that physical capital and infrastructure were the main reasons why Northern Mexican states reaped the benefits from trade liberalization more than the Southern states. While insightful, these papers did not explicitly analyze the distribution of gains across wage levels and geographical regions.

households may respond to changes in labor demand by altering the type of labor they sell or relocating. The distribution of benefits from NAFTA will presumably accrue to those already working in export industries or living in regions close to the US border and those who can more easily migrate into those regions and sectors. Conversely, those facing higher migration barriers may be penalized by the structural shift in the economy brought about by trade.

Migration within Mexico is substantial. Five percent of working-age men migrated from one state to another between 1995 and 2000 (Vega, 2005; INEGI, 2008)[6]. There is a growing literature on the effect of migration on wages in Mexico, primarily focused on the international labor movement. Hanson & McIntosh (2010) find that the increase in the labor supply in Mexico places downward pressure on wages, making external migration more attractive. External migration increases Mexican wages (Mishra, 2007) and can promote local development through remittances (Unger, 2005). Aroca and Maloney (2005) find that trade and FDI slow migration because increased linkages to global markets decrease the incentive to emigrate. However, if trade affects different regions within a country, it might induce internal migration, making benefits from trade available primarily to those households who can move (Arends-Kuenning et al., 2019). With our method, we can disentangle the impact of NAFTA on the wage differential due to trade effects and distinguish this from the effect of the subsequent internal migration on the wage differential. In the short run, trade changes cause changes in prices and wages. In the medium-to-long term, workers respond to these changes through labor supply and internal migration. Both of these processes will affect wage inequality within a region. Suppose one ignores the labor adjustment to regional wage differentials. In that case, one might attribute changes in the wage distribution within a location to the trade agreement, which might also reflect a locational sorting of workers.

To study the effect of NAFTA on migration, we first predict the probability that an individual will migrate based on the potential growth in municipal Gross Value Added (GVA) associated with tariff reductions from

[6] Between 1985 and 1990 the interstate migration was 6% and for 2005 to 2010 was 4%.

NAFTA. Because migration and wage outcomes are jointly determined and likely both related to unobservable individual characteristics, we instrument for migration using local crop yield shocks, specifically corn, which have been shown to influence migration (Hunter et al., 2013; Nawrotzki et al., 2013; Feng & Oppenheimer, 2012; Feng et al., 2010) yet are unlikely to affect wages in the manufacturing, retail, or service sectors in urban areas except through labor supply: A crop yield shock would influence labor migration out of agriculture into other sectors[7], but will not influence wages in other sectors[8]. Next, in a second stage, we estimate a wage equation as a function of trade, demographic and household characteristics, and the previously instrumented migration probability. By analyzing trade openness and distance to the border, we find that workers closer to the US-Mexico border get a higher wage than their far-off counterparts. But this spread diminishes as tariffs fall after NAFTA. Further, we find that low-wage men get a boost from NAFTA in their wages, while NAFTA negatively affects those with high wages. Thus, trade liberalization appears to have decreased wage differentials.

This paper offers the following contributions: First, to our knowledge, this is one of the first studies to consider the effect of trade on wages while explicitly controlling for migration[9]. Second, we correct the potential endogeneity of internal migration and wages[10] by using two-stage least squares (2SLS) instrumental variable estimation. Third, we explore which workers gained and lost from trade. Fourth, we include the 2010 population census to observe long-run wage changes after NAFTA and ask whether wage differentials persist as the economy adapts to trade. This research can help identify those barriers facing individuals and regions that limit their ability to benefit from trade. Thus, this research can help identify the areas of social investment and infrastructure

[7] labor leave the agriculture sector in search for a better (more stable) job in other sectors.
[8] However, in the long run, a large of exodus of labor to one specific sector may reduce its wage.
[9] Some related studies are Haisken-De New & Zimmerman (1999), which studies the effects of trade and migration on the labor market in Germany, Ortega & Peri (2014) explore the relationships among trade, immigration, and income per person across countries, and Hofer & Huber (2001) study how imports and migration influence workers' wage growth in Austria.
[10] Migrants may have unobserved characteristics such as ability and the drive to succeed that are also associated with higher wages. Thus, by using a 2SLS model, we mitigate the endogenous relationship between migration and wage, by identifying (in the first stage) the specific effect of trade-openness, GVA growth and (most importantly) negative crop yield through their effects on migration.

investment[11] that may help smooth wage inequality. Further, by identifying those regions and individuals who have benefited and lost from trade, this information can be used to target compensation. Finally, regional governments can anticipate migration and wages in their region using this estimation approach and adjust local development plans accordingly.

[11] Following Costa-i-Font & Rodriguez-Oreggia (2005) we divide the public investment into social & infrastructure investments. The social investment goes to areas such as health education whereas the infrastructure investment goes to areas such as transportation, and telecommunication.

2. Methods

This paper analyzes how migration patterns and wages change from 1990 to 2010. The main research question is: Did NAFTA increase wage differentials across skill levels and regions once internal migration is considered? The standard trade theory predicts that trade would decrease wage differentials in Mexico; because Mexico is abundant in low-wage earners, it will attract more companies, increasing the wage and reducing the wage differentials in the long run (Stolper & Samuelson, 1941). New Economic Geography (NEG), for its part, argues that companies will continue moving where low-wage workers are available, increasing wage differentials across space (Krugman and Venables, 1995)[12]. Combining the NEG and the standard trade theory, we obtain the following testable hypotheses:

1. Over the past decades, trade openness has caused a substantial decrease in wage differentials in Mexico, with changes in tariffs decreasing wages for high-wage workers and increasing them for low-wage earners[13].
2. However, trade openness has differential effects regionally. The wage increases from trade have gone primarily to workers near the US border, increasing the wage differentials (Nicita, 2009).
3. People who migrate can obtain more remunerative and secure employment opportunities than those who do not, and employment opportunities are the main motivation for migration (Morrison et al., 2007; Finan et al., 2005).

We estimate the wage equation using two-stage least squares (2SLS) to account for the endogeneity between wages and migration. In the first stage, we predict the probability that a person migrates as a function of trade openness with the United States, distance to the U.S.-Mexico border, individual/household/origin-region characteristics, and negative crop yields at the state-of-origin level. To capture trade openness, we include the measures of the Gross Value Added (GVA) in location *r* for period *t-1* (GVA_{rt-1}), from the state where the person

[12] See Fallah et al. (2011) for the US metropolitan case.

[13] This hypothesis is in line with the Stolper & Samuelson (1941) theorem, but opposite to what Esquivel and Rodríguez-Lopez (2003) found.

lived five years ago[14], multiplied by the change in tariffs ($\Delta\tau_t$). This interaction term captures the potential growth or contraction in state GVA associated with a reduction in tariffs in the state of origin ($\Delta\tau_t * GVA_{rt-1}$). We also include the measures of GVA for four different sectors s (commerce, manufacturing, services, and mining) in period *t-1* (GVA_{srt-1}), from the state where the person lived five years ago, to observe whether and how different economic sectors influence migration and wages. Finally, the model includes a triple interaction ($distF_r * \Delta\tau_t * GVA_{rt-1}$), which includes distance to the US border, explained below. This triple interaction shows that the potential growth or contraction of economic activity (GVA) due to trade openness (reduction in tariffs) did not affect all states evenly. We expect that states close to the U.S.-Mexico border benefited more from NAFTA than those further away (Baylis et al., 2012)

To predict migration, Sahota (1968) uses the geographical distance from the capital of region k to the capital of region j. We instead use the distance from the capital of each municipality to the closest US border-crossing point ($distF_r$), from the state where the person lived five years ago because economic opportunities provided by NAFTA will be greater closer to the US border due to the accessibility to markets (Hanson, 1996). We control for characteristics of the household, the source and destination municipalities. Following Feng et al. (2010), we use negative changes in corn crop yields (NCY_{rt}) as an instrumental variable to predict people's migration responses. We calculate negative changes in corn yield (negative shocks) as yields below one standard deviation from the mean. These negative changes in corn yields (at the state level) work as a good instrument because they influence migration out-flows (Feng et al., 2010) without being correlated with non-agricultural wages in urban areas[15]. We assume shocks at the state level do not affect food prices because corn is an internationally traded

[14] For the 1990's census, INEGI only asked the state where the person was living 5 years ago, but not the municipality.

[15] Since we are looking at state-level shocks while controlling for year fixed effects, we are capturing changes in regional agricultural productivity controlling for national-level shocks.

commodity[16]. We created a pooled cross-section of individuals in all municipalities over three years (1990, 2000 and 2010). The complete migration function is:

Equation 1

$$P(M_{it} = 1|\ \Delta\tau_t * GVA_{rt-1}; GVA_{srt-1}; distF_r; distF_r * \Delta\tau_t * GVA_{rt-1}; I_{it}; H_{it}; S_{rt-5};\ NCY_{rt})$$

where

M_{it}	= 1 if individual *i* migrated within Mexico within the last five years; 0 otherwise
$\Delta\tau_t$	= % change in Tariffs from *t-1* to *t* for state-of-origin
GVA_{rt-1}	= Total GVA in real 2003 Mexican pesos for state-of-origin
GVA_{srt-1}	= GVA in Manufacturing/Mining/Services/Commerce sector in real 2003 Mexican pesos for state-of-origin
$distF_r$	= Road distance (in thousands of kilometers) from the capital of state-of-origin *r* to the closest US border crossing point
I_{it}	= Vector of individual characteristics (i.e., education, age, indigenous status, # of working hours, and whether the individual owns a business)
H_{it}	= Vector of household characteristics in time *t* (i.e., electricity, # of people, water, and drainage)
S_{rt-5}	= Vector of state-of-origin characteristics, in time *t-1*
NCY_{it}	= Sum of the number of negative changes in corn yields in the last five years in the state-of-origin [17] r, in time *t*

In the second stage, following Nicita (2009), we estimate a wage function based on individual data as a function of trade-related, demographic and household characteristics and the instrumented probability of migration for individual *i*. Like Nicita (2009), we include control variables such as age, years of education, gender of the worker, and whether s/he is a business owner. We ran the regression for separate segments of the wage

[16] Because urban food markets are relatively spatially integrated in Mexico (Reardon et al., 2003), we do not expect these regional shocks to translate to substantial food price increases in urban areas.

[17] Since there are no data for corn yields in 1990 and 2010, we use corn yields for 1991 and 2009, respectively.

distribution to analyze trade openness's effect on wage differentials. We define the segment of low-wage earners by separating those individuals earning less than one standard deviation below the mean wage for each year. In the same way, the high-wage segment is defined as those people earning more than one standard deviation above the mean wage for each year. The wage function is

Equation 2

$$ln(\omega_{it}) = f(\Delta\tau_t * GVA_{rt-1}; GVA_{srt-1}; distF_r; distF_r * \Delta\tau_t * GVA_{rt-1}; I_{it}; H_{it}; S_{rt-5}; \widehat{P(M_{it})})$$

where

ω_{it} = Observed wage of individual i in year t.

$\widehat{M}_{it}$ =instrumented probability to migrate

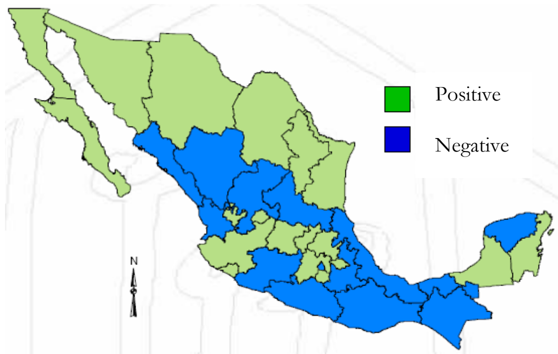
To determine regional wage differentials throughout Mexico, we use individual-level wages, individual and household characteristics, and regional-level data regarding economic growth, education, migration, and other characteristics. Finally, the estimated probability of migrating caused by trade openness and other variables, $\widehat{P(M_{it})}$, is included in the regression.

3. Data

We use the 1990, 2000 and 2010 micro-samples of the Population Census, collected by the National Institute of Statistics and Geography (INEGI), which provides household-level data on the Mexican population. These data create cross-sections across time that span the introduction of NAFTA.

Most migrants come from the Southern states of Guerrero, Oaxaca, Veracruz, Puebla, and Hidalgo (SEDESOL, 2004) to recipient states in the north, such as Sinaloa, Sonora, Baja California, and Baja California Sur (see Figure 1).

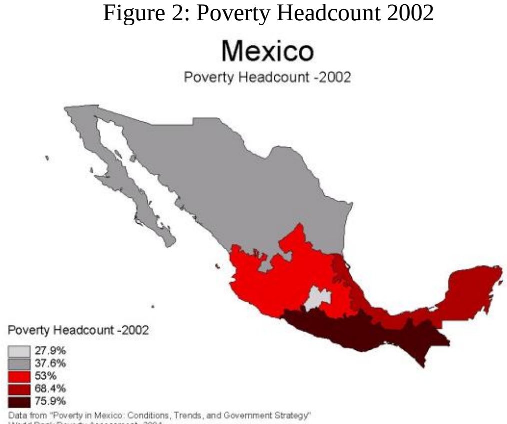
Figure 1: Net Migration by state, 1995-2000



Source: CONAPO, with information from INEGI's 2000 Population Census (Vega, 2005, p. 17).

The regional distribution of poverty is illustrated in Figure 2. Here we observe the poverty headcount, the share of people living on less than USD 2.00 per person per day (Walton & Lopez-Acevedo, 2004). The darker colors denote states with higher shares of people living on less than 2 dollars per day. For example, in dark red, states in the south have 76% of their people living on less than two dollars per person per day, whereas Northern states, in light gray[18], have only 28% of their population in this situation.

Figure 2: Poverty Headcount 2002



[18] The Baja Californians (North and South), Sonora, Chihuahua, Coahuila, Nuevo Leon, Tamaulipas, Sinaloa, Durango and Zacatecas.

The variables used are described below. Summary statistics are provided in Table 1.

Migration (M_{it}): Migration data come from the 1990, 2000 and 2010 Population Censuses from a question that asks in what state (or municipality) the interviewee resided five 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 five years. In the sample, 6.8%, 5.6% & 4.4% of the men reported migrating in 1990, 2000, and 2010, respectively.

GVA sectors: we include the measurements of the GVA for four different sectors (commerce, manufacturing, services, and mining) in period *t-1* for the origin and destination areas. These data were obtained from INEGI's economic censuses in 1989, 1999 and 2009.

% Change in Tariffs ($\Delta\tau$): Trade openness was not the same across all sectors. Some sectors got their tariffs (with the US) reduced faster than others, making these sectors grow faster than others since they could export more goods freely to the US (Aguayo-Tellez et al., 2010). Therefore, to identify NAFTA's effect on migration and wages, this paper uses the different tariffs available for the different sectors. These data were obtained from the United States International Trade Commission (USITC, 2014). We use the data available, with an annual frequency, of the US tariffs on Mexican exports at the 1-digit Standard Industrial Classification (SIC) level for the light/heavy manufactured, mining, and intermediate goods, which we matched to the manufacturing, mining and commerce sectors, respectively. These tariffs are aggregated across different sectors' goods and weighted by their respective national export trade volumes. These tariffs are the same for the entire country.

Transportation cost (distF): we consider that economic growth will be correlated with transportation cost to the US border, which we proxy with the road distance (measured in thousands of kilometers) from the region of origin to the closest US border crossing point. To create the border distance variable, d*istF*, we first obtain the names of the municipality or state capitals (INEGI, 2008). Second, we calculate the road distance from each municipality or state capital to the US border crossing points by entering the destination and origin points on the

"Traza tu Ruta" web page provided by the Secretaría de Comunicaciones y Transportes (2008). Finally, we chose the shortest distance for each municipality or state capital from the different distances provided by each border crossing point. For municipality 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. The average distance to the border was about 900 km (Table 1).

Infrastructure (Infrastructure): Investment in infrastructure provided by the local governments plays an important role in the migration decision and wages since people tend to migrate from places with low infrastructure levels to places with high levels of infrastructure (Arends-Kuenning et al., 2019). But, to minimize the noise caused by including all the infrastructure variables in the regression, we include a principal component index of the three infrastructure variables (the percentage of households with water, electricity, and sewage from the region where the person lived five years ago). This information was obtained from the INEGI's population censuses (see Table 1).

Population density (Pop. Density): Greenwood (1997) mentions that migration is directly related to the population size of the origin. Thus, we control the population size from the region where the person lived five years ago because regions with larger populations will have more outmigration (Rupasingha et al., 2015). We use the population density (population per squared kilometer) that municipalities and states report, including children and elderly, in every population census.

Unemployment. The level of unemployment plays an important role in the migration decision because higher levels of unemployment trigger migration to places with low levels of unemployment (Arends-Kuenning et al., 2019). Therefore, we use the unemployment rate (for men and women) from the region where the person lived five years ago. INEGI´s economic censuses provide this information. The unemployment rate (for men and women) was 53%, 54%, and 51% in 1989, 1999 and 2009.

Negative crop yields in the last five years in the state of origin (NCY_{rt}): Following Feng et al. (2010), we took the corn yield, at the state level, for all the years (1994-2009). Corn is the most important crop grown in Mexico. Of the total area harvested in Mexico in 2018 (16,118,051 hectares), 44% was dedicated to growing corn. The second-largest crop grown is beans, produced on only 10% of the total area harvested[19]. These data were obtained by the *Sistema Estatal y Municipal de Bases de Datos* (SIMBAD) from INEGI (2010). We calculate the negative changes in corn yield (negative shocks) as yields below one standard deviation from the mean for the entire country. After, we sum those states with negative corn yields in the last five years and create a variable with the number of years a state-of-origin experienced negative corn yields (0 to 5). Experiences of negative corn shocks differ, varying from a low of only 0.06 in 2000 to 1.4 in 2010 (Table 1).

Individual Characteristics

Age: For this study, we consider only males of working age (18 to 65 years) because we see a large increase in labor force participation of women from 1990 to 2000, for which we would have difficulty controlling, whereas 78% and 80% of men of working age were participating in the labor force in 1990 and 2000, respectively. Hanson (2007) and Nicita (2009) also work with the working-age male population due to the same problem. Hanson explains that female participation in the labor force is low and varies considerably across time. He further argues that including women creates a sample selection problem since many report zero labor earnings but may work in family businesses or family farms[20]. A quadratic function approximates the age effect. Here we expect that the older the person, the less their probability to migrate but the higher their wage[21]. The average age for the men in the sample ranges from 34 in 1990 to 36.5 in 2010 (Table 1).

[19] FAO Stats-Crops (http://www.fao.org/faostat/en/#data/QC), accessed on July 31st, 2020.
[20] For a deeper analysis of the problems caused by including the working age women population see also Borjas, et. al. (2008)
[21] wage reaches its highest point at age 48 and then falls .But it never falls below the values of people aged less than 30.

Indigenous language: There is a large literature on the internal migration of the indigenous population in Mexico, who are constantly searching for a better standard of living[22]. Therefore, we include the question "do you speak an indigenous language?" from INEGI´s population census to identify the indigenous population, which migrates more than the average population (Asad & Hwang, 2019). The percentages of the sample who report speaking an indigenous language are 4%, 4.8% and 4.4% for 1990, 2000 and 2010, respectively.

Working hours: We include the number of hours worked in the week. These data were obtained from INEGI´s population censuses. Working hours might reduce migration because people with good jobs will be less likely to migrate. However, working hours might indicate a higher average wage, as it might be a proxy for a more remunerative and secure employment opportunity (Morrison et al., 2007). The average working hours were 46, 49.7 and 49.6 for 1990, 2000, and 2010.

Business owner: We include the percentage of the population that owns a business. These data were obtained from INEGI's population censuses. Business ownership may increase the transaction cost of moving because people who own their business will be less likely to migrate and give up their capital and connections to local markets (Greenwood, 1997). However, business ownership may increase the average wage, providing a more stable income. The percentage of business ownership was 3.2%, 3.4% and 3.7% for 1990, 2000 and 2010, respectively.

Education is the stock of productive skills and technical knowledge embodied in labor. Men's educational levels increased in Mexico over time, completing 8.0 years on average in 1990 and 9.8 years on average in 2010 (Table 1). Mexico has a competitive advantage in unskilled labor-intensive goods. Then the effect of the education variables will be $\frac{\partial y}{\partial edu} > 0$. That means those with more education will earn higher wages.

[22] i.e. León-Pérez (20019), Sandoval-Cervantes (2017), and Mora-Rivera & Fierros-González (2020).

4. Results

1st Stage—*Working-Age Male Population*

In the first stage, we regress the probability of migration on drivers associated with trade. Table 2 reports the linear probability model (LPM) regression results from the first stage of the probability of migration. Column 1 shows the regression for the working-age male population, where most variables are significant at the 1% level. To capture the effect of trade openness on the probability of migration, we use the interaction variables of the GVA with the change in tariff ($\Delta\tau_t * GVA_{rt-1}$) and the distance to the US-Mexico border with the change in tariff and the GVA ($distF_r * \Delta\tau_t * GVA_{rt-1}$). Table 3 shows the marginal effect of the change in tariff, considering all the interaction terms. A one percent decrease in tariffs, multiplied by GVA, decreases the probability of migrating by 0.3%. All the variables of the sectoral GVA are significant (Table 2), but their signs are different: While an increase in commerce GVA reduces the probability of migration, an increase in manufacturing, mining, and service GVA significantly increases it.

We find that the instrumental variable, negative changes in corn yield (NCY_{rt}), has a negative and statistically significant effect on migration. The instrumental variable´s F-statistics of the three models (All, Low-wage, High-wage) are always above 10 (5277.49, 34.81, and 280.82, respectively); therefore, we can reject the null hypothesis that the instrument is weak. That means negative changes in corn yields hinder migration out-flows. Negative crop yields may prevent individuals from financing migration because poor people cannot afford the minimum money necessary to migrate (Arends-Kuenning et al., 2019; Kazaqi, 2016).

Years of education (*edu*) are positively & significantly correlated with migration; men with high levels of education are more likely to migrate than men with low levels of education. We find that distance-to-the-border ($distF_r$) plus the interaction of distance, GVA, and change-in-tariff ($distF_r * \Delta\tau_t * GVA_{rt-1}$) have a positive and significant effect on migration; in other words, the further the worker lives from the US-Mexico border, the higher the probability of migration (see Table 3). Overall, the marginal effect of distance is that living a thousand kilometers away from the border increases the probability of migrating by 11% (see Table 3) compared with people living at the border. Effects are positive but smaller for the low-wage workers (1%) and high-wage workers (6%) compared to the entire sample.

Assuming our instrument is valid, we test for endogeneity of migration using the Durbin-Wu-Hausman test and get a χ^2 of 63.22 (p-value=0.00). Thus, we can reject the null hypothesis that migration is exogenous and conclude that it is endogenous.

2nd stage

Overall, the coefficients on the core variables are generally statistically significant and with the predicted signs (Table 4). The first column shows the result of the second stage regressions of the working-age male population. Columns 2 and 3 show the result only for the working-age population for the low and high wages. Table 5 shows the marginal effects of changing tariffs and distance to the border. Next, we explore each of these results.

Whole Working-Age Male Population

To capture the effect of trade openness, we use the interaction variable of GVA with change-in-tariff ($\Delta\tau_t * GVA_{rt-1}$). We find that an increase in GVA, keeping $\Delta\tau_t$ constant increases the wage (see Table 4).

All the variables of the sectoral GVA are significant, but their signs are different. While increasing commerce and mining GVA increases the average wage, higher manufacturing and service GVA will reduce the average wage. The coefficients indicate that the larger the manufacturing and service sectors in that region, the lower the wage. While this result shows that trade openness decreases wages, mainly for traded sectors, it does not show the effect trade openness has on wage differentials. For that reason, we split the data into high- and low-wage individuals in the following section.

We find that years of education are positive and significantly correlated with average wages. As education increases, so do wages.

We also find that distance to the border ($distF_r$) plus the interaction of distance with GVA and change-in-tariff ($distF_r * \Delta\tau_t * GVA_{rt-1}$) have a negative and significant effect on wages (column 1). Overall, the main marginal effect of distance[23] is that working a thousand kilometers away from the border decreases the average wage by 4% (see Table 5). This evidence does not reject our second hypothesis that, following Nicita's (2009) findings, the effect of NAFTA has gone primarily to workers near the US-Mexico border, increasing regional wage differentials.

The estimated probability of migrating caused by trade openness and other variables, $\widehat{P(M_{it})}$, is not significant when considering the overall working-age population, but it is significant when we split the data into high- and low-wage individuals in the following section.

Low Vs. High Wages

When we divide the data between high- and low-wage men, we find that the marginal effect of a decrease in tariffs due to NAFTA is negative for high wages but positive for low wages (see Table 5). While high-wage workers lose 0.08% of their wages for a 1% decrease in tariffs, low-wage workers gain a 0.02% increase. This result supports the first hypothesis that trade openness has decreased wage differentials because the tariff reductions associated with NAFTA appear to have benefited low but not high-wage workers, thereby decreasing the wage differential.

Moving to the third hypothesis, we observe those low-wage workers who migrate, $\widehat{P(M_{it})}$, do well concerning their final wages, whereas high-wage workers who migrate do not improve their wages. Thus, we see two types

[23] That is distance to the border ($distF_i$) plus the interaction of distance with GVA and change-in-tariff ($distF_i * \Delta\tau_t * GVA_{it-1}$).

of migrants, low-skilled workers migrating to occupy better-wage jobs and high-skilled migrant workers who get lower-paid jobs. The coefficients on $P(\widehat{M_{it}})$ represent the Local Average Treatment Effect, the effect for people whose migration behavior was affected by the negative crop yields. High-wage workers who are less likely to migrate due to negative crop shocks find lower-paying jobs when they migrate, and vice versa for low-wage workers. This evidence suggests that migration allows low-wage men to end up in higher-paying jobs than those who do not migrate, on average, over the whole country. This result supports the Morrison et al. (2007) findings that poor households prevent and mitigate risk by migrating to locations with more remunerative and secure employment opportunities.

5. Conclusions

This paper explores the factors that influence Mexico's regional wage differentials and the effect of NAFTA, taking internal migration into account. We use individual-level wages, individual and household characteristics, and regional-level data regarding economic growth, education, migration, and other characteristics, to determine regional wage differentials throughout each Mexican region. Thus, this study sheds light on how trade openness affects individual and wage differentials.

This research provides initial evidence of the mechanism of internal migration to reduce wage differentials, suggesting that trade liberalization has reduced wage differentials, leading to a decrease in regional polarization, partly due to internal migration. Men with lower wages benefited more from NAFTA than those with higher wages, indicating a decrease in the wage differential. The potential effect of NAFTA on migration is also stronger for high-wage men than for low-wage men because low-wage workers cannot afford the minimum amount of money necessary to migrate. Also, large manufacturing and service sectors[24] in the region induced migration but

[24] We are not considering agriculture, since there is no information from agriculture in the economic censuses we are using.

offered a lower wage overall, especially in manufacturing, which increases the wage differential because NAFTA has only benefited workers in commerce and mining but not in manufacturing and service sectors.

The effects of trade liberalization, such as regional Government investment in transportation (to reduce transportation costs), have slightly increased migration toward the US-Mexico border (Arends-Kuenning et al., 2019). This result conforms with earlier evidence by Krugman & Livas-Elizondo (1996), who find that trade leads to more migration because the US market appears to be increasingly important.

While workers close to the US market have a higher wage, workers far away from the United States receive a lower wage[25]. This spread reduces over time as tariffs decrease. However, north-south disparities are only one part of the story. Large manufacturing and service sectors seem to be associated with a smaller wage.

This study's potential policy implications are that investment in commerce and mining sectors can be used to ease regional wage inequality. This evidence suggests that internal migration policies encourage economic growth and reduce wage differentials. Instead of deterring mechanisms of labor adjustment, governments should foster them to reduce regional disparities. Concerns about preventing internal migration should be replaced by arguments that internal migration can reduce regional disparities. This finding should contribute to the current debates about trade and migration in Mexico and the United States. The concerns should focus on improving people's welfare and encouraging regional development rather than stopping internal (and external) migration. However, it is important to mention that those policies should have broad access to ensure it reaches all the households and regions. In this way, it will avoid increasing inequality among households and regions.

[25] This is only valid for the Whole & High-wage working-age population because the coefficient on distance for the low-wage workers is positive (see table 5).

6. References

Aguayo-Téllez, E., Airola, J., & Juhn, C. (2010). *Did trade liberalization help women? The case of Mexico in the 1990s*. Cambridge, MA: NBER working paper series.

Airola, J. (2008). A regional analysis of the impact of trade and foreign direct investment on wages in Mexico, 1984–2000. *Review of Development Economics*, 12(2), 276-290.

Anderson, J. E., & Van Wincoop, E. (2004). Trade costs. *Journal of Economic Literature*, 42, 691–751.

Anzaldo Gómez, C., Hernández Esquivel, J. C., & Rivera Vázquez, A. (2008). Migración interna, distribución territorial de la población y desarrollo sustentable. In C. N. (CONAPO), *La situación demográfica de México 2008* (pp. 129-141). Mexico: CONAPO.

Arends-Kuenning, M., Baylis, K., & Garduño-Rivera, R. (2019). The effect of NAFTA on internal migration in Mexico: a regional economic analysis. *Applied Economics*, 51(10), 1052-1068.

Aroca, P., & Maloney, W. F. (2005). Migration, Trade, and Foreign Direct Investment in Mexico. *World Bank Economic Review*, 449-472.

Asad, A. L., & Hwang, J. (2019). Migration to the United States from indigenous communities in Mexico. *The ANNALS of the American Academy of Political and Social Science*, *684*(1), 120-145.

Baylis, K., Garduño-Rivera, R., & Piras, G. (2012). The distributional effects of NAFTA in Mexico: Evidence from a panel of municipalities. *Regional Science and Urban Economics*, 42(1-2), 286-302.

Borjas, G. J., Grogger, J., & Hanson, G. H. (2008). *Imperfect substitution between immigrants and natives: a reappraisal* (No. w13887). National Bureau of Economic Research.

Brülhart, M. (2011). The spatial effects of trade openness: a survey. Review of World Economics, 147(1), 59-83.

Camarota, S. A. (2006). Immigration from Mexico: Assessing the Impact on the United States. July 12, 2001. *Center for Immigration Studies*. May 27.

Chiquiar, D. (2005). Why Mexico's regional income convergence broke down. *Journal of Development Economics*, 77, 257– 275.

Chiquiar, D. (2008). Globalization, regional wage differentials and the Stolper–Samuelson theorem: Evidence from Mexico. *Journal of International Economics*, 74(1), 70–93.

Costa-i-Font, J., & Rodriguez-Oreggia, E. (2005). Is the Impact of Public Investment Neutral Across the Regional Income Distribution? Evidence from Mexico. *Economic Geography*, 81(3), 305–322.

Cragg, M. I., & Epelbaum, M. (1996). Why has wage dispersion grown in Mexico? Is it the incidence of reforms or the growing demand for skills? *Journal of Development Economics*, 51(1), 99-116.

Esquivel, G., & Rodrıguez-López, J. A. (2003). Technology, trade, and wage inequality in Mexico before and after NAFTA. *Journal of Development Economics*, 72(2), 543-565.

Fallah, B. N., Partridge, M. D., & Olfert, M. R. (2011). New economic geography and US metropolitan wage inequality. *Journal of Economic Geography*, *11*(5), 865-895.

Feenstra, R. C., & Hanson, G. H. (1996). *Globalization, outsourcing, and wage inequality* (No. w5424). National Bureau of Economic Research.

Feliciano, Z. M. (2001). Workers and trade liberalization: the impact of trade reforms in Mexico on wages and employment. *ILR Review*, 55(1), 95-115.

Feng, S., Krueger, A. B., & Oppenheimer, M. (2010). Linkages among climate change, crop yields and Mexico–US cross-border migration. *Proceedings of the National Academy of Sciences*, 107(32), 14257-14262.

Feng, S., & Oppenheimer, M. (2012). Applying statistical models to the climate–migration relationship. *Proceedings of the National Academy of Sciences*, 109(43), E2915-E2915.

Finan, F., Sadoulet, E., & De Janvry, A. (2005). Measuring the poverty reduction potential of land in rural Mexico. *Journal of Development Economics*, 77(1), 27-51.

Gonzalez-Rivas, M. (2007). The effects of trade openness on regional inequality in Mexico. *The Annals of Regional Science*, 41(3), 545-561.

Greenwood, M. J. (1997). International Migration in Developed Countries. In M. R. Rosenzweig, & O. Stark, *Handbook of Population and Family Economics* (Vol. 1b). Amsterdam: Elsevier Science B.V.

Haisken-De New, J., & Zimmermann, K. F. (1999). Wage and mobility effects of trade and migration. *International trade and employment: The European experience*, 139-160.
Hanson, G. H. (1996). Localization Economies, Vertical Organization, and Trade. *The American Economic Review*, 86(5), 1266-1278.
Hanson, G. H. (2003). *What has happened to wages in Mexico since NAFTA?* (No. w9563). National Bureau of Economic Research.
Hanson, G. H. (2007). Globalization, labor income, and poverty in Mexico. In *globalization and poverty* (pp. 417-456). University of Chicago Press.
Hanson, G. H., & Harrison, A. (1995). *Trade, technology, and wage inequality* (No. w5110). National Bureau of Economic Research.
Hanson, G. H., & McIntosh, C. (2010). The great Mexican emigration. *Review of Economics and Statistics*, 92(4), 798-810.
Harrison, A. (2007). Globalization and poverty: An introduction. In *globalization and poverty* (pp. 1-32). University of Chicago Press.
Hirte, G., Lessmann, C., & Seidel, A. (2020). International trade, geographic heterogeneity and interregional inequality. *European Economic Review*, 103427.
Hofer, H., & Huber, P. (2001). Wage and mobility effects of trade and migration on the Austrian labour market. *IHS Economics Series*. Working Paper 97
Hunter, L. M., Murray, S., & Riosmena, F. (2013). Rainfall patterns and US migration from rural Mexico. *International Migration Review*, 47(4), 874-909.
INEGI. (2008, April 18). *Catálogo de Entidades, municipios y localidades*. Accessed May 14, 2008, from Instituto Nacional de Estadística y Geografía: http://mapserver.inegi.gob.mx/mgn2k/?s=geo&c=1223
———. 2010. Sistema Estatal y Municipal de Bases de Datos (SIMBAD): 1994 to 2009. Aguascalientes. Accessed April 4, 2010, from https://sc.inegi.org.mx/cobdem/index.jsp?recargar=false
Kazaqi, P. (2016). Three Essays in the Economics of Migration and Education (Doctoral dissertation, The Ohio State University).
Krugman, P. (1991). Increasing Returns and Economic Geography. *The Journal of Political Economy*, 99(3), 483-499.
Krugman, P., & Venables, A. J. (1995). Globalization and the Inequality of Nations. *The quarterly journal of economics*, *110*(4), 857-880.
Krugman, P., & Livas-Elizondo, R. (1996). Trade policy and the Third World metropolis. *Journal of Development Economics*, 49(1), 137-150.
León-Pérez, G. (2019). Internal migration and the health of Indigenous Mexicans: A longitudinal study. *SSM-population health*, 8, 100407.
López Malo, E. (1960). *Ensayo sobre localización de la industria en México*. Mexico DF: UNAM.
Mishra, P. (2007). Emigration and wages in source countries: Evidence from Mexico. *Journal of Development Economics*, 82, 180-199.
Mora-Rivera, J., & Fierros-González, I. (2020). Determinants of Indigenous Migration: the Case of Guerrero's Mountain Region in Mexico. *Journal of International Migration and Integration*, 21(1), 93-116.
Morrison, A., Raju, D., & Sinha, N. (2007). *Gender Equality, Poverty and Economic Growth*. Gender and Development Group, Poverty Reduction and Economic Management Network. Washington, DC: The World Bank.
Nawrotzki, R. J., Riosmena, F., & Hunter, L. M. (2013). Do rainfall deficits predict US-bound migration from rural Mexico? Evidence from the Mexican census. *Population research and policy review*, 32(1), 129-158.
Nicita, A. (2004). *Who Benefited from Trade Liberalization in Mexico? Measuring the Effects on Household Welfare*. World Bank Policy Research Working Paper, 3265.
Nicita, A. (2009). The price effect of tariff liberalization: Measuring the impact on household welfare. *Journal of Development Economics*, 19-27.

Ortega, F., & Peri, G. (2014). Openness and income: The roles of trade and migration. *Journal of International Economics*, 92(2), 231-251.
Ranjan, P. (2008). Growth and Inequality in Closed and Open Economies: The Role of the Product Cycle. *The BE Journal of Economic Analysis & Policy*, 8(1), Article 36.
Reardon, T., Timmer, C. P., Barrett, C. B., & Berdegue, J. (2003). The rise of supermarkets in Africa, Asia, and Latin America. *American Journal of Agricultural Economics*, 85(5), 1140-1146.
Revenga, A. (1997). Employment and wage effects of trade liberalization: the case of Mexican manufacturing. *Journal of Labor Economics*, 15(S3), S20-S43.
Robertson, R. (2007). Trade and Wages: Two Puzzles from Mexico. *The World Economy*, 1378-1398.
Rostow, W. (1960). *The Stages of Growth: A Non-Communist Manifesto*. Cambridge, UK: Cambridge University Press.
Rupasingha, A., Liu, Y., & Partridge, M. (2015). Rural bound: Determinants of metro to non-metro migration in the United States. *American Journal of Agricultural Economics*, *97*(3), 680-700.
Sahota, G. S. (1968). An Economic Analysis of Internal Migration in Brazil. *The Journal of Political Economy*, 76(2), 218-245.
Sandoval-Cervantes, I. (2017). Navigating the city: internal migration of Oaxacan indigenous women. *Journal of Ethnic and Migration Studies*, 43(5), 849-865.
Secretaría de Comunicaciones y Transportes. (2008). Traza tu Ruta. Retrieved May 23, 2008, from Secretaría de Comunicaciones y Transportes: http://aplicaciones4.sct.gob.mx/sibuac_internet/ControllerUI?action=cmdEscogeRuta
SEDESOL. (2004). Programa de Atención a Jornaleros Agrícolas. Mexico City: Secretaría de Desarrollo Social.
Stolper, W. F., & Samuelson, P. A. (1941). Protection and real wages. *Review of Economic Studies*, *9*(1), 58-73.
Unger, K. (2005). *Regional economic development and Mexican outmigration* (No. w11432). National Bureau of Economic Research.
USITC. (2014). United States International Trade Commission. Interactive Tariff and Trade DataWeb. Washington, DC, USA. Retrieved from https://dataweb.usitc.gov/
Vega, D. (2005). Migración interna: Dimensión, alcances y desafíos. *Dirección General de Estudios Sociodemográficos y Prospectiva. Guanajuato, Gto.: Consejo Nacional de Población (CONAPO)*.
Walton, M., & López-Acevedo, G. (2004). *Poverty in Mexico: An Assessment of Conditions, Trends and Government Strategy*. Washington: World Bank.

ANNEX

Table 1: Summary Statistics. Reported statistics are mean, (standard errors), and [minimum, maximum] values.

Year	**1990**	**2000**	**2010**
Obs (minimum)	1,173,621	1,992,050	2,289,041
% of migration	0.07	0.06	0.04
	(0.25)	(0.23)	(0.21)
	[0 , 1]	[0 , 1]	[0 , 1]
Negative crop yields in the last five years in the state-of-origin (NCY_{rt})	0.71	0.06	1.41
	(1.18)	(0.35)	(1.75)
	[0 , 5]	[0 , 2]	[0 , 5]
Age	34.01	34.84	36.44
	(11.43)	(12.39)	(12.80)
	[18 , 65]	[18 , 65]	[18 , 65]
(Years of) Education	7.91	8.83	9.87
	(4.566)	(4.526)	(4.438)
	[0 , 24]	[0 , 22]	[0 , 24]
Married	0.65	0.67	0.48
	(0.48)	(0.47)	(0.50)
	[0 , 1]	[0 , 1]	[0 , 1]
Indigenous Language	0.040	0.048	0.044
	(0.20)	(0.21)	(0.21)
	[0 , 1]	[0 , 1]	[0 , 1]
Working Hours	46.07	49.68	49.64
	(17.86)	(18.27)	(18.64)
	[0 , 168]	[0 , 168]	[0 , 168]
(Business) Owner	0.032	0.034	0.037
	(0.176)	(0.182)	(0.188)
	[0 , 1]	[0 , 1]	[0 , 1]
$\text{Infrastructure}_{rt-5}$: *Principle Component Variable of Infrastructure*	-0.492	1.135	1.095
	(1.76)	(1.14)	(0.92)
	[-4.26, 1.92]	[-1.31 , 2.68]	[-1.30 , 2.50]
Unemployment rate $_{rt-1}$	0.528	0.537	0.513
	(0.024)	(0.033)	(0.036)
	[0.46 , 0.605]	[0.46 , 0.635]	[0.43 , 0.63]
Origin $\text{Pop.Density}_{rt-5}$: Population per Km^2	1045.83	836.08	741.56
	(2084.77)	(1825.66)	(1688.29)
	[3.73, 5684.43]	[5.25, 5654.85]	[6.85 , 5644.95]
$GVA_{commerce\ t-1}$ ***(in millions of real Mexican pesos)***	22.91	30.16	27.56
	(2.6.51)	(36.63)	(27.99)
	[0.89 , 79.73]	[1.33 , 123.20]	[2.52 , 116.90]
$GVA_{manufac\ t-1}$ ***(in millions of real Mexican pesos)***	43.80	53.28	43.73
	(38.92)	(52.75)	(36.90)
	[1.22 , 108.95]	[0.66 , 144.37]	[0.77 , 123.86]
$GVA_{minning\ t-1}$ ***(in millions of real Mexican pesos)***	23.99	3.17	5.98
	(57.61)	(11.66)	(22.54)
	[0 , 234.80]	[0.01 , 80.31]	[-1.25 , 248.02]
$GVA_{service\ t-1}$ ***(in millions of real Mexican pesos)***	12.48	26.27	24.86
	(18.93)	(43.91)	(56.60)
	[0.19 , 54.28]	[0.62 , 144.32]	[1.09 , 256.85]
Border Distance ($distF_r$) in thousands of Kms.	0.89	0.90	0.90
	(0.40)	(0.41)	(0.42)
	[0.001, 2.004]	[0.001, 2.004]	[0.001, 2.004]

Table 2: 1st stage—2SLS across time: Linear Probability Model (LPM) – P(Migrate). Significance levels: *** 0.001, ** 0.01, * 0.05

	(1) *All*	(2) *Low Wage*	(3) *High Wage*
$\Delta\tau_t * GVA_{rt-1}$	-0.0000000000225	0.000000000253**	-0.000000000223*
	(-1.83)	(3.13)	(-2.49)
$GVA_{commerce\ t-1}$	-0.00000000144***	0.0000000000558	-0.00000000267***
	(-13.85)	(0.08)	(-5.13)
$GVA_{manufac\ t-1}$	0.00000000111***	0.00000000111**	0.00000000162***
	(20.99)	(3.00)	(7.07)
$GVA_{minning\ t-1}$	0.0000000000502***	0.0000000000771	0.000000000125
	(6.16)	(1.42)	(1.90)
$GVA_{service\ t-1}$	0.000000000369***	0.000000000247*	0.000000000304**
	(22.20)	(2.11)	(3.28)
Education	0.00195***	0.00150***	0.00429***
	(47.88)	(5.92)	(22.23)
$distF_r$	0.111***	-0.0440	0.0579**
	(18.93)	(-1.02)	(2.74)
$distF_r * \Delta\tau_t * GVA_{rt-1}$	0.0000000000322*	-0.000000000308***	-0.0000000000814
	(2.46)	(-3.47)	(-1.09)
NCY_{rt}	-0.000830**	0.00313	0.00218
	(-2.66)	(1.81)	(1.34)
Age	-0.000741***	0.00156***	-0.000422
	(-8.02)	(3.61)	(-0.66)
Age^2	-0.00000153	-0.0000249***	-0.0000179*
	(-1.38)	(-4.76)	(-2.45)
Married	-0.00109*	0.00184	-0.00372
	(-2.57)	(0.72)	(-1.31)
Indigenous Lang.	0.0168***	0.00503	-0.000522
	(18.69)	(1.46)	(-0.09)
$\text{Infrastructure}_{rt-5}$	-0.0675***	-0.00632	-0.0240***
	(-61.91)	(-0.89)	(-4.40)
$\text{Origin Pop.Density}_{rt-5}$	0.0000915***	0.0000678***	0.0000607***
	(54.16)	(6.19)	(8.67)
Working Hours	0.000317***	0.0000278	0.000259***
	(30.79)	(0.70)	(4.66)
Owner	-0.000780	0.0145	-0.0204***
	(-0.82)	(1.57)	(-8.58)
$\text{Unemployment rate}_{rt-1}$	2.488***	0.563*	1.788***
	(61.77)	(2.29)	(9.57)
x2000	0.0925***	-0.0281	0.0486***
	(38.53)	(-1.83)	(4.16)
x2010	0.175***	-0.0165	0.0636***
	(49.30)	(-0.70)	(3.49)
Constant	-1.311***	-0.248	-0.879***
	(-64.42)	(-1.94)	(-8.91)
N	3'801,663	107,401	148,784
R-sq	0.225	0.173	0.195
Adjusted R-sq	0.225	0.172	0.195
Instruments' F-statistics	5277.49	34.81	280.82

Table 3 Marginal Effect of Change in Tariffs and Distance for P(Migrate).

Marginal Effect	Migration		
	All	Low	High
$\Delta\tau_t$	0.3%	-0.5%	-2.2%
$distF_r$	11%	1%	6%

Table 4: 2nd stage 2SLS across time: Ln(Wage). Significance levels: *** 0.001, ** 0.01, * 0.05

	(1) *All*	(2) *Low Wage*	(3) *High Wage*
$\Delta\tau_t * GVA_{rt-1}$	0.00000000119***	-0.00000000256***	0.000000000785***
	(18.19)	(-17.02)	(6.17)
$GVA_{commerce\ t-1}$	0.00000000385***	0.00000000305***	0.00000000804***
	(11.90)	(5.31)	(11.92)
$GVA_{manufac\ t-1}$	-0.00000000105***	-0.0000000021***	-0.000000000746**
	(-8.34)	(-9.41)	(-2.71)
$GVA_{minning\ t-1}$	0.00000000026***	-0.000000000208**	0.00000000059***
	(7.98)	(-2.58)	(5.06)
$GVA_{service\ t-1}$	-0.000000000274***	-0.000000000776***	0.00000000138***
	(-3.60)	(-5.50)	(8.93)
Education	0.0695***	-0.00226***	-0.0333***
	(246.92)	(-4.56)	(-49.69)
$distF_r$	-0.0583***	0.143***	-0.0374*
	(-5.97)	(6.48)	(-2.12)
$distF_r * \Delta\tau_t * GVA_{rt-1}$	-0.000000000914***	0.0000000021***	0.0000000000583
	(-15.23)	(13.88)	(0.52)
$P(\widehat{M_{it}})$	0.0150	0.0989**	-0.0776**
	(1.18)	(2.82)	(-2.69)
Age	0.0728***	0.0115***	-0.0390***
	(103.29)	(12.79)	(-20.91)
Age^2	-0.000820***	-0.000168***	0.000444***
	(-88.15)	(-14.97)	(20.22)
Married	0.203***	0.101***	-0.131***
	(78.71)	(20.71)	(-18.78)
Indigenous Lang.	-0.145***	-0.0212***	0.0120
	(-27.39)	(-4.34)	(0.59)
$\text{Infrastructure}_{rt-5}$	-0.0195***	0.0748***	-0.105***
	(-7.84)	(17.08)	(-16.90)
$\text{Pop.Density}_{rt-5}$	-0.0000336***	-0.0000170	-0.000122***
	(-8.57)	(-1.87)	(-14.41)
Working Hours	0.00739***	0.000283***	-0.00237***
	(97.40)	(4.06)	(-16.31)
Owner	0.539***	-0.0478***	-0.0596***
	(75.06)	(-4.02)	(-8.72)
Unemployment rate	-0.735***	2.782***	-1.458***
	(-7.93)	(18.15)	(-6.79)
x2000	-0.512***	-0.833***	-1.534***
	(-94.71)	(-75.60)	(-104.20)
x2010	0.255***	-0.754***	-1.119***
	(31.64)	(-57.02)	(-60.94)
Constant	5.723***	-1.099***	14.12***
	(113.01)	(-12.87)	(116.26)
N	3’801,663	107,401	148,784
R-sq	0.148	0.369	0.443
adj. R-sq	0.148	0.369	0.443

Table 5 Marginal Effect of Change in Tariffs and Distance for Ln(Wage).

Marginal Effect	Wage		
	All	Low	High
$\Delta\tau_t$	3%	-2%	8%
$distF_r$	-4%	11%	-4%