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Trade, Migration, and the Place Premium: Mexico and the United States

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Abstract: Large wage differences between countries ("place premiums") are well documented. Neoclassical trade theory suggests that factor price convergence should follow increased commercial integration. Rising commercial integration, foreign direct investment, and migration followed the 1994 North American Free Trade Agreement between the United States and Mexico. This paper evaluates the degree of wage convergence between Mexico and the United States between 1988 and 2011. We match survey and census data from Mexico and the US to estimate the change in wage differentials for observationally identical workers over time. We find no evidence of long-run wage convergence among cohorts characterized by low migration propensities although this was, in part, due to large macroeconomic shocks. On the other hand, we do find some evidence of convergence for workers with high migration propensities. Finally, we find evidence of convergence in the border of Mexico vis-à-vis its interior in the 1990s but this was reversed in the 2000s. We conclude that the place premium is largely stable, even following large reductions to trade and investment barriers and high migration.

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Recent papers have renewed interest in understanding equilibrium differences in earnings levels across countries. Clemens et al. (2008) use individual-level data from 43 countries to estimate the "place premium" for observationally identical workers. Kennan (2012) argues that if these differences are due to productivity then the welfare losses from migration restrictions are very large. On the other hand, neoclassical theory suggests that restrictions on trade (and possibly investment) might also contribute to the place premium. Indeed, part of the motivation developing countries have in pursuing trade agreements is the promise that increased trade will help close the wage gap between developing and developed countries (factor price equalization).

The goal of this paper is to evaluate the stability of the place premium over time in an environment of reduced trade restrictions, increased trade, rising foreign investment, and significant migration. The North American Free Trade Agreement (NAFTA) significantly increased commercial integration between the United States, Canada, and Mexico. Between 1994 and 2011, trade in goods between the two countries quadrupled in value, increasing from $108.39 billion to $461.24 billion (US Census Bureau). The value of US goods exported to Mexico increased from $50.84 to $198.39 billion, while the value of Mexican goods exported to the United States increased from $49.49 billion to $262.86 billion. In 2011, total exports to Mexico accounted for 13.4 percent of overall US exports and total imports from Mexico accounted for 11.9 percent of overall US imports (Office of the United States Trade Representative). In 2012, the total value of trade between Mexico and the US closely approached half a trillion dollars. By 2013, total trade between all three NAFTA countries reached 1 trillion dollars.

GDP per capita has also increased in both countries. In constant 2005 US dollars, US GDP per capita increased from $32,015 to $43,063 between 1992 and 2012. While Mexico has had some macroeconomic setbacks, such as the December 1994 peso crisis, recovery has generally been rapid. In constant 2005 US dollars, Mexican GDP per capita increased from $6,628 to $8,215 over the same time period.[1]

Rather than converge, however, Mexican GDP per capita and US GDP per capita grew apart. The ratio of Mexican to US GDP per capita fell from 20.7% of US GDP per capita in 1992 to 19.2% in 2011.

The persistent and seemingly growing gap between GDP per capita is at odds with neoclassical trade theory, migration theory, and early applied general equilibrium predictions of the effects of NAFTA. The neoclassical Heckscher-Ohlin-Samuelson (HOS) framework, one of the canonical trade models, predicts that trade liberalization would lead to convergence in the prices of traded goods, which in turn would induce factor price convergence. In addition to the significant increase in trade noted above, Robertson, Kumar, and Dutkowsky (2009) find strong support for convergence in goods-level prices between Mexico and the United States, making the lack of convergence in income inconsistent with the prediction of trade models.[2]

The lack of convergence is also at odds with labor-based migration models. At the most basic level, an increase in labor supply from migration should reduce wages if the aggregate labor demand curve is downward sloping. Although debated, Borjas (2003) provides empirical evidence for the downward-sloping labor demand curve.[3] Emerging evidence also suggests that

[1] World Bank Development Indicators. See http://data.worldbank.org/data-catalog/world-development-indicators.

[2] The lack of evidence of factor price equalization generally has prompted many to question the validity of neoclassical HOS-type models. Schott (2003) finds that we live in a "multi-cone" world that precludes factor price equalization. Davis and Mishra (2007) suggest that ignoring important variation between the mix of factors employed in the production of domestic and imported goods obfuscates the possible effect that free trade may depress the wages of workers in relatively labor-intensive domestic industries. Goldberg and Pavcnik (2007) discuss evidence of rising inequality in poorer countries in the wake of many trade liberalizations in the eighties and nineties, which is very much at odds with a standard HOS story of how globalization should unfold. The authors provide numerous reasons why the predictions of the standard HOS theory may not hold in the data such as technology, the pattern of tariff reductions, and within-industry shifts.

[3] For example, Card (1990, 2001) argues that the evidence for migration's effect on wages is weak.

emigration increases wages of workers who stay behind. Mishra (2007) provides evidence that Mexican emigration bids up Mexican wages, and Elsner (2013a) finds similar results for Lithuania. Elsner (2013b) finds that emigration's effects are not uniform throughout the wage distribution. Because most Mexican migrants come from the middle to lower end of the age, education, and wage distribution (Chiquiar and Hanson 2005), convergence should be the most prominent for these demographic groups. Such movements would tend to raise Mexican wages and depress US wages, thereby reinforcing the effects of free trade on wage convergence.

Early applied general equilibrium models generated predictions of NAFTA's effects that implied significant income convergence. Brown (1992) in particular surveys several of the pre-NAFTA applied general equilibrium models and demonstrates that the models that included both Mexican and US income gains all predicted that Mexican gains would be at least double (if not an order of magnitude greater than) the US gains.

One possible explanation is Mexico's demographic shift. Mexico's labor force is younger and the entrance of youth at the lower end of the wage distribution would lower average wages and mask convergence. Therefore, although the above studies suggest that there should be some degree of wage convergence between Mexico and the United States, there has yet to be a study that investigates the place premium between these countries holding demographic characteristics constant. The closest papers to ours focus on within-country convergence or short-run convergence. Within-country changes may help explain changes in international comparisons, and early studies of the Mexican labor market did detect evidence of regional wage convergence within countries (Hanson 1996, 1997, and Chiquiar 2001). Robertson (2000) finds a strong, positive correlation between short-run wage growth in the United States and short-run wage growth for Mexican workers who reside on the border with the United States. Hanson

(2003) also finds a similar result. Robertson (2005), however, finds no evidence that NAFTA increased the estimated degree of labor market integration between the United States and Mexico as measured by the transmission of short-run shocks. Our paper differs from these earlier papers in that we evaluate the stability of the place premium – the long-run wage differential across nations – over a long time horizon.

In this paper, we evaluate the stability of the place premium using two complementary methodologies and four data sources. The first approach matches quarterly data from the Current Population Survey (CPS) in the United States and the Encuesta Nacional de Ocupacion y Empleo (ENOE) in Mexico.[4] The second approach employs census data from Mexico and the United States for three different time periods. Clemens et al. (2008) use very similar data and a similar approach. The main difference is that they compare a single cross section for multiple countries; we compare a single country pair and multiple time periods.

Following Robertson (2000), Borjas (2003), and Mishra (2007), we first divide Mexican and US working-age people into 45 age-education cohorts. Comparing exclusively Mexican and US workers in the same education-age cohort effectively controls for variation in returns to skill and allows us to use quarterly data to identify time-series patterns. The disadvantage is that it focuses only on workers residing in urban areas in Mexico.

The second approach overcomes this disadvantage by using data that include rural workers, but it has the disadvantage that the data are observed only once every ten years. These data have the added advantages that, in a given year, the sample sizes are larger, they have more complete information about hours worked, and they capture long-run differences. First, we compare mean wage differentials by education and age cohort and look at how these have

[4] In addition to the ENOE, we use its predecessors, the Encuesta Nacional de Empleo (ENE) and the Encuesta Nacional de Empleo Urbano (ENEU).

evolved over time. Next, we look deeper into the data and investigate how the relative wage distributions have evolved over time by comparing changes in a given percentile for a given age and education level.

The results demonstrate that there has been very little, if any, convergence between US and Mexican wages over time for everyone but the least educated. While there is evidence of some convergence in the high-migration cohorts (*i.e.* younger people with less than twelve years of education), this seems to be primarily due to falling US wages at the bottom of the US income distribution, as opposed to rising Mexican wages. The overall divergence from 1990-2000, however, has much to do with the effect of the peso crisis of 1994. We do see some convergence in the high frequency data post-1994 but this abates in 2001. A more detailed look at the census data reveals that there was convergence in the border region of Mexico relative to the interior in the 1990's but divergence in the 2000's. Since foreign direct investment in Mexico is mainly concentrated in the border, NAFTA may indeed have led to some initial wage convergence that was reversed during the 2000's.

Importantly, while we do provide some suggestive evidence that both migration and trade may arbitrage the US-Mexico wage differential, their effects are very modest when compared to the overall differential. Particularly, even if we adopt methods from the literature that are the most likely to deliver the largest effects of migration on wages, an implausibly high level of migration would be needed to achieve wage equalization. In addition, when we compare the evolution of Mexican wages in its border and its interior, the wage gains in the border during the 90's are relatively modest when compared to the overall differential. We conclude that the place premium is largely stable, even following large reductions to trade and investment barriers and high migration.

We begin by discussing the four data sources that we use in Section I. We then present some descriptive empirical results in Section II and III in which we elucidate some of the patterns in the evolution of Mexico-US wage differentials over the past 25 years. We then investigate some of the mechanisms that may be behind what convergence we do see in the previous sections in Section IV. Finally, we conclude in Section V.

I. Data

We use four datasets that represent two separate types of data. The first type is quarterly urban household survey data that cover the 1994-2011 period. US household survey data are a representative sample of both urban and rural US households, but the rural population is much smaller in the US than in Mexico, leading us to assume that the covered populations are comparable. Second, we use census data that have two advantages over the survey data. The first is that the Mexican Census data contain much more accurate information about rural households. The second is that the sample sizes are much larger so we can obtain a more detailed understanding of what is happening to the relative wage distributions. That said, they have the disadvantage of only being available in ten-year intervals.

Household Survey Data

We extract all data on Mexican households from the Encuesta Nacional de Empleo Urbanao (ENEU) and the Encuesta Nacional de Empleo (ENE) over the period 1988-2004 and from the Encuesta Nacional de Ocupacion y Empleo (ENOE) over the period 2005-2011. US household data are from the Merged Outgoing Rotation Groups (MORG) data of the Current Population Surveys (CPS) over the entire 1988-2011 period. We exclude working-age adults who have zero or unreported earnings. The sample is further restricted to adult males between 19 and 63 years of age. Focusing on male workers allows us to ignore the issue of self-selection on the participation of women in the labor force, as well as the effect of changes to self-selection patterns over time and between the United States and Mexico.

The Mexican data are reported as monthly earnings until 2005. The US data report weekly earnings. We multiplied reported US weekly wages by 4.33 to transform them into monthly wages.

Following Chiquiar and Hanson (2005), all earnings measures are converted into 1990 US dollar units. Mexican earnings are converted into dollars by using simple quarterly averages of the daily official exchange rates published by the Mexican Central Bank (Banco de Mexico 2013). We then deflated the wages to 1990 dollars using the quarterly average of the US Consumer Price Index (CPI) (Bureau of Labor Statistics). Also as in Chiquiar and Hanson (2005), we only use Mexican wages that are between $0.05 and $20.00 and US wages that are between $1.00 and $100.00.

ENEU/ENE/ENOE surveys have been extended to significantly more rural areas over the last two decades. In order to reduce the bias generated by greater participation of the rural Mexican population, we restrict the sample to workers from major metropolitan areas that have consistently been included: Mexico City, the State of Mexico, San Luis Potosí, Leon, Guadalajara, Chihuahua, Monterrey, Tampico, Torreon, Durango, Puebla, Tlaxcala, Veracruz, Merida, Orizaba, Guanajuato, Tijuana, Ciudad Juarez, Matamoros, and Nuevo Laredo. No geographical restrictions have been imposed on MORG data.

Descriptive statistics for the raw survey data are displayed in Table 1. Each column gives an average of quarterly observations collected over a four- or five-year period. The average US monthly wage ranges from $1466 to $1515, and it has remained roughly constant from 1988 to 2011. The average Mexican monthly wage ranges from $226 to $310. It has declined fairly steadily over time. The average age of the US workforce has increased steadily between 1988 and 2011, from 37 to 40 years. The average age of the Mexican workforce has also risen steadily, from 35 years in 1988-1994 to 37 in 2008-2011.

The US workforce is significantly more educated than the Mexican workforce, with about 90% of all workers in each time period having at least completed high school education. By contrast, the number of Mexican workers who completed high school education or attended college ranges from 30% in 1988-1994 to 32.3% in 2008-2011. Mexico has improved the education of its workforce. The steady rise in the number of high school graduates and college attendees has been accompanied by a steady decline in the number of workers with 0-5 years of education, which dropped from 18% in 1988-1994 to 12% in 2008-2011. The largest gains emerge in the 9-11 category because Mexico raised the compulsory education requirement from 6 to 9 years in 1992.[5]

Ideally, survey data would collect information from surveyed individuals at regular intervals, and neatly organize it as panel data. In the absence of such data, it is possible to use a time series of cross-sectional surveys (Deaton, 1985). We create 45 age-education cohorts when using the survey data. In the absence of significant changes to the composition of the cohorts, the average behavior of each cohort over time should approximate the estimates obtained from genuine panel data (Deaton, 1997). Since our focus is not on wage growth of individuals over time, we do not "age" the cohort cells.

Working-age adults in each sample are subdivided into five education categories and nine age categories. The first age group includes workers aged 19-23 years old; the second includes

[5] See http://wenr.wes.org/2013/05/wenr-may-2013-an-overview-of-education-in-mexico.

workers aged 24-28, the third those aged 29-33, and so forth. The first education group includes adults with 0-5 years of education; the second includes adults with 6-8 years of education; the next comprise those with 9-11, 12-15 and finally 16 or more years of education. These categories are roughly comparable to those employed by Robertson (2000), Borjas (2003), and Mishra (2007). Unlike Borjas (2003), we are able to identify greater variation in the group of working adults who have not completed high school. We are unable to distinguish between high school graduates and workers with some college experience; we classify both groups as having 12-15 years of schooling. We exclude from the sample workers with zero or unreported amounts of education. Once workers are assigned to the 45 categories, we take the average wage of each cell with and without the sample (population) weights. Sample (population) weights are not available for Mexican household surveys during the 1994-2003 periods.

Different demographic groups have different propensities to migrate, and since migration may drive equalization, Figure 1 shows the percentage of Mexican-born workers in the US by age and education for each of the 45 cohorts. Most Mexican-born workers in the US are younger. In addition, Mexican-born workers in the United States comprise a progressively declining share of the workforce among older groups. We also see that the bulk of Mexicans residing in the United States tend to be less educated.

Figure 2a plots the log of the real average monthly earnings of Mexican workers over time by education-age cohorts[6]. Several significant macroeconomic events are immediately apparent. The December 1994 peso crisis led to the rapid devaluation of the peso against the US dollar, as nominal exchange rates doubled from 4 pesos/US dollar to 8 pesos/US dollar in a few months. The drastic change in exchange rates and the subsequent erosion of purchasing power

[6] The wages of 59-63 year-old male workers with 12-15 years of education are not shown. Since this particular demographic cohort of Mexican workers is very small, it displays a wildly erratic wage pattern that obfuscates the general picture; therefore, we chose to omit it.

represented a significant shock to Mexican wages. The peso/US dollar exchange rate has been floating ever since. At least some of the increase in Mexican real wages between 1994 and 2001 may be attributed to a rebound in purchasing power experienced by Mexican workers as the effects of the crisis waned over time. The increase in wages reverses around 2001, which coincides with both the US recession (March 2001) and China entering the WTO (December 11, 2001). Recovery resumes around 2005 and continues until the Financial Crisis and Great Trade Collapse in October 2008.

Figure 2b plots the log of the real average monthly earnings of US workers over time by age-education cohorts. Compared to Mexican wages, US wages are relatively stable. Real wages have experienced no significant expansion or contraction over the sample period, but may appear to decline slightly after 2001.

Figure 3 plots the difference between real US earnings and real Mexican earnings over time. Once again, the differential experienced by workers aged 59-63 with 12-15 years of education has been omitted for the sake of overall clarity. Figure 3 shows less dispersion across cohorts than the individual country graphs, which suggests that the relative earnings structure in the two countries is relatively stable over time. The differentials of different cohorts largely move together and changes in the differential coincide with significant macroeconomic events. To see these events more clearly, Figure 4a graphs the mean wage differential and identifies some of the significant events affecting Mexico since NAFTA. [7] The peso crisis is immediately apparent, as is the relatively rapid recovery. The reduction in the differential accelerates until 2001, when China enters the WTO. Dussel, Peters and Gallagher (2013) argue that China had a significantly negative influence on NAFTA trade. The differential grows until the middle of the 2000s and then falls until the financial crisis.

[7] The mean is calculated taking the unweighted arithmetic average across cohorts.

To formally identify structural breaks in the average differential, we apply tests for unknown breaks described by Vogelsang and Perron (1998). Figure 4a plots the relevant additive outlier test statistic. The local extremes of the test statistic indicates a trend break. The peso crisis is the most significant break, but a smaller local maximum appears around 2000. The 2000 break roughly corresponds to the 2001 US recession and China's entrance into the World Trade Organization. Therefore, in the empirical work that follows, we include structural breaks in both 1994 and 2001.

Figure 4b graphs the standard deviation of the earnings differentials across cohorts. The standard deviation of wage differential across cohorts exhibit breaks at the times indicated by the Vogelsang and Perron test statistic. The standard deviation rises steadily until the end of the sample, again supporting the use of multiple structural breaks. Figure 4b also motivates a more detailed look at changes in other measures of the wage distribution, which we carry out using census data.

While the differentials of different cohorts generally move together, there are some differences across cohorts. Figures 5a, 5b, and 5c present the trends for three different cohorts. Figure 5a shows that the differential for Cohort 4 (workers with 0-6 years of education and 34-38 years old) exhibits significant peso crisis effects. Around 2001, however, the recovery seems to stop and the differential grows through the 2000s. The pattern for Cohort 38 (workers with 12-16 years of education and 54-58 years old), shown in Figure 5b, reveals a smaller peso crisis effect, but a rising wage gap during the 2000s. On the other hand, Figure 5c shows that the wage gap for the "high migration" cohort (19 to 23 year-old workers with 6-9 years of education) either remains flat or falls slightly throughout the 2000s. These differences across cohorts are consistent with the idea that migration helps to integrate markets by closing the wage differential across countries because migration propensities across these groups are different.

Census Data

We employ three years of census data from Mexico and the US: 1990, 2000 and 2010. We use a 10 percent sample from the Mexican Census. For the years 1990 and 2000, we use a 5 percent sample from the US Census. For 2010, we employ the American Community Survey, which is a 1 percent sample of the population.

The sample selection criteria that we use for the census data mimic that of the survey data. Specifically, we include men between ages 19 and 63 who report positive income in the previous year. In Mexico, hourly wages are constructed by taking monthly earnings and then dividing by reported hours worked during a typical week times 4.33. In the United States, hourly wages were computed by taking reported yearly earnings and then dividing by reported usual hours worked per year.[8] As with the survey data, all wages are in 1990 US dollars. Mexican wages were, once again, converted to 1990 dollars by, first, converting wages in pesos to US Dollars using the exchange rate for that year and then deflating the wages to 1990 dollars using the US CPI.[9]

We employ two samples from the Mexican Census. The first is a sample of all workers meeting the criteria defined above, which we simply call the whole sample. The second is a sample of primarily urban dwellers that includes the metropolitan areas employed in the survey data. We call this the urban sample.

[8] Hours worked per year were obtained by taking usual hours worked per week times the number of weeks that the respondent reported to have worked during the year.

[9] We also converted Mexican wages to 1990 US dollars by first deflating the wages to 1990 pesos using the Mexican CPI and then converting them to US dollars using the 1990 exchange rate. Overall, this alternative method did not make too much of a difference.

Table 2 displays descriptive statistics from the census data. We see that the average US wage was between $14.21 and $15.07 for the three census years. In Mexico for the whole sample, average wages were between $1.43 and $1.59 and increased steadily over the 20 year period. The mean wages were slightly higher in the urban sample when we only employed urban dwellers. The average age in the US sample ranged between 36.83 and 39.61 and increased over time. The average age in Mexico also increased over the 20 year period but ranged from 34.79 and 37.10 in the whole sample and 34.59 and 37.46 in the urban sample. Finally, as in the survey data, the statistics on years of schooling in Mexico indicate massive gains in human capital over this period. In the whole sample, the percentage of Mexicans with 0-4 years of schooling in 1990 was 29.56 percent but was only 11.89 percent in 2010. Similarly, the percentage of Mexicans with 9-12 years of schooling was 27.41 percent in 1990 but was 45.53 percent in 2010.[10] The numbers are similar in the other sample.

Figure 6 shows the percentages of Mexicans residing in the United States by the 45 age and education categories employed with the survey data. Note that for reasons discussed above the education groups in the census data differ slightly from the survey data. The patterns in this figure are broadly consistent with Figure 1. One key difference, however, is that we see substantially more people in the second education category that we label as "ed1." The reason for this is that many Mexicans leave school between grades 5 and 6. The category "ed1" includes grade 5 in Figure 1 but excludes it in Figure 6.

[10] Note that the education categories in the census data are slightly different than what we use in the survey data due to the way that years of schooling were categorized in the US Census years 1990 and 2000.

II. Descriptive Results: Household Survey Data

Our main variable of interest is the long-run US-Mexican wage differential across age-education cohorts. The trend in the long-run differentials may be affected by exogenous shocks (e.g. trade liberalization and exchange rate shocks) and differences in migration costs across cohorts. To describe the changes in the long-run differential, we use a simple trend analysis that accounts for both the peso crisis and the 2001 trend break. Since we expect changes in wage differentials to differ between the migrants and non-migrant groups, we also include a dummy variable for the high migration cohort (HMC). The following regression captures all these observations:

$$w_{jt}^{d} = \beta_0 + \beta_1 time + \beta_3 HMC_j + \beta_4\left(time * HMC_j\right) + \beta_5 d94_t$$
$$+\beta_6(time * d94_t) + \beta_7 d01_t + \beta_8(time * d01_t) + \lambda_j + \vartheta_{jt}$$

where $\mathrm{w}_{\mathrm{jt}}^{\mathrm{d}}$ is equal to the difference between the natural log of the US earnings and natural log of the Mexican earnings in education-age group j at time t. Negative values indicate wage convergence. The variable *time* is a time trend;HMC_j is a dummy variable that indicates whether *j* is the high migration cohort (workers of age 19-23 with 6 to 9 years of schooling); d_{94} is a dummy variable indicating whether the year is 1994 or later; d_{01} is a dummy variable indicating whether the year is 2001 or later and λ_j are group-specific fixed effects for an education-age group *j*.

The trend analysis based on the equation above (and variations of it) are reported in Table 3. The following results do not use weights, but in separately available results, we find that the same qualitative results emerge when we use US sample weights, Mexican sample weights, US cell sizes, and Mexican cell sizes as weights. All equations include fixed cohort effects and all estimated coefficients are statistically significant at the1% level. The first column just includes the time trend. The positive sign indicates overall divergence, but the coefficient is quite small. Figure 3, however, shows the importance of controlling for macroeconomic events. Column 2, therefore, includes controls for the 1988-1994 and the 1994-2001 periods both in levels and interacted with the time trend. The overall trend (which represents 2001-2011) more than triples, representing overall divergence in wage differentials. Note that the controls for the two periods show the response to shocks with high intercept terms and large and negative convergence estimates.

We are also interested in the possibility that the rates of convergence differ across cohort characteristics. In particular, we are interested in whether or not the high-migration cohort exhibits different trends than the rest of the sample. Columns (3) and (4) show that the high migration cohort exhibits more convergence than the rest of the sample both with and without controls for the different macroeconomic shocks. Overall, therefore, these results are consistent with the hypothesis that migration helps close the wage gap between the United States and Mexico but overall, the gap has not been getting smaller.[11]

III. Descriptive Results: Census Data

Mean Wage Differentials

We now turn to a descriptive analysis of the census data. We begin by plotting w_{ikt}^{d} which is the mean wage differential for education cohort *i* and age *k* at time *t* in Figure 7 to provide a visual

[11] To explore the robustness from using potentially poor measures of hours worked, we consider both monthly and hourly earnings. US hourly wages have been computed by dividing weekly earnings by the number of hours usually worked each week. Mexican hourly wages have been computed by dividing monthly earnings by the number of hours worked each week times 4.33 until 2005, when the hourly wages of Mexican workers are directly available from ENOE data. The results for hourly earnings in the survey data are broadly consistent with the earnings results. To conserve space, we do not report these findings but they are available upon request.

understanding of the wage differentials in the census data. We do so using both samples from the Mexican Census described in Section II. We see that for people with less education (*i.e.* 0 to 8 years of education) there was little change in the differential between 1990 and 2000 but there was a substantial decline between 2000 and 2010. This is the case in both Mexican samples. Also, noteworthy is that the mean differentials are smaller when we use the urban sample which is a consequence of urban areas being richer. Once we move on to people with slightly more years of schooling, we see a more attenuated decline between 2000 and 2010 while there still is little difference between 1990 and 2000. Finally, for the most educated cohort (more than 16 years of schooling), there is little difference from 1990 to 2010. Overall, this figure reflects the key finding from the survey data which is that there is some evidence of wage convergence for less educated people, although in the census, these results are concentrated during the 2000's.

In an attempt to quantify some of the results in Figure 7, we estimate the following regression model:

$$w_{ikt}^{d} = \beta_i + \beta_t + \beta_{it} + v_{ikt}$$

in which we regress the wage differential for each education/age cohort on a set of education (indexed i) and time dummies together with their interactions. The results are reported in Table 4.[12] In the first two columns, we employ the whole sample from the Mexican Census and in the last two columns, we employ the urban sample. In the first and third columns, we weight age education/age/year cells using weights from the US Census and in the second and fourth

[12] Note that we use people ages 19-63 for the first four education groups but only people ages 22-63 for the last education group which yields 222 groups per year.

columns, we use weights from the Mexican census. These adjust each education/age/time cell for the share of the population that they represent in either Mexico or the US for that year.[13]

It is important to bear in mind that the results in this table utilize 222 cohorts per year, whereas the results in Table 3 utilize 45 cohorts per quarter. The reason is that, while both use five education groups, for the census data results we collapse the data for every age between 19 and 63, whereas for the survey data, we collapse the data into a total of nine five-year age bins. We collapse by one and five year bins in the census and the survey data, respectively, because the larger sample sizes in the census enable us to use smaller cells. This accounts for the differences between the two tables.

The table essentially reinforces the results shown in Figure 7 but does provide some additional quantitative content. First, the constants in each column range from 2.25-2.39 suggesting that in 1990, people with zero to four years of schooling earned about ten times as much in the US than in Mexico. This is broadly consistent with the average wage differentials shown in Table 2 for the census data as well as with figures shown in Table 2 of Hanson and Chiquiar (2005). Note that these differentials, which are on the order of about ten, are larger the differentials obtained from the Survey data which are on the order of five; this is not a consequence of differences in the Mexican survey and census data but instead in differences in the US data since US wages in the CPS are lower than in the census.

Next, the first column suggests that there was a substantial widening of the wage differential in 2000 but this is not borne out in the next three columns. Moreover, the last two columns, in which we employ the urban sample from the Mexican Census, show a statistically significant *narrowing* of the differential from 1990 to 2000. One reason for this discrepancy

[13] We have two layers of weighting. In the first, we use the weights from the US and Mexican Censuses to construct averages for each age/education/time cell; these weights come from their respective census. In the second, we weight each cell average with either the US or the Mexican weights for that cell.

could be that weights based on the US Census place more emphasis on better educated people for whom we see substantial wage divergence in 2000 as shown in the fifth panel of Figure 8 in the first column. It is not quite appropriate, however, to attribute the negative estimates for the year 2000 dummy to a narrowing of the wage differential during the nineties. The reason for this is that interaction between the 2000 dummy and the education variables, in columns three and four, by-and-large are positive and at least marginally significant for up to 12 years of schooling. Moreover, they tend to be larger in magnitude than the 2000 dummy which is indicative of a *widening* of the US-Mexico wage gap during the nineties, which is consistent with the results from the survey data.

Looking at the interactions between years of schooling and the 2010 dummy, we see evidence of convergence for less educated cohorts during the 2000's. This is true regardless of how we weight the regressions or what sample we use. In the first column, we see that the interactions with 0-4 and 5-8 are -0.163 and -0.137 and in the second column, they are -0.162 and -0.096. This indicates that, for these less-educated cohorts, the wage differential in 2010 was between 85.0 percent and 90.9 percent of what it was in 2000. The corresponding interactions are -0.110 and -0.139 in column three and -0.109 and -0.089 in column four.

Finally, comparing columns (1) with (3) and (2) with (4), we are able to see how using the whole sample or the urban sample from the Mexican sample affects our results. First, the interactions of the education variables with the 2010 dummy seem to be relatively unaffected by the choice of the rural/urban or just the urban sample. The interactions with the 2000 dummy, however, do seem to be affected. In particular, these interactions in columns (3) and (4) for the urban sample are larger than in columns (1) and (2) for the entire sample for people with up to 12 years of education. This suggests that there was overall divergence for these groups between

1990 and 2000 in urban areas. It is hard to say exactly why this is the case, but one possibility is that the Peso Crisis may have had larger effects in more urban parts of Mexico since these areas are more likely to be engaged in trade.

Changes in the Relative Wage Distribution over Time

One of our contributions is to analyze the long-run wage differentials for observationally-equivalent U.S. and Mexican workers. Our approach, however, does not control for unobserved characteristics that disperse observationally equivalent workers throughout the wage distribution. To get a sense of the importance of these unobserved characteristics, we now consider how the US and Mexican wage distributions evolved from 1990 to 2010. To do this, we compute differences in percentiles of the US and Mexican wage distribution by education and year for 2000-1990 and 2010-2000. To fix ideas, we let $q(\alpha)_{kt}^{l}$ denote the αth percentile for education cohort *k* at year *t* in country *l*. We then plot

$$\left(q(\alpha)_{k,2010}^{US} - q(\alpha)_{k,2010}^{MX}\right) - \left(q(\alpha)_{k,2000}^{US} - q(\alpha)_{k,2000}^{MX}\right)$$

and

$$\left(q(\alpha)_{k,2000}^{US} - q(\alpha)_{k,2000}^{MX}\right) - \left(q(\alpha)_{k,1990}^{US} - q(\alpha)_{k,1990}^{MX}\right)$$

as a function of α. The first term in parentheses in each of these expressions is the wage differential at the αth percentile between the US and Mexico in either 2010 or 2000. The second term is the same quantity but from the previous census year. The difference in the two expressions in parentheses is then the change in the cross-border differential at a particular percentile over a ten year period. At this point, we only consider three educational cohorts since computing percentiles is more demanding of the data than computing means; the three cohorts that we consider are 0-11 (no high school), 12-15 (high school) and more than 15 years of schooling (college).

In Figure 8, we plot the changes in the relative wage distributions for 2000-2010 and 2000-1990 using both samples from the Mexican Census. The most striking results are in the first row which displays 2010-2000. First, we see that at, all points in the wage distribution, there was a narrowing of the cross-border differential for people with less than twelve years of schooling. The estimates indicate that the wage differential in 2010 was roughly 85 percent of what it was in 2000 in the whole sample and 80% of what it was in the urban sample. For high school and college graduates, we see convergence at the lower end of the distribution. The estimated change in the differential is negative through the 20th percentile for the college-educated and the 40th percentile for the high school-educated in the whole sample. In the urban sample, we do not see convergence for college graduates and but we do until the 40th percentile for high school graduates. This indicates that the wages of US workers in the bottom half of the distribution became closer to their counterparts across the border in the 2000s (consistent with the trade-driven findings of Autor et al. 2013).

The bottom panel displays the difference from 1990 to 2000. In the whole sample, the figure shows no stark patterns and, overall, is not indicative of any converge in the two wage distributions over this period. However, in the urban sample, we see some evidence of convergence among the college-educated; in particular, their wages in Mexico in 2000 were roughly 85% of what they were in 1990. The survey data results, however, indicate that the peso crisis led to a large divergence during the mid-90's and that this may account for the lack of evidence of convergence which we see in Figure 8 for the period 1990-2000.

An important question to ask at this point is whether these changes are driven by Mexico catching up or the US falling behind. To do this, we plot the change in the wage distributions in the US and Mexico from 1990-2000 and 2000-2010. For each Mexican sample, we display these four profiles in three graphs corresponding to the three educational cohorts. The panel for people with less than twelve years of schooling indicates that a large part of the convergence that we see for the less educated is a consequence of US workers falling behind. Indeed, real wages in the US fell about 0.12 log points at all points in the distribution over this period. In contrast, there were modest gains in Mexican wages over this period. Turning to high school graduates in the middle panel, we see that from 2000-2010, US wages fell behind quite a bit, particularly, at the bottom of the distribution. Mexican wages also declined over this period but, typically, by a smaller magnitude.

There is, however, one very important difference in the behavior of the wage structure of high school graduates from 2000-2010 between the United States and Mexico. We see that the plot for the United States is increasing and that the plot for Mexico is decreasing. What this means is that the losses in the United States disproportionately hit the poor, whereas in Mexico, they disproportionately hit people towards the top of the distribution. This suggests that although mean wages of high school graduates may have fallen during the 2000's in both countries, inequality for this group declined in Mexico but increased in the US. This result is consistent with the well-known Stolper-Samuelson result from trade theory that implies opposite movements in relative wages following trade liberalization between a labor-abundant and a labor-scarce country.

We now turn to the college-educated in the third row. In the whole sample, we do not see terribly strong evidence of either Americans falling behind or Mexicans catching up during either the 1990's or the 2000's. The results, however, are starker in the urban sample. The wages of the college-educated in Mexico declined between 2000 and 2010 by roughly 10%. However, we also see that between 1990 and 2000, Mexican wage growth was over 10% larger than in the US at most points in the wage distribution. This suggests that the evidence for convergence that we saw in Figure 8 for the college-educated between 1990 and 2000 was due to gains in Mexico.

IV. Investigating Possible Mechanisms

We now employ the census data to look into the extent to which both migration and trade lead to convergence in US-Mexico wages in finer detail by completing some simple econometric exercises. In the first, we follow the approaches of Borjas (2003) and Mishra (2007) to look into the effects of immigration to the US and emigration from Mexico on wage convergence. In the second, we look at wages in Mexican states on the US-Mexico Border and in the interior and investigate how these wages evolved in the two regions over the period 1990-2010. The basic idea of this exercise is that foreign direct investment in Mexico historically has been along the border in what was called the Free Trade Zone. Both of these exercises use the census data to capitalize on large sample sizes and to focus on long differences where these mechanisms are most likely to be detected.

Migration

We consider the somewhat standard estimation model in the migration literature (e.g. Borjas (2003) and Mishra (2007))

$$w_{ikt}^{d} = \beta MIGPROP_{ikt} + \alpha_i + \alpha_k + \alpha_{ik} + \alpha_t + \epsilon_{ikt}$$

where i is (once again) education group, k is age, t is time and $MIGPROP_{ikt}$ is the proportion of Mexican migrants in group (i,k) at time t. Once again, because we have the large samples of the census, we do not collapse age into five year bins but instead use all ages between 19 and 63. As in Mishra (2007), the model includes a complete set of fixed effects for the interaction between age and education and so relies on variation in the proportion of migrants within age/education groups to identify the effects of migration on wage convergence. Again as in Mishra (2007), the migrant variable is defined as the ratio of the number of Mexican born people living in the US as measured by the US Census to the population of the cell ($i.k$) at time t as measured by the Mexican Census. In addition to using the US-Mexico wage differential as a dependent variable, we also employ Mexican and US wages as dependent variables to get a better handle on the contributions of emigration from Mexico and immigration to the US on wage convergence.

We employ three weighting schemes for these estimations: using Mexican Census weights, using US Census weights, and using no weights. Using these different schemes allows us to carry out something akin to the Oaxaca decomposition. For example, estimating the effects of emigration on Mexican wages using weights from the US Census allows us to gain some insights into what the effects of emigration on Mexican wages would be if Mexico's demographic structure was more like the US's.

We report the results in Table 5. The top panel uses the entire Mexican Census and the bottom panel uses only Mexican urban dwellers. In columns (1)-(3), we report the effects of emigration on Mexican wages. In the first column of the top panel where we use weights from the Mexican Census, we obtain a highly significant point estimate of 0.209 which indicates that an increase of 0.01 in the proportion of migrants residing in the US raises Mexican wages by 0.209%. Interestingly, if we use weights from the US Census in the second column, the point estimate increases to 1.034 in the top panel. One interpretation of this is that weighting education/age cells that are more common in the US but less common in Mexico emphasizes groups such as more educated people that may be more highly impacted by emigration. While the underlying reason for this is not totally clear, one possibility is that groups that are relatively more present in the US have less elastic labor demands in Mexico. In column (3) of the top panel, we use no weights and obtain an estimate of 0.715 which, not surprisingly, is between the estimates in the first two columns (although this is not a theorem).

In columns (1)-(3) of the bottom panel, we estimate the same models only using urban Mexicans. Once again, we see that using US weights results in a higher estimate. We also see that in each column, the effects are greatly attenuated in the urban sample indicating that emigration of urban dwellers has smaller effects than of rural dwellers.

In columns (4)-(6), we look at the effects of immigration on US wages. First, we see that the effects in column (4) when Mexican weights are employed are larger than in column (5) when we use the US weights; this is true in both the top and the bottom panels. What this indicates is that immigration to the US has larger effects on demographic groups that are more present in Mexico such as those with less education which is the opposite of what we found in Mexico. In addition, we see substantially attenuated effects when we consider only Mexican migrants as a proportion of Mexican urban dwellers just as we did when in columns (1)-(3) once again indicating that rural dwellers are doing most of the arbitrage.

Finally, in columns (7)-(9), we look at the effects of migration on the US-Mexico wage differential. In some sense, these results are redundant since the estimates are simply the sum of the absolute values of the estimates for US and Mexican wages. An important question to ask is whether emigration from Mexico or immigration to the US is primarily driving the convergence.

From the table, it is not clear and, in particular, depends on whether or not weights from Mexico or the US are used. Using Mexican weights places a greater role for immigration to the US. One reason for this is that this tends to emphasize less skilled American workers who may be more vulnerable to competition from abroad either in the form of immigration or trade. On the other hand, using US weights places a greater emphasis on emigration from Mexico that downplays less educated groups in the US.

At this point, it is important to ask, based on our estimates, how high would immigration to the US need to be to eliminate the US-Mexico wage differential. Before we carry out this simple back-of-the-envelope calculation, however, it is important to bear in mind that the methods that we used in this subsection are, indeed, controversial and much work by Card (1990 and 2001) finds smaller effects. For this exercise, this is actually not critical. One can remain agnostic about this literature but accept that using the methods of Borjas (2003) will most likely result in the largest effects of immigration wages. So, this exercise will deliver a lower bound on the extent to which immigration will have to increase to equalize wages in Mexico and the US.

Based on our data, within an educational group, the US-Mexico wage differential in the census is on the order of eight which translates to 2.08 log-points.[14] The estimate in column (9) of Table 5 implies that if the migrant ratio is unity then the wage differential will decline by 1.248 log-points. So, to eliminate the differential, the migrant ratio would have to be 1.66 which implies that for every Mexican in an age/education cell in Mexico, there will have to be 1.66 migrants from the same cell residing in the US which is an implausibly high level of migration. Essentially, about 60% of all Mexicans would have to reside in the US to achieve wage convergence. Although our estimates do indicate sizable effects given current migration levels,

[14] This is not reported but is available upon request.

it still remains that migration would have to be implausible high in order to eradicate the place premium based on our estimates (which we believe to be conservative).

Border Effects

Another way in which we can attempt to tease out the extent to which US-Mexico trade or migration contributes to wage convergence is to conduct a similar distributional analysis as in Section III but to compare these changes between Mexico's border and interior states. The rationale behind this exercise is that, as pointed by many including Robertson (2000), Mexico's border is more tightly linked with the United States than its interior. The two reasons for this are the presence of the maquiladora industry which is concentrated primarily along the US-Mexico border and the fact that many border cities are conduits for migrants, notably, Tijuana. In addition and perhaps more important, Figure 3 showed that the peso crisis of 1994 most likely confounds our ability to detect any convergence during the 1990's that may have occurred due to trade or migration. Because the crisis impacted the entirety of Mexico, this third difference mitigates the bias from this confounding factor.

To investigate this, we consider a triple-difference version of the exercise from the previous section. Specifically, we compute

$$\left[\left(q(\alpha)_{k,2010}^{US} - q(\alpha)_{k,2010}^{MX,B}\right) - \left(q(\alpha)_{k,2000}^{US} - q(\alpha)_{k,2000}^{MX,B}\right)\right] - \left[\left(q(\alpha)_{k,2010}^{US} - q(\alpha)_{k,2010}^{MX,I}\right) - \left(q(\alpha)_{k,2000}^{US} - q(\alpha)_{k,2000}^{MX,I}\right)\right]$$

where the subscript k denotes an educational group, the superscript B denotes Mexico's border region and I denotes Mexico's interior.[15] So, we look at how the change in the US-Mexico wage gap between 2010 and 2000 differs as we move from Mexico's border to its interior.

We report the results in Figure 10. During the period 2000-2010, we do not see any evidence that convergence was any faster along the border than in the interior. In fact, using the urban sample from the Mexican sample, we actually see that, relative to the interior, the wage differential along the border expanded from 2000 to 2010. What this may then indicate is that during the period 2000-2010 light industries may have exited Mexico's border region thereby reducing wages there vis-à-vis the interior. Next, we see that during the period 1990-2000 that wages in Mexico's border region increased at a more rapid rate than in the interior. This is particularly the case in the urban sample.

It is important to emphasize that we see large movements in wage differentials in the border area relative to the interior once we restrict the sample to more urban areas. During the 1990's, wages in these cities close to the border saw large gains relative to the rest of Mexico and this was subsequently reversed in the 2000's. This is suggestive that trade has the potential to narrow US-Mexico wage differentials, and that trade, broadly defined to include Chinese trade, should be considered.

Finally, to quantify the magnitude of these border effects, we estimate the following regression

$$w_{ikst}^{MX} = 1990d + 2000d + 2010d + 1990d * BORD + 2000d * BORD + 2010d * BORD$$
$$+ \gamma_i + \gamma_k + \gamma_{ik} + \gamma_s + \varepsilon_{ikst}$$

[15] We define "border" to be all of Mexico's states that border with the United States which includes Baja California, Sonora, Chihuahua, Tamaulipas, and Coahuila. When we employ the whole sample, we use all wages from these states which include those from rural areas. When we employ the urban sample, we only use selected cities which include large border towns such as Tijuana and Juarez.

where w_{ikst}^{MX} is the log Mexican wage in group (i,j), in Mexican state s at time t. The variables$1990d$, $2000d$ and $2010d$ are year dummies and $BORD$ is a dummy for being a border state. Note that an observation is now an education/age/state/time cell whereas with the migration regressions, it was an education/age/time cell. It is important to bear in mind that because this regression does a thorough job of controlling for a variety of age, education and location effects that there may be effects that can be detected using this regression that may not be evident in Figure 10. The results are reported in Table 6. The main results of this exercise can be seen by differencing the interactions of the year and border dummies across subsequent years.

We see that from 1990 to 2000, Mexican wages in states bordering the US gained between 6% and 8% relative to the interior. These estimates are remarkably stable across samples and weighting schemes. If we use a US-Mexico differential of eight (or 2.08 log-points) as we did in the previous subsection, these border effects during the 90's constitute about a 3-4% narrowing of the differential. Once again, this is not trivial but not nearly enough to achieve absolute wage convergence.

On the other hand, we see very strong declines in real wages over the period 2000-2010. When we employ the weights from the Mexican Census, the estimates are -19.3% when we use the entire sample and -17.7% when we use urban Mexicans. Using the US weights in columns (2) and (5) attenuates these estimates; they become -9.7% and -14.6% in the entire and urban samples, respectively. If relatively less educated Mexicans were the most adversely affected in the 2000's then using US weights should understate these effects in the estimation. While the estimates in this table are by no means the final word, they are (once again) very much consistent with a story in which NAFTA led to wage gains that were subsequently reversed in the 2000's.

Even so, however, the overall effects of trade, foreign investment, and migration have exhibited very little influence over the estimated place premium.

V. Conclusion

The significant and well documented "place premium" across countries could be a function of productivity, trade barriers, investment barriers, or barriers to migration. We use matched survey and census data from Mexico and the United States to evaluate the stability of the place premium over time in an environment of significantly increasing trade, investment, and migration. Our results show that wages between the two countries diverged slightly over the 1988-2011 period. Macroeconomic fluctuations, such as the peso crisis of 1994, contributed to the divergence. Subsequently, there was a large convergence until 2001, the year in which China entered the WTO, after which we saw steady divergence. These findings strongly indicate that the divergence from 1988-2011 had much to do with large macroeconomic events that may have counteracted the effects of US-Mexico trade and migration. Overall, however, the place premium remained remarkably stable.

A more detailed look at our data reveals that trade and migration may contribute to modest wage convergence, despite the overall divergence in the raw data. First, the movements in the wage distributions are consistent with Stolper-Samuelson effects: relative wages of the less-skilled fall in the United States and rise in Mexico. Migration may also explain these results. Using survey data, we show that, the peso crisis notwithstanding, there is steady convergence for young people with intermediate levels of schooling who are precisely the people who are most likely to emigrate from Mexico (consistent with Mishra 2007). Second, in the census data, we show that over the period 1990-2000 that the Mexico's border-region wages moved towards US wage levels more quickly than wages in the interior. This exercise has the added benefit that it greatly mitigates the confounding effects of the peso crisis, since the effects of NAFTA should have been more prevalent in the border. On the other hand, this same exercise reveals that during the period 2000-2010 that there was divergence in the border relative to the interior. Given that we also saw that low-skilled US wages declined by around 10% over this period, this suggests that a third factor may have had adverse effects on the Mexico border and low-skilled US wages. The main policy implication of our exercise is that trade, investment, and migration polices, although highly beneficial for many other reasons, are not sufficient to reduce the place premium across countries.

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Table 1: Summary Statistics of Survey Data

		United States			
		1988-1994	1995-2002	2003-2007	2008-2011
Monthly Wage		$1,492.69	$1,504.65	$1,515.75	$1,466.30
		(679.02)	(703.75)	(677.00)	(681.38)
Hourly Wage		$8.26	$8.27	$8.41	$8.28
		(3.42)	(3.52)	(3.41)	(3.45)
Age		37.45	38.74	39.85	40.54
		(0.29)	(0.45)	(0.19)	(0.18)
Education					
	0-5	1.60%	2.30%	2.40%	2.10%
	6-8	2.70%	1.60%	1.40%	1.20%
	9-11	7.50%	7.80%	7.90%	6.50%
	12-15	61.50%	59.40%	57.00%	56.60%
	>15	26.70%	28.90%	31.30%	33.60%
Mean N per quarter		21,155.89	19,393.91	20,960.35	19,667.75

		Mexico			
		1988-1994	1995-2002	2003-2007	2008-2011
Monthly Wage		$310.57	$260.24	$272.11	$226.50
		(175.59)	(149.47)	(135.21)	(112.70)
Hourly Wage		$2.09	$1.36	$1.41	$1.24
		(1.33)	(0.81)	(0.74)	(0.64)
Age		35.05	35.56	36.88	37.32
		(0.11)	(0.41)	(0.35)	(0.09)
Education					
	0-5	18.40%	14.30%	12.90%	12.40%
	6-8	27.70%	26.80%	23.60%	22.10%
	9-11	24.10%	30.60%	31.60%	33.20%
	12-15	13.40%	13.10%	16.90%	18.90%
	>15	16.40%	15.20%	15.00%	13.40%
Mean N per quarter		33,445.89	42,934.50	31,427.05	27,756.00

Notes: All wages are in 1990 US dollars. In Mexico, the monthly wage was computed by converting wages to US dollars using the exchange rate for that year and then deflating the wages using the US CPI. Standard deviations are in parentheses. Mean N per quarter represents the average number of observed individuals per quarter per period (without population weight expansion).

Table 2: Descriptive Statistics from Census Data

	1990	2000	2010
		US	
Hourly Wage	14.21	15.07	14.98
	(11.38)	(12.49)	(13.09)
Age	36.83	38.33	39.61
	(11.59)	(11.50)	(12.27)
Education			
0-4	1.56%	1.56%	1.50%
5-8	3.26%	3.20%	3.01%
9-12	37.72%	35.42%	32.36%
13-16	47.99%	49.66%	52.07%
>16	9.47%	10.15%	11.06%
N	1,982,151	2,361,079	496,042
		MX – Whole Sample	
Hourly Wage	1.43	1.55	1.59
	(1.82)	(1.92)	(1.81)
Age	34.79	35.39	37.10
	(11.20)	(11.04)	(11.38)
Education			
0-4	29.56%	18.10%	11.89%
5-8	30.01%	26.49%	21.60%
9-12	27.41%	37.42%	45.53%
13-16	5.62%	9.54%	12.22%
>16	7.42%	8.45%	8.77%
N	1,264,613	1,597,037	1,754,953
		MX – Urban Sample	
Hourly Wage	1.61	1.77	1.74
	(1.98)	(2.15)	(1.97)
Age	34.59	35.42	37.46
	(10.97)	(10.91)	(11.35)
Education			
0-4	18.38%	10.95%	7.30%
5-8	31.00%	24.65%	18.85%
9-12	33.04%	43.12%	49.24%
13-16	7.81%	11.80%	14.62%
> 16	9.76%	9.47%	9.99%
N	507,068	538,663	360,515

All wages are in 1990 US dollars. In Mexico, the hourly wage was computed by converting wages to US dollars using the exchange rate for that year and then deflating the wages using the US CPI. US Census data were 5% samples except for the American Community Survey sample in 2010 which was a 1% sample. The Mexican Census was a 10% sample for all three years.

MX – The whole sample uses all people who meet the sample criteria described above. MX – The urban sample uses these criteria and further restricts the sample to the metropolitan areas that are employed in the Mexican survey data.

Table 3: Trends in US-Mexico Wage Gap

	(1) Trend	(2) Breaks	(3) Migrants	(4) Migrants and Breaks
Time	0.002***	0.007***	0.002***	0.007***
	(0.000)	(0.000)	(0.000)	(0.000)
Migrant * time			-0.003***	-0.003***
			(0.001)	(0.001)
1988-1994		4.139***		4.139***
		(0.077)		(0.076)
1994-2001		3.187***		3.187***
		(0.104)		(0.104)
Trend in 88-94		-0.031***		-0.031***
		(0.001)		(0.001)
Trend in 94-2001		-0.019***		-0.019***
		(0.001)		(0.001)
Constant	1.448***	0.393***	1.437***	0.381***
	(0.028)	(0.048)	(0.028)	(0.048)
Observations	4,320	4,320	4,320	4,320
Number of cohorts	45	45	45	45

Notes: Standard errors in parentheses. *** p<0.01.

Table 4: Mean Wage Difference Regressions, Census Data

	(1)	(2)	(3)	(4)
Constant	2.393***	2.402***	2.238***	2.250***
	(0.052)	(0.012)	(0.056)	(0.016)
Years of Education				
0-4	-	-	-	-
5-8	-0.207***	-0.272***	-0.093	-0.154***
	(0.064)	(0.017)	(0.069)	(0.020)
9-12	-0.314***	-0.340***	-0.170***	-0.196***
	(0.054)	(0.017)	(0.058)	(0.019)
13-16	-0.569***	-0.586***	-0.464***	-0.480***
	(0.053)	(0.030)	(0.057)	(0.028)
>16	-0.332***	-0.358***	-0.249***	-0.270***
	(0.057)	(0.027)	(0.061)	(0.027)
Year				
2000	0.084**	0.033	-0.087**	-0.113***
	(0.030)	(0.033)	(0.032)	(0.031)
2010	-0.009	-0.008	-0.003	-0.013
	(0.029)	(0.032)	(0.031)	(0.030)
Education*Year				
0-4*2000	-0.058	-0.005	0.129	0.157***
	(0.080)	(0.038)	(0.085)	(0.040)
5-8*2000	-0.061	0.033	0.100	0.167***
	(0.059)	(0.037)	(0.064)	(0.036)
9-12*2000	-0.033	0.020	0.120***	0.145***
	(0.033)	(0.037)	(0.036)	(0.034)
13-16*2000	-0.204***	-0.136	-0.025	0.012
	(0.032)	(0.048)	(0.035)	(0.043)
0-4*2010	-0.163**	-0.162***	-0.110	-0.104***
	(0.080)	(0.040)	(0.087)	(0.042)
5-8*2010	-0.137***	-0.096***	-0.139**	-0.084***
	(0.060)	(0.037)	(0.064)	(0.036)
9-12*2010	0.008	-0.007	-0.006	-0.010
	(0.033)	(0.036)	(0.036)	(0.034)
13-16*2010	0.014	0.022	0.038	0.057
	(0.032)	(0.047)	(0.034)	(0.042)
MX Sample	Whole	Whole	Urban	Urban
Weights	US	MX	US	MX
R2	0.7548	0.7472	0.7213	0.6508
Number of Cohorts	666	666	666	666

Notes: The dependent variable is the log difference between the US and Mexican hourly earnings for each match cohort. In the first and third column, we weight the regression using weights from the US Census; in the second and fourth column, we weight the regression using weights from the Mexican Census. Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1