What Has Happened to Wages in Mexico since NAFTA? Implications for Hemispheric Free Trade

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Abstract. In this paper, I examine the impacts of trade and investment liberalization on the wage structure of Mexico. Part one of the paper surveys recent literature on the labor-market consequences of Mexico's economic reforms in the 1980's. Mexico's policy reforms appear to have raised the demand for skill in the country, reduced rents in industries that prior to reform paid their workers high wages, and raised the premium paid to workers in states along the U.S. border. These changes have resulted in an increase in wage dispersion in the country. Part two of the paper examines changes in Mexico's wage structure during the 1990's. In the last decade, Mexico has experienced rising returns to skill, which mirror closely wage movements in the United States. There is, however, little evidence of wage convergence between the two countries. Regional wage differentials in Mexico have widened and appear to be explained largely by variation in regional access to foreign trade and investment and in regional opportunities for migration to the United States. I discuss implications of Mexico's experience for the rest of Latin America in the event a Free Trade Agreement of the Americas is enacted.

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INTRODUCTION

The proposed Free Trade Agreement of the Americas (FTAA) would alter dramatically trading relationships in the Western Hemisphere. Eliminating trade barriers within the region would, among other effects, induce economies to specialize more in export production. Such specialization would enable countries in Latin America to realize gains from trade, but these income gains would likely not be shared equally by all individuals in society. In Brazil, for instance, farmers growing oranges or workers producing shoes would likely benefit more from an FTAA than would capital-intensive manufacturers. As a result, an FTAA would be likely to redistribute national incomes in the region. Latin America's long history of income inequality makes the impact of an FTAA on the distribution of earnings an important issue for policymakers.

In this paper, I use Mexico as a test case for how regional free trade affects labor earnings. I examine how trade reform in Mexico, and the North American Free Trade Agreement (NAFTA) in particular, has altered the country's wage structure. Mexico is a useful case to study because it has opened itself to trade aggressively. It unilaterally liberalized foreign trade and investment policies in the 1980's and then enacted NAFTA in 1994, which further reduced trade barriers and helped lock in reform by enshrining it in a multilateral treaty. Mexico is now as closely tied to the North American economy as at any point in its history. In 2000, it sent 88.7% of its exports to and bought 73.1% of its imports from the United States. Greater openness has helped increase the share of trade in Mexico's GDP from 11.2% in 1980 to 32.2% in 2000.

There are several channels through which North American economic integration impacts Mexico's labor market. One is by equalizing the price of traded goods between

economies. Trade theory predicts that convergence in goods' prices between countries creates pressure for convergence in factor prices. In Mexico, this would affect both wage levels and the relative wages of low- and high-skilled labor. An additional channel through which trade reform may shock labor demand is through its impact on capital flows. Given that capital appears to complement skilled labor, capital inflows may increase the demand for skill. In Mexico, NAFTA appears to have raised capital inflows in part by raising investor confidence in the country's commitment to free trade. From 1980 to 1994, foreign direct investment (FDI) average 1.3% of Mexico's GDP, while from 1995 to 2000, it averaged 2.8% of GDP (Chiquiar 2001). About two-thirds of this FDI comes from the United States. In Mexico's export assembly sector, capital inflows expand trade directly. The creation of export assembly plants, or *maquiladoras*, by U.S. firms in Mexico has increased trade in intermediate inputs. In 2000, maquiladoras accounted for 47.7% of Mexico's exports and 35.4% of Mexico's imports.

In using Mexico to preview the effects of an FTAA, it is important to recognize that it differs from the rest of Latin America in some important respects. In particular, Mexico shares a land border with the United States that creates opportunities for migration abroad that other countries do not enjoy. During the 1990's, net immigration from Mexico in the United States was about 400,000 individuals per year. In the absence of migration flows, trade reform in Mexico might have generated even more trade and FDI than has occurred. Any estimate of the impact of regional free trade on Mexico, then, may understate the impact an FTAA would have on the rest of the region.

The body of the paper has two parts. In part one, I examine changes in Mexico's wage structure following reforms in the 1980's. Here, I rely on a substantial body of

research that examines the impact of specific policy changes on labor earnings. This work finds that lower barriers to foreign trade and investment have changed Mexico's wage structure. The evidence suggests that tariff reductions have increased relative wages for skilled workers, increased foreign investment has raised the relative demand for skilled labor, and tariff and quota reductions have altered inter-industry wage differentials. Mexico's economic opening thus appears to have raised the skill premium and reduced industry rents going to labor. It also appears to have increased wages in states along the U.S. border relative to the rest of the country.

In part two of the paper, I use data from the 1990 and 2000 Mexico population census to examine changes in Mexican wages over the period during which NAFTA was implemented. During the 1990's in Mexico, the returns to skill continued to rise and regional differences in wages continued to widen. Wage gains were largest in regions most exposed to international trade, FDI, and/or opportunities for migration to the United States. After controlling for regional exposure to globalization, other regional characteristics appear to be unimportant in explaining wage changes. Overall, wage gains were largest for more-educated workers living close to the United States and smallest for less-educated workers living in the country's south. There is little evidence of convergence in wages between Mexico and the United States. I conclude the paper by discussing the implications of these results for an FTAA.

POLICY CHANGE AND WAGES IN MEXICO: THE FIRST REFORM WAVE

The last two decades in Mexico have not been a quiet period. Since 1980, the country has had three currency crises, bouts of high inflation, and severe macroeconomic

contractions. The reform of the country's trade and investment policies has been, in part, a response to this turmoil. Following a balance of payments crisis in 1982, the country eased restrictions on maquiladoras. In 1985, Mexico joined the General Agreement on Trade and Tariffs (GATT), which entailed cutting tariffs and eliminating many non-tariff barriers. In 1989, Mexico eased restrictions on the rights of foreigners to own assets in the country. In 1994, NAFTA consolidated and extended these reforms and tied them to reciprocal access to the U.S. and Canadian markets. Concomitant with its economic opening, Mexico privatized state-owned enterprises, deregulated entry restrictions in many industries, and used wage and price restraints to combat inflation.

The policy shocks to Mexico's labor markets have attracted much academic attention. A large body of work examines the impact that these policy changes have had on wages in the country. In this section, I briefly survey the literature. I organize the discussion around three questions: (i) Why have skill premia in Mexico risen? (ii) Has greater economic openness affected regional wage differences in Mexico? And, (iii) is there evidence of labor-market integration between Mexico and the United States?

Rising Skill Premia in Mexico

Relative to the United States, Mexico has abundant supplies of less-skilled labor and scarce supplies of human and physical capital. Trade and investment reforms would be likely to alter the relative demand for labor of different types, producing changes in the premium for skill. Recent research shows that Mexico has indeed experienced changes in the relative wages of skilled workers, but ones that are quite different from what many would have expected given Mexico's relative factor supplies.

Since the mid 1980's, Mexico has experienced widening wage inequality associated with rising returns to skill. Cragg and Epelbaum (1996) show that between 1987 and 1993, though average real wages rose by 30%, the wages of urban workers with a primary education (grade six completed) fell relative to the wages of urban workers with secondary education (completed grade nine) by 15% and relative to the wages of urban workers with post-secondary education by 60%. The returns to labor-market experience also rose markedly over this time period. Skill premia continued to rise in the 1990's. Robertson (2001) finds that the annual return to schooling for urban workers rose from 0.035 in 1987 to 0.05 in 1994 and to 0.07 in 1998. Consistent with evidence that skill premia and average educational attainment among workers have increased simultaneously, Cragg and Epelbaum (1996) suggest that Mexico's rising skill premium is due mostly to increases in the relative demand for skill.

Why has the relative demand for skilled labor in Mexico risen? The literature proposes a several answers to this question. The one that has attracted the most attention is that rising skill premia are due to trade and investment liberalization. Attributing rising skill premia to trade reform may seem counterintuitive, given Mexico's presumed comparative advantage in low-skill activities (Leamer, 1993). The natural expectation might be that skill premia in Mexico would fall, not rise, after liberalization.[1]

This line of reasoning, however, does not accord with the pattern of trade protection in Mexico before reform. At the time Mexico began to lower its trade barriers, labor-intensive sectors had the highest tariff barriers. Hanson and Harrison (1999) find that 1984 industry tariffs are negatively correlated with the 1984 industry ratio of white-

[1] See Robbins (1995) for a cross-country comparison of changes in wage inequality following trade reform.

collar to blue-collar employment and that the 1984-1990 change in industry tariffs is positively correlated with this employment ratio. This suggests that trade protection was initially higher in less-skill intensive sectors and was reduced by more in these sectors during reform. If these tariff changes were passed through to changes in goods' prices, then the logic of the Stolper-Samuelson Theorem (1941) would imply that the relative wage of skilled labor would have risen. Robertson (2001) suggests that this is exactly what happened. He finds that over the period 1987-1993 the relative price of skill-intensive goods in Mexico rose and that the tariff-induced change in relative prices had the effect of raising the relative wage for white-collar labor. Interestingly, tariff reductions in Mexico due to NAFTA have been larger in more-skill intensive sectors, suggesting that the final stage of trade reform may halt the increase in skill premia.

In related work, Feliciano (2001) finds that between 1986 and 1990 wage dispersion in Mexico rose more in tradables than in non-tradables. She also finds that trade reform altered inter-interindustry wage differentials. Industry wage premia fell more in industries with larger reductions in import-license requirements, but not in industries with larger reductions in tariffs. Consistent with these results, Revenga (1997) finds that over the period 1984-1990 manufacturing plants in industries with larger reductions in tariffs and non-tariff barriers had higher reductions in employment. These findings suggest that industries that enjoyed high rents before trade reform, as indicated by high average wages after controlling for observable worker characteristics, experienced relatively large reductions in wages and employment after trade reform.

Another mechanism through which trade and investment reform may have increased the demand for skilled labor in Mexico is outsourcing to the country by foreign

firms. A large fraction of U.S.-Mexico trade in manufactured products is the result of U.S. firms establishing maquiladoras in Mexico. These plants import nearly all parts and components from the United States, assemble final goods in Mexico, and export most output back to the United States. In 1995, exports by maquiladoras accounted for 40.2% of all Mexican exports to the United States.[2] From 1980 to 1997, the maquiladora share of national manufacturing employment in Mexico rose from 5.6% to 25.1%. The plants are concentrated in Mexican states on the U.S. border.[3]

How has the growth of maquiladoras affected labor demand in Mexico? Feenstra and Hanson (1997) show that in theory if policy reform allows U.S. firms to outsource more production to Mexico, these firms will choose to move the least skill-intensive activities that they perform. By moving low-skill activities to Mexico, the average skill intensity of production would rise in both the United States and Mexico. This would raise the relative demand and earnings of high-skilled workers in both countries, contributing to a binational increase in wage inequality.

To test these predictions, Feenstra and Hanson (1997) examine whether the relative demand for skilled workers in Mexico has risen more in regions where foreign investment has been concentrated. They use regional data on maquiladoras to measure the spatial distribution of foreign direct investment in Mexico. Consistent with their

[2] Most maquiladoras assemble one of three types of goods, apparel, electronics, or auto parts. In 1995, these three industries accounted for 80.5% of total exports by maquiladoras to the United States.

[3] It is often asserted that the growth of maquiladoras was the result of special trade advantages afforded to goods produced by these plants on their entry into the United States. Tariffs are levied only on the value added abroad (i.e., in Mexico) and not on the value of the U.S. inputs used in the assembly of the goods. Mexican firms that use domestically-produced inputs enjoy no such advantage. An alternative view is that maquiladoras have expanded in part because Mexico, given its relative abundance of low-wage labor, has a comparative advantage in assembly-type activities (rather than in entire industries). Since NAFTA was implemented in 1994, maquiladoras have lost their special trade advantages in most industries. Yet, until 2000 maquiladoras continued to grow faster than any other sector in the economy. This suggests that their initial trade advantages relative to other firms in Mexico cannot fully account for their growth.

theory, during the 1980's the relative demand for high-skilled workers was higher in regions where maquiladoras expanded most rapidly. Maquiladora growth can account for over 50% of the increase in the skilled labor wage share that occurred during the late 1980's. These results suggest that U.S. outsourcing to Mexico, in the form of creating maquiladoras, has contributed to rising in wage inequality in the country.

Beyond the specific activity of outsourcing, FDI in general is likely to affect the level and structure of wages in Mexico. Aitken, Harrison, and Lipsey (1996) find that, controlling for plant, industry, and region characteristics, manufacturing plants that are foreign owned pay their skilled workers 21.5% more and their unskilled workers 3.3% more than plants that are domestically owned. Similar results hold for Venezuela. These results are consistent with several interpretations. Workers may be more productive in multinational firms, multinationals may attract more able workers, or multinationals may earn rents and share these rents with their workers.

Regional Wage Differences in Mexico

Mexico's proximity to the United States suggests that trade liberalization for the country was tantamount to economic integration with its northern neighbor. Given northern Mexico enjoys relatively low-cost access to the U.S. market, we would expect that North American economic integration would raise the demand for labor in the region relative to the rest of the country. Hanson (1996, 1997) examines how trade reform has affected Mexico's regional economies. Following trade reform, there has been a decline in relative industrial activity in central Mexico and an expansion in northern Mexico. In 1980, five years before trade reform began, 46% of the Mexico's manufacturing labor

force was located in the Mexico City area and 21% was located in states on the U.S. border (Hanson 1997). In 1993, after eights years of reform, the share of manufacturing activity in Mexico City had fallen to 29% and the share at the border had risen to 30%. By 1998, four years after NAFTA, Mexico City's employment share had fallen further to 23% and the border's employment share had risen to 34% (Chiquiar 2001).

Movements in regional relative wages also suggest North American economic integration has benefited northern Mexico disproportionately. Hanson (1996) estimates state manufacturing wages relative to national manufacturing wages as a function of distance to Mexico City (the largest market in the country prior to trade reform) and distance to the United States (the largest market for the country's goods after trade reform). Regional relative wages are negatively correlated with distance to Mexico City and with distance to the Mexico-U.S. border. Prior to trade reform, a 10% increase in distance from Mexico City was associated with a 1.9% decrease in the relative state nominal wage, and a 10% increase in distance from the Mexico-U.S. border was associated with a 1.3% decrease in the relative state nominal wage. After trade reform, the regional wage gradient shifts. The effect of distance from Mexico City on state wages weakens and the effect of distance from the United States strengthens.

In related work, Chiquiar (2001) finds that for the period 1970-1985 there was convergence in per capita GDP levels across Mexican states, but that after 1985 this process broke down. For the period 1985-1993, there is strong divergence in state per capita GDP levels and for the period 1993-1998 relative state GDP levels remain roughly constant. The divergence in regional growth occurs at the time of trade reform.

The experience of Mexico suggests that trade policy plays an important role in determining regional economic fortunes. While trade reform raises wages in Mexican border states, it may lower wages in regions of the country that had a privileged role under the closed economy or that have poor access to the U.S. market.

Convergence in Mexican and U.S. Wages

Have the flows of goods, capital, and people helped integrate the labor markets of Mexico and the United States? In one of the few papers to address the topic, Robertson (2000) examines whether shocks to Mexican wages are correlated with shocks to U.S. wages. Using household data from the two countries over 1987-1997, Robertson takes mean wages by age, schooling, region of residence, and time period and constructs a panel of synthetic cohorts. He then regresses the quarterly change in Mexican wages for a given age-education-region cell on quarterly changes in U.S. wages for the same age-education cell and on the lagged difference in U.S. and Mexican wages for the cell. The first variable captures the strength of labor-market integration between the two countries and the second captures the rate of wage convergence between the two countries.

Wage changes in Mexico are positively correlated with wage changes in the United States. This suggests that there is at least partial labor-market integration between the two countries. A shock that raises U.S. wages by 10% would raise wages in Mexican interior cities by 1.8% and wages in Mexican border cities by 2.5%. Wage changes in Mexico are negatively correlated with the lagged U.S.-Mexico wage difference, which suggests that over time wages in the two economies tend to converge. The estimated convergence rates are very rapid, with equilibrium U.S.-Mexico wage differentials being

reached within one to two quarters. This finding of rapid convergence seems at odds with rising levels of trade, investment, and migration between the two countries, which suggests that integration of U.S. and Mexican markets is incomplete and that wage convergence between the two countries would be more gradual.

Revenga and Montenegro (1998) offer a related analysis of U.S.-Mexico wage differentials. They use data on Mexican manufacturing plants and U.S. manufacturing industries for 1984-1990 to examine the evolution of average industry wages in Mexico relative to the United States. They regress the log ratio of average wages in Mexican plants to average wages in the corresponding U.S. industry on average industry tariffs in Mexico, average industry import license requirements in Mexico, and other controls. The analysis is performed separately for less- and more-skilled workers. The Mexico-U.S. wage is positively correlated with Mexican tariffs and import-license requirements. The estimated regression coefficients for the sample of production workers and for the sample of non-production workers are very similar. A 50% reduction in tariffs would be associated with a 3.7% reduction in relative Mexico-U.S. wages for less-skilled workers and a 4.3% reduction in relative Mexico-U.S. wages for more-skilled workers.

It is tempting to interpret these results to mean that trade liberalization in Mexico depressed wages for Mexican workers relative to their U.S. counterparts. Were this the case, one might the effects on more- and less-skilled workers to be asymmetric, but they are not. An alternative and more plausible interpretation is that trade barriers in Mexico allowed firms to earn rents, which they shared with workers in the form of higher wages. Trade reform would have reduced these rents, producing a positive correlation between trade protection in Mexico and relative Mexico-U.S. wages for all labor types.

Summary

Recent literature suggests that liberalizing barriers to trade and investment have contributed to changes in Mexico's wage structure.[4] There is evidence consistent with tariff reductions having increased relative wages for skilled workers, increased foreign investment having raised the relative demand for skilled labor, and tariff and quota reductions having altered inter-industry wage differentials. Mexico's economic opening thus appears to have raised the demand for skill and reduced industry rents going to labor. Both changes appear to have had adverse consequences for low-skilled workers.

Several larger messages also emerge from the literature. One is that Mexico's comparative advantage in low-skill activities is not as strong as many had thought. Mexico's trade reform entailed larger tariff reductions in less-skill-intensive industries, reflecting the high levels of protection afforded these industries under import-substitution industrialization. After trade reform, less-skill-intensive industries ended up taking the hardest hit in terms of wage and employment declines. This may come as a surprise, given Mexico's presumed comparative advantage in labor-intensive activities. While Mexico may have such a comparative advantage relative to the United States, it is probably does not relative to China or South Asia. Trade liberalization exposed Mexico's vulnerability in very low-end manufacturing, as producers in this segment lost out to imports. Replacing these producers were export assembly plants in apparel, auto parts, and electronics. While Mexico may have a cost disadvantage relative to China in

[4] There is also evidence that other reforms affected Mexico's labor market. During the 1980's, real minimum wages declined substantially. Bell (1997) finds that this didn't affect formal-sector employment due to low initial minimum wages and non-compliance with minimum wage laws (see Feliciano, 1998, for evidence of stronger minimum-wage effects). Woodruff (1999) finds that government encouragement of wage restraints to combat inflation in the late 1980's had a larger impact on large firms than on small firms, leading to a disappearance of the employer-size wage effect. Fairris (2003) finds that during the late 1980's and early 1990's the observed increase in wage dispersion in Mexico was larger in the unionized sector (though lower in this sector to begin with), perhaps indicating a decline in union bargaining power.

finished goods like t-shirts, plastic footwear, and simple consumer electronics, it appears to have a cost advantage in assembly services for the U.S. economy. Mexican manufacturing has, in effect, reoriented itself from producing simple consumer goods to being a subcontractor for the North American economy.

A second message to emerge from the literature is that trade and FDI appear to be complements. Trade reform freed up resources in manufacturing that allowed Mexico to become more specialized export assembly. But to make this transition, the country needed FDI. The arrival of foreign firms brought in needed capital and new technology for managing assembly operations and handling the logistics of importing intermediate inputs and exporting output. These assembly operations, as it turns out, are intensive in the use of skilled labor relative to other Mexican manufacturing plants. The combination of freer trade, which allowed greater specialization, and fewer restrictions on FDI, which allowed plants in Mexico to become part of North American production networks, induced in shift from low-end production for the domestic economy to the provision of input-processing services for the North American economy.

WAGES AND EMPLOYMENT IN MEXICO, 1990 AND 2000

Previous literature has focused on how Mexico's reforms affected wages and employment in the country during the 1980's and early 1990's. There is little work on the post-NAFTA period or that evaluates the relative impact of Mexico's economic reforms on labor-market outcomes in the country. In the next two sections, I attempt to address these shortcomings. I study changes in Mexico's wage structure over the period 1990-2000. The goals of this exercise are (a) to examine whether changes in Mexican

wages in the 1990's mirrored those in the 1980's, (b) to assess whether there has been convergence between U.S. and Mexican wages, and (c) to evaluate how different forms of economic openness have impacted Mexico's wage structure.

Data and Summary Statistics

The data I use for the analysis are 1% random samples from the 1990 and 2000 Mexico population census. Much previous research limits the analysis to the manufacturing sector and/or to workers in large cities and so gives only a partial view of how Mexico's wage structure has evolved. The census provides comprehensive data on earnings and employment in Mexico. By looking over the entire decade of the 1990s, the analysis spans both the planning and negotiation period for NAFTA and the period following its enactment. This helps account for the possibility that firms began adjusting to NAFTA before the treaty was formally approved. It also extends the time period well beyond the severe recession Mexico suffered in 1995, when real GDP fell by 6.2%, which was precipitated by a bungled devaluation of the peso.

Table 1 gives summary statistics on the sample of individuals in 1990 and 2000. To focus on potential wage earners, I include only individuals 16-65 years old. Over time, Mexico has experienced increases in educational attainment. From 1990 to 2000, the share of working-age individuals with 8 years of education or less declined from 59.3% to 47.5% for males and from 63.3% to 51.4% for females. There are marked increases in the share of individuals completing secondary school (9 years) or preparatory school (12 years). Despite large wage differences across regions (as discussed in the last section), there is little interregional migration. The border region, which has the highest

wages in the country, had its share of the national population increase by only 1.0% for males and 0.5% for females. Within regions, there has been rural-to-urban migration. The share of individuals living in cities with more than 500,000 inhabitants rose by 4.8% for males and 4.4% for females and the share of individuals living in localities with less 2,500 inhabitants fell by 4.0% for males and 3.2% for females.

Despite increases in schooling, average hourly earnings fell in the 1990's. When deflated by Mexico's CPI, the average hourly wage in 1990 dollars declined for males from $1.33 to $1.11 and for females from $1.24 to $1.13. Wage declines are larger when controls are added for individual characteristics. These wage movements reflect in part the effects of Mexico's economic collapse in 1995. Even with falling wages, labor-force participation rates rose modestly for males and sharply for females over the decade. By 2000, 30.9% of working-age women were wage earners, up from 20.7% in 1990.

Table 2 shows the distribution of employed individuals across industries in 1990 and 2000. The major change in industrial specialization over the period was a decline in employment in agriculture and mining. The sector's share of male employment fell from 28.9% to 20.7%. due in part to the reform of the land tenure system in Mexico and the breakup of rural cooperatives, or *ejidos*. Manufacturing's share of total employment remained steady over the 1990's at around 20%.

OLS Wage Regressions, 1990 and 2000

To summarize changes in Mexico's wage structure, I present results from OLS wage regressions. Since most regressors in the estimation are dummy variables, these results summarize the conditional mean of log wages with respect to education, region,

industry, and other characteristics. This is a compact way to characterize the returns to observable characteristics at different points in time.

Tables 3a and 3b present the estimation results for males and females. The dependent variable is log average hourly earnings. The independent variables are dummy variables for seven categories of education attainment (the excluded category is no schooling), age and age squared, a dummy variable for whether an individual is married, dummy variables for four categories of city/locality size (the excluded category is localities with fewer than 2,500 inhabitants), dummy variables for five regions (the excluded region is the South), and dummy variables for nine industries (the excluded sector is agriculture and mining). To reduce the effects of measurement error, I drop observations with the lowest or highest 0.5% of wage values.[5] The sample is wage earners, 25-65 years old. The tables report results for the full sample and excluding the self-employed. In unreported regressions I find little impact of excluding those who work less than 20 hours per week or of further restricting extreme wage values.

In Table 3a, several changes in earnings for males over 1990-2000 are apparent. First, there is a sharp increase in the returns to high levels of schooling (but not to low or moderate schooling). The returns to completing 13-15 years of schooling (the equivalent of some college) rose by 13.3 log points and the returns to completing 16 or more years of schooling (the equivalent of at least a college education) rose by 13.1 log points. Second, there is a decrease in returns to age. A 30 year old received a boost in wages for an extra year of age of 1.7 log points in 1990 but only 1.2 log points in 2000. Third, there are changes in regional wage differentials. Between 1990 and 2000, wages in the border

[5] The 1990 sample has a large number of observations with very low hourly wages. To account for what appears to be more severe measurement error in 1990, I first drop observations (3031 in total) with wages below $0.006 dollars per hour, for which there is zero mass in the 2000 sample and then trim the 1% tails.

region rose by 8.5 log points relative to south region, while wages in other regions were stable relative to the south. Fourth, there are changes in inter-industry wage differentials. Wages in agriculture, the excluded sector, rose relative to all industries except public administration and social assistance. This may reflect the reform of agriculture. With the breakup of ejidos, only relatively high-wage workers may have remained in the sector.

Some results are sensitive to whether or not the self-employed are included in the sample. Excluding the self-employed, wages in all regions except the Yucatan rose relative to the south. The border again showed the largest increase in relative wages.

Table 3b shows wage regressions for females. For women, there were increases in returns to education at all levels, with the largest increases occurring at the highest schooling levels. Wages in the south fell relative to wages in all other regions, with the border having the largest wage increases. In contrast to males, females in manufacturing earn relatively low wages. The results for women should be interpreted with caution. The large increase in female labor-force participation in the 1990's suggests that the composition of females in the labor force may have changed over time. Self-selection into work may introduce bias into the estimation for women.

Summary

Wages changes in the 1990's mirrored those in the 1980's. Returns to schooling appeared to rise, the border wage premium rose, and industry wages shifted in favor of agriculture. While manufacturing employment became more concentrated in the border region, the border's share of the national population increased only slightly.

ECONOMIC OPENNESS AND CHANGES IN MEXICO'S WAGE STRUCTURE

In this section, I examine the role that economic openness has played in Mexico's evolving wage structure. To do so, we need measures of shocks to the economy and to define groups of workers that have similar sensitivities to these shocks. Lacking data on individuals over time, I construct a panel of synthetic cohorts. For 1990 and 2000, I calculate average hourly earnings for individuals in the sample and then take mean wages for cells broken down by sex, age, education, and region. I define cells according to four 1990 age categories (16-25, 26-35, 36-45, and 46-55 years), seven education categories (0-4, 5-8, 9-11, 12, 13-15, and 16+ years of schooling), and each of Mexico's 32 states. I then track wage changes for the same cohort between 1990 and 2000 (e.g., the change in wages between 26-35 year-old males with 12 years of education in a given state in 1990 and 36-45 year-old males with 12 years of education in the same state in 2000).

Wages Changes for Mexican and U.S. Cohorts

The first exercise is to compare wage changes in Mexico and the United States. Evidence using high-frequency data in Robertson (2001) suggests that Mexico-U.S. wage convergence is occurring. I revisit the issue using long-period time changes. This requires constructing a matching panel of U.S. synthetic cohorts. To do so, I use the 1990 and 2000 Current Population Survey (for merged outgoing rotation groups). These cohorts are defined for the United States as a whole for the same age and education categories as their Mexican counterparts. One problem with the CPS is that it does not identify country of birth in 1990. U.S. cohorts thus include both immigrant and native-born workers. This is unfortunate because during the 1990's large numbers of

immigrants with low-education levels arrived in the United States. Immigration changes the underlying population of individuals from which the CPS sample is drawn, with the change being largest for the cohorts with the lowest education levels.

Table 4 summarizes changes in Mexican wages relative to changes in U.S. wages over the 1990's for the panel of synthetic cohorts. All wage changes are weighted by average cohort size in 1990 and 2000. In terms of nominal dollar values, Mexican wages rose relative to U.S. wages by 3.1 log points over 1990-2000. But Mexico's small relative nominal gains were swamped higher relative inflation in Mexico. As a result, Mexico's average real CPI wage fell by 17.3 log points. For mean wages, there thus appears to be no evidence of Mexico-U.S. wage convergence.

The results in Table 4 suggest there has been substantial variation in wage changes across labor-market groups in Mexico. To see this variation more clearly, Table 5 breaks out changes in real CPI Mexico wages and real relative CPI Mexico-U.S. wages for the sample of cohorts by age, education, and region. Real Mexico wages and real Mexico-U.S. wages fall least for younger cohorts. Young women are the only cohort to experience real wage gains both in absolute terms and relative to the United States. From Table 3, it is not surprising to see that more educated workers have higher wage growth. Men with 13 or more years of education have positive real wage gains, but only males in the 13-15 years of education cohort have real wages gains relative to the United States. Women with 12 or more years of education have real absolute and relative wage gains, again with the 13-15 years of education cohort showing the strongest gains.

Turning to regions, we see that on average all regions show real absolute and relative wage declines. These declines are smallest in the border region and largest in the

south and the Yucatan. In Table 3, more educated workers and workers in the border region were among those with the highest wages in 1990. The results in Table 5 suggest that young, highly educated workers living in the border region had the strongest wage growth during the 1990's. Together, these two findings suggest there was little wage convergence across labor market groups during the 1990's. This lack of convergence is consistent with Chiquiar's (2001) results on the late 1980's and early 1990's.

Estimation Results on Mexico-U.S. Wage Convergence

To examine the contribution of economic openness to changes in Mexico's wage structure, I estimate regressions of wage changes for the panel of synthetic cohorts. The dependent variable is the 1990-2000 change in log wages by Mexican cohort. The independent variables are drawn from the following set: the 1990 log wage for the Mexican cohort; the 1990 log wage for the same age-education U.S. cohort; the 1990-2000 change in log wages for the U.S. cohort; dummies variables for age, education level, and region; and measures of regional exposure to globalization.

I begin by replicating the specification in Robertson (2000), in which the independent variables are the log difference in lagged Mexico and U.S. wages and the log change in U.S. wages. He allows regression coefficients to differ between border and interior regions, in order to capture possibly stronger links between Mexican and U.S. labor markets for Mexican regions closer to the United States. Similarly, I interact regressors with a dummy variable for border states.

Table 6a reports the regression results for males and Table 6b reports the regression results for females. In column one of Table 6a, the regressors are the 1990

difference in log Mexico and U.S. wages, the 1990-2000 change in log U.S. wages, the interactions of the wage variables with the border dummy, and region dummy variables. The coefficient on the 1990 difference in Mexico-U.S. wages indicates whether there is wage convergence between Mexico and the United States. In column one, this coefficient is negative, small in magnitude, and imprecisely estimated. However, the interaction between this wage variable and the border dummy is negative and precisely estimated. For border states, but not for interior states, wage growth is higher for cohorts where initial Mexico wages are lower relative to U.S. wages. This is consistent with convergence between Mexico and U.S. wages in Mexican border states.

There is a strong positive correlation between wage growth in Mexico and wage growth in the United States. The precisely estimated coefficient of 1.3 indicates that Mexican wages increase more than one for one with increases in U.S. wages. This is consistent with labor markets in Mexico and the United States being integrated, through some combination of trade, investment, and migration flows. The border interaction with this variable is positive, though imprecisely estimated, showing weak evidence that Mexico-U.S. integration is stronger in border states than in interior states.

The large coefficient on U.S. wage growth is surprising and invites skepticism. One concern about the specification in column one is that by forcing the coefficients on 1990 Mexico wages and 1990 U.S. wages to be equal and of opposite sign we are possibly convoluting Mexico-U.S. wage convergence with convergence or divergence in wages across Mexican cohorts. To address this issue, in column two I add the 1990 log Mexico wage, and its interaction with the border dummy, as regressors. It is now the case that the coefficients on the difference in 1990 Mexico-U.S. wages and the border

interaction with this variable are statistically insignificant. This is evidence against Mexico-U.S. wage convergence. The coefficient on 1990 Mexico wages is positive and precisely estimated and the border interaction with this variable is negative and precisely estimated. What this suggests is that during the 1990's interior regions had higher wage growth for cohorts with higher initial wages. In other words, there was wage divergence in interior regions, but not in the border region. This evidence of growing wage dispersion is not surprising, given the rising returns to skill evident in Table 3. Overall, evidence of Mexico-U.S. wage convergence appears to be fragile. This confirms the impression from mean relative wage changes in Table 4.

In column three, I examine the sensitivity of changes in Mexico wages to changes in U.S. wages by adding dummy variables for three age categories (16-24 years of age is the excluded category) and dummy variables for five education categories (0-4 years of schooling is the excluded category) to the regression. The dummy variables for age are individually and jointly statistically insignificant. After controlling for education and U.S. cohort wage changes, there appear to be no age-specific wage changes in Mexico. The dummy variables for education are positive and precisely estimated, with larger magnitudes for higher education levels that suggest rising returns to schooling.

With controls for age and education included, the coefficient on U.S. wage changes becomes small and imprecisely estimated. Since U.S. wages vary only by age and education, the only variation left in U.S. wage changes after including age and education dummies are age-specific changes in the returns to education. The results suggest that it is the commonality in overall changes in returns to education that account for the strong positive correlation between Mexico and U.S. wage changes. These results

are not evidence against Mexico-U.S. labor market integration. Instead, they imply that the mechanisms that link wages in Mexico and the United States (be they trade, FDI, and/or migration) work through broad changes in the returns to education.

Estimation Results for Regional Exposure to Globalization

In column four of Table 6a, I add controls for regional exposure to globalization to the specification. To control for regional variation in business cycles, I also include the log change in state real GDP as a regressor. I include six measures of regional exposure to foreign trade and investment. The share of manufacturing in state GDP and the share of agriculture in state GDP control for variation across regions in industrial specialization in traded goods. The share of net foreign direct investment flows in state GDP controls for how attractive the state is to multinational enterprises. The state share of national maquiladora employment controls for the attractiveness of the state to foreign firms that specialize in export assembly operations. Some but not all FDI is in maquiladoras. Imports as a share of state GDP capture the exposure of the state to foreign trade (similar measures for exports are unavailable). Distance to the United States (nearest U.S. border crossing) captures physical proximity to U.S. markets.

Several estimation issues merit comment. Most globalization variables are in terms of shares averaged over the 1990's, rather than as changes in shares, to avoid introducing simultaneity into the regression. Average shares of FDI, imports, manufacturing, or agriculture in GDP capture cross-section differences in regional exposure to globalization. Changes in shares would capture state specific globalization shocks that might be correlated with unobserved shocks to wages. By regressing changes

in wages on average cross-sectional characteristics, I capture transitional dynamics in state wages associated with adjustment to NAFTA (and other shocks). Results are similar results when shares in the initial period are used instead of average shares.

I include one measure of regional opportunities to migrate to the United States. Some background is helpful to understand this measure. A large literature documents that some Mexican states are more likely than others to send migrants to the United States and have been for many decades (e.g., Woodruff and Zenteno 2001). These states are mostly in agricultural regions in western Mexico. They are neither the poorest states in the country nor the states that are closest to the United States. Most research attributes these migration patterns to longstanding regional networks that help Mexican workers find jobs in the United States. The persistence of these migration networks suggests that historical migration flows are a good indicator of current regional opportunities for migration abroad. The measure I use is the share of the 1960 state population that migrated to the United States over the period 1955-1959. I obtain similar results for current migration flows.[6] Historical measures reduce concerns about endogeneity.

Column four of Table 6a reports the results. Wage changes are uncorrelated with the share of state GDP in manufacturing or in agriculture. It appears that industrial specialization (at least measured at this aggregate level) is not associated with changes in regional wage differences. Mexican regions with larger manufacturing sectors do have higher wage levels but did not enjoy higher wage growth in the 1990's.

There are strong positive correlations between wage growth and the share of FDI and between wage growth the share of imports in state GDP. It appears that states with

[6] As one indication of this, the correlation between the shares of the state population that migrated to the United States over the period 1995-2000 and over the period 1955-1959 is 0.68.

greater exposure to multinational firms and/or with greater exposure to foreign trade enjoyed higher wage growth in the 1990's. This suggests, perhaps not surprisingly, that regions with better access to global markets for goods and capital had larger increases in the demand for labor during the 1990's. The correlation between wage changes and the state share of national maquiladora employment is positive but statistically insignificant. What this may suggest is that, controlling for FDI inflows (and for state proximity to the United States), there is nothing special about a state having a particular concentration in export assembly operations. What matters is overall access to foreign capital.

There is a strong positive correlation between wage changes and historical state migration rates to the United States. States with better opportunities for migration abroad had higher wage growth during the 1990's. This suggests that migration abroad puts upward pressure on wages in the region from which workers were drawn.

Regional exposure to globalization appears to account for a large portion of regional wage differentials. To see this clearly, compare results in columns three and four of Table 6a. The regression in column three includes controls for age, education, lagged Mexico and U.S. wages, and U.S. wage growth. In this regression coefficients on regional dummy variables are large and statistically significant. When I introduce the globalization measures in column four the magnitudes of these coefficients fall considerably and they become individually and jointly statistically insignificant. The regional characteristics that matter for wage in Mexico during the 1990's appear to be those related to regional exposure to foreign trade, investment, and migration.

The results for females are shown in Table 6b. With a few exceptions, the results for males and females are similar. For females, there remains the concern that changes in

their labor-force participation may complicate analysis of their wage changes. For women, there is stronger evidence of wage convergence between Mexico and the United States (columns one and two). For women, as for men, there is evidence of wage divergence in interior regions of the country, a strong positive correlation between Mexico wage growth and U.S. wage growth, and strong positive correlations between wage growth and the share of FDI in state GDP and historical state migration rates to the United States. There is no positive correlation between wage growth and the import share of GDP, as there is for men. Also distinct from men, the globalization variables do not render regional dummy variables statistically insignificant.

For males and females, I have estimated alternative specifications to gauge the robustness of the findings. The results on the globalization variables are robust to (a) allowing for interactions between returns to schooling and either border dummies or distance to the United States, (b) using as the dependent variable changes in Mexico wages minus changes in U.S. wages, and (c) measuring U.S. wages using data on the four U.S. border states only rather than data for the U.S. as a whole.

IMPLICATIONS OF MEXICO'S EXPERIENCE FOR AN FTAA

In this paper, I have surveyed recent literature on the impact of trade and investment liberalization in Mexico on wages in the country and examined recent changes in the country's wage structure. Over the last two decades, Mexico has dramatically opened its economy to the rest of the world. During this period, Mexico has experienced three significant changes in its wage structure: (a) overall wage levels have had large temporary declines, usually following a macroeconomic contraction, (b) wages

in states on the Mexico-U.S. border have increased relative to wages in the rest of the country, and (c) there has been a sustained increase in the returns to skill in the country, leading to an overall increase in wage inequality.

The breadth of Mexico's reforms complicates identifying their effects on labor markets in the country. Compounding these problems are the effects of Mexico's recent macroeconomic instability. Nevertheless, a number of important lessons emerge from Mexico's experience for how economic integration with other countries, and in particular with a large, rich neighbor, impacts labor markets in a developing country. These lessons are useful for gauging how an FTAA might affect other Latin American countries.

The liberalization of barriers to foreign trade and investment appears to have contributed to an increase in the relative demand for skill in Mexico. Recent literature suggests that tariff reductions increased relative wages for skilled workers, increased foreign investment raised the relative demand for skilled labor, and tariff and quota reductions altered inter-industry wage differentials. Mexico's economic opening thus appears to have raised the premium paid to skilled workers and reduced rents in industries that prior to reform paid their workers relatively high wages. Both of these outcomes have increased in wage dispersion in the country.

One factor that contributed to how trade affected wages in Mexico was that prior to trade reform, the country had relatively high tariffs on less-skill-intensive industries. These industries thus bore the brunt of adjustment to Mexico's economic opening. Similar tariff adjustments following an FTAA are unlikely to be a common occurrence in the rest of Latin America. One reason for this is that many countries have already engaged in some degree of unilateral trade liberalization. Columbia, for instance,

reduced its trade barriers in the early 1990s. As in Mexico, trade reform in Columbia led to larger tariff reductions in less-skill-intensive industries (Goldberg and Pavcnik, 2001). Thus, the shock of trade reform related to tariff reductions in low-skill industries may have already been delivered in many Latin American countries.

In the 1990's, Mexico consolidated its economic opening by signing and enacting NAFTA. The decade saw further increases in the premium paid to workers in Mexican states on the U.S. border and in the premium paid to more-skilled workers. Following Mexico's peso crisis of 1994-1995, real wage levels declined both in absolute terms and relative to the United States. Increases in the returns to education during the 1990's in Mexico were nationwide and appeared to follow closely increases in the returns to education in the United States. Partial labor-market integration between Mexico and the United States is a likely explanation for these cross-border wage co-movements. Changes in regional wage differentials in Mexico appear to be explained almost entirely by regional variation in exposure to foreign markets. Wage growth has been much stronger in regions with higher levels of FDI, higher levels of exposure to foreign trade, and higher rates of migration to the United States.

Overall, the workers in Mexico that have fared the best in the country's newly globalized economy are those with relatively high skill levels living in regions with relatively good access to foreign markets. Less-skilled workers and workers in regions with relatively poor access to foreign markets have fared poorly. This aspect of Mexico's experience with globalization holds important lessons for an FTAA. Multinational firms and firms in export-intensive sectors appear to have relatively strong demand for more-skilled labor and appear to place a premium on locating in regions with relatively high-

quality transportation and communication infrastructure. In Mexico, NAFTA appeared to fortify incentives for FDI. If an FTAA does the same in the rest of Latin America, it is likely to be skilled workers who benefit first and in particular those living in larger cities, or near international ports or airports. At least in the initial periods of adjustment to trade reform, the effects of greater economic openness appear to be greater dispersion in wages (with unknown effects on average wage levels). This is an unfortunate message for a region with already high levels of inequality.

A related lesson from Mexico's adjustment to NAFTA is that FDI appears to play an important role in shaping the pattern of specialization that emerges in an economy following a reduction in trade barriers. Much of Mexico's export growth has occurred in maquiladoras, whose expansion was made possible by a combination of lower trade barriers and relaxed restrictions on FDI in Mexico and tariff breaks on imports with U.S. content in the United States. If an FTAA does not also address restrictions on FDI in Latin America, it may not produce the same degree of regional specialization in export production that NAFTA has generated in Mexico.

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Table 1: Summary Statistics

		Males 1990	Males 2000	Females 1990	Females 2000
Age		32.7	33.8	32.7	33.7
Literate		91.3	94.5	86.3	91.7
Highest Grade	0	11.6	5.7	15.6	7.8
of Schooling	1 to 4	19.1	14.8	19.6	15.9
Completed	5 to 8	28.6	27.0	28.1	27.7
(%)	9	13.9	20.4	12.3	18.8
	10 to 11	7.7	7.2	7.4	6.7
	12	6.5	10.0	7.6	11.3
	13 to 15	5.2	4.9	5.1	4.6
	16+	7.2	9.6	4.0	6.8
Married		53.7	51.4	53.9	50.3
Region	Border	17.6	18.6	16.8	17.3
	North	10.4	10.0	10.3	10.0
	Center	33.6	32.7	34.3	34.0
	Capital	23.7	23.8	24.0	24.1
	Yucatan	4.7	5.4	4.5	5.1
	South	10.0	9.5	10.0	9.4
Size of	500k+	23.9	28.7	24.3	28.7
Locality	100k-500k	23.5	22.3	24.3	22.7
	15k-100k	12.9	13.7	13.3	13.9
	2.5k-15k	13.2	12.8	13.2	13.1
	<2.5k	26.5	22.5	24.9	21.7
Migration	Since Birth	22.4	23.5	23.0	23.9
	Within 5 Years	5.7	5.7	5.7	5.2
Self-Employed		22.0	21.3	3.3	7.9
Wage Earner		66.1	68.7	20.7	30.9
Hourly wage	Current Prices	1.33	1.80	1.24	1.82
(US$)	1990 Pesos		1.11		1.13
	1990 Dollars		1.37		1.38
N		211,133	265,797	228,964	288,228

This table shows summary statistics on a 1% sample of individuals 16-65 years old in the 1990 and 2000 Mexico *Censo de Poblacio y Vivienda*. Border: Baja California, Chihuahua, Coahuila, Nuevo Leon, Sonora, Tamaulipas; North: Aguascalientes, Baja California Sur, Durango, Nayarit, San Luis Potosi, Sinaloa, Zacatecas; Center: Colima, Guanajuato, Hidalgo, Jalisco, Michoacan, Morelos, Puebla, Queretaro, Tlaxcala, Veracruz; Capital: Federal District, Mexico; South: Chiapas, Guerrero, Oaxaca; Yucatan: Campeche, Tabasco, Quintana Roo, Yucatan.

Table 2: Distribution of Employment across Industries

	Males 1990	Males 2000	Females 1990	Females 2000
Agriculture, Mining	28.9	20.7	3.5	4.7
Manufacturing	20.7	20.0	20.5	19.3
Trans, Comm, Elec, Water	6.6	7.7	2.2	2.3
Construction	9.1	11.8	0.9	0.8
Commerce	12.3	14.3	18.9	23.0
Public Administration	3.8	4.2	5.1	4.5
General Services	4.1	6.0	6.5	6.3
Restaurants, Hotels	2.6	3.6	6.2	7.8
Social Assistance	5.1	5.1	23.1	16.8
Repair, Domestic Services	6.8	6.6	13.1	14.5

This table shows the allocation of workers across industries. See Table 1 for details on the sample.

Table 3a: OLS Wage Regressions, Males in 1990 and 2000

		Full Sample		w/o Self-Employed	
Variable		1990	2000	1990	2000
Highest Grade	1 to 4	**0.112**	**0.101**	**0.092**	**0.084**
of Schooling		(0.01)	(0.01)	(0.01)	(0.01)
Completed	5 to 8	**0.255**	**0.240**	**0.218**	**0.213**
		(0.01)	(0.01)	(0.01)	(0.01)
	9	**0.410**	**0.381**	**0.373**	**0.345**
		(0.01)	(0.01)	(0.01)	(0.01)
	10 to 11	**0.553**	**0.557**	**0.516**	**0.516**
		(0.01)	(0.02)	(0.02)	(0.02)
	12	**0.686**	**0.686**	**0.643**	**0.645**
		(0.01)	(0.01)	(0.01)	(0.01)
	13 to 15	**0.873**	**1.006**	**0.835**	**0.983**
		(0.02)	(0.02)	(0.02)	(0.02)
	16+	**1.221**	**1.352**	**1.168**	**1.329**
		(0.01)	(0.01)	(0.01)	(0.01)
Age		**0.045**	**0.032**	**0.042**	**0.029**
		(0.00)	(0.00)	(0.00)	(0.00)
Age Squared/100		**-0.047**	**-0.033**	**-0.045**	**-0.031**
		(0.00)	(0.00)	(0.00)	(0.00)
Married		**0.095**	**0.115**	**0.090**	**0.112**
		(0.01)	(0.01)	(0.01)	(0.01)
Size of	500k+	**0.293**	**0.308**	**0.238**	**0.286**
Locality		(0.01)	(0.01)	(0.01)	(0.01)
	100k-500k	**0.243**	**0.251**	**0.190**	**0.233**
		(0.01)	(0.01)	(0.01)	(0.01)
	15k-100k	**0.235**	**0.162**	**0.159**	**0.151**
		(0.01)	(0.01)	(0.01)	(0.01)
	2.5k-15k	**0.164**	**0.110**	**0.110**	**0.10**
		(0.01)	(0.01)	(0.01)	(0.01)
Border		**0.375**	**0.460**	**0.260**	**0.418**
		(0.01)	(0.01)	(0.01)	(0.01)
North		**0.281**	**0.274**	**0.150**	**0.229**
		(0.01)	(0.01)	(0.01)	(0.01)
Center		**0.246**	**0.225**	**0.130**	**0.183**
		(0.01)	(0.01)	(0.01)	(0.01)
Capital		**0.216**	**0.215**	**0.114**	**0.189**
		(0.01)	(0.01)	(0.01)	(0.01)

Table 3a Continued

Yucatan	**0.084**	**0.062**	**-0.028**	**0.065**
	(0.01)	(0.01)	(0.02)	(0.01)
Manufacturing	**0.292**	**0.221**	**0.220**	**0.196**
	(0.01)	(0.01)	(0.01)	(0.01)
Trans, Comm,	**0.328**	**0.209**	**0.237**	**0.172**
Elec, Water	(0.01)	(0.01)	(0.01)	(0.01)
Construction	**0.372**	**0.263**	**0.277**	**0.213**
	(0.01)	(0.01)	(0.01)	(0.01)
Commerce	**0.286**	**0.134**	**0.125**	**0.057**
	(0.01)	(0.01)	(0.01)	(0.01)
Public Admin.	**0.063**	**0.185**	**0.033**	**0.174**
	(0.01)	(0.01)	(0.01)	(0.01)
Gen. Services	**0.397**	**0.277**	**0.268**	**0.204**
	(0.01)	(0.01)	(0.02)	(0.01)
Restaurants,	**0.215**	**0.127**	**0.050**	**0.012**
Hotels	(0.02)	(0.02)	(0.02)	(0.02)
Soc. Assist.	**0.274**	**0.375**	**0.236**	**0.375**
	(0.01)	(0.01)	(0.01)	(0.01)
Repair,	**0.305**	**0.153**	**0.144**	**0.066**
Domestic Serv.	(0.01)	(0.01)	(0.01)	(0.01)
N	93,999	121,873	67,409	89,778
R-Squared	0.306	0.418	0.295	0.449

Standard errors are in parentheses. The sample for the estimation is a 1% random sample of individuals 25-65 years old from the 1990 and 2000 Mexico *Censo de Poblacio y Vivienda*. Individuals with wages in the highest or lowest 0.5% of wage values have been dropped (see text for details). The first two columns show results for all wage earners. The second two columns show results excluding the self-employed. Sampling weights were used in the 2000 census but not in the 1990 census. Accordingly, the 1990 regressions are unweighted while the 2000 regressions are weighted. See Table 1 for other details.

Table 3b: OLS Wage Regressions, Females in 1990 and 2000

		Full Sample		w/o Self-Employed	
Variable		1990	2000	1990	2000
Highest Grade	1 to 4	**0.124**	**0.172**	**0.092**	**0.153**
of Schooling		(0.02)	(0.02)	(0.02)	(0.02)
Completed	5 to 8	**0.224**	**0.351**	**0.188**	**0.312**
		(0.02)	(0.02)	(0.02)	(0.02)
	9	**0.459**	**0.542**	**0.438**	**0.493**
		(0.02)	(0.02)	(0.02)	(0.02)
	10 to 11	**0.592**	**0.762**	**0.575**	**0.726**
		(0.02)	(0.02)	(0.03)	(0.03)
	12	**0.736**	**0.865**	**0.718**	**0.819**
		(0.02)	(0.02)	(0.02)	(0.02)
	13 to 15	**0.877**	**1.201**	**0.856**	**1.167**
		(0.02)	(0.02)	(0.02)	(0.03)
	16+	**1.089**	**1.398**	**1.055**	**1.351**
		(0.02)	(0.02)	(0.02)	(0.02)
Age		**0.048**	**0.045**	**0.043**	**0.040**
		(0.00)	(0.00)	(0.00)	(0.00)
Age Squared/100		**-0.051**	**-0.046**	**-0.045**	**-0.039**
		(0.00)	(0.00)	(0.01)	(0.00)
Married		**0.121**	**0.093**	**0.108**	**0.101**
		(0.01)	(0.01)	(0.01)	(0.01)
Size of	500k+	**0.268**	**0.319**	**0.184**	**0.279**
Locality		(0.02)	(0.02)	(0.02)	(0.02)
	100k-500k	**0.227**	**0.266**	**0.143**	**0.230**
		(0.02)	(0.02)	(0.02)	(0.02)
	15k-100k	**0.144**	**0.175**	**0.052**	**0.140**
		(0.02)	(0.02)	(0.02)	(0.02)
	2.5k-15k	**0.123**	**0.131**	**0.039**	**0.115**
		(0.02)	(0.02)	(0.02)	(0.02)
Border		**0.277**	**0.416**	**0.235**	**0.347**
		(0.02)	(0.02)	(0.02)	(0.02)
North		**0.145**	**0.202**	**0.096**	**0.133**
		(0.02)	(0.02)	(0.02)	(0.02)
Center		**0.104**	**0.178**	**0.066**	**0.118**
		(0.02)	(0.02)	(0.02)	(0.02)
Capital		**0.179**	**0.249**	**0.145**	**0.199**
		(0.02)	(0.02)	(0.02)	(0.02)

Table 3b Continued

Yucatan	**0.00**	**0.160**	**-0.026**	**0.102**
	(0.03)	(0.02)	(0.03)	(0.02)
Manufacturing	**-0.008**	**0.003**	**-0.013**	**0.01**
	(0.02)	(0.02)	(0.02)	(0.02)
Trans, Comm,	**0.178**	**0.227**	**0.166**	**0.204**
Elec, Water	(0.03)	(0.03)	(0.03)	(0.03)
Construction	**0.287**	**0.167**	**0.229**	**0.129**
	(0.05)	(0.04)	(0.05)	(0.04)
Commerce	**0.007**	**-0.10**	**-0.091**	**-0.101**
	(0.02)	(0.02)	(0.02)	(0.02)
Public Admin.	**-0.052**	**0.171**	**-0.053**	**0.162**
	(0.03)	(0.02)	(0.02)	(0.02)
Gen. Services	**0.183**	**0.154**	**0.136**	**0.111**
	(0.03)	(0.02)	(0.03)	(0.02)
Restaurants,	**0.003**	**-0.018**	**-0.111**	**-0.118**
Hotels	(0.02)	(0.02)	(0.03)	(0.02)
Soc. Assist.	**0.124**	**0.310**	**0.113**	**0.301**
	(0.02)	(0.02)	(0.02)	(0.02)
Repair,	**-0.174**	**-0.135**	**-0.221**	**-0.162**
Domestic Serv.	(0.02)	(0.02)	(0.02)	(0.02)
N	26,583	47,008	21,988	37,066
R-Squared	0.294	0.475	0.329	0.523

See Table 3a for details on the estimation.

Table 4: Changes in Mexico-U.S. Relative Wages, 1990-2000

	Males		Females	
	Mean	St. Dev.	Mean	St. Dev.
Change in Log Wages 1990-2000:				
Nominal Mexico Wages	0.291	0.205	0.474	0.258
Real Mexico Wages (CPI)	-0.190	0.205	-0.006	0.258
Nominal U.S. Wages	0.260	0.050	0.300	0.055
Real U.S. Wages (CPI)	-0.016	0.050	0.024	0.055
Change in Log Mexico/U.S. Wages 1990-2000:				
Nominal Wages	0.031	0.192	0.175	0.242
Real Wages (CPI)	-0.173	0.192	-0.030	0.242

This table shows changes in wages for a panel of synthetic cohorts in Mexico and the United States for two years (1990, 2000), four 1990 age categories (16-25, 26-35, 36-45, and 46-55 years), seven education categories (0-4, 5-8, 9-11, 12, 13-15, and 16+ years of schooling), and Mexico's 32 states (U.S. cohorts are defined for the nation as a whole). Nominal Mexico and U.S. wages are in terms of current U.S. dollars.

Table 5: Change in Log Real CPI Wages, 1990-2000

Real CPI Wages	Age in 1990	Males	Females	Years of Education	Males	Females	Region	Males	Females
Mexico	16-25	-0.125	0.087	4	-0.341	-0.233	Border	-0.053	0.081
Mex/US		-0.113	0.020		-0.288	-0.204		-0.041	0.052
Mexico	26-35	-0.182	-0.031	5-8	-0.225	-0.037	North	-0.187	0.043
Mex/US		-0.157	-0.029		-0.204	-0.055		-0.170	0.016
Mexico	36-45	-0.292	-0.150	9-11	-0.141	-0.003	Center	-0.222	-0.042
Mex/US		-0.282	-0.132		-0.132	-0.050		-0.202	-0.065
Mexico	46-55	-0.373	-0.303	12	-0.083	0.043	Capital	-0.193	-0.018
Mex/US		-0.311	-0.308		-0.076	0.009		-0.183	-0.040
Mexico				13-15	0.105	0.258	Yucatan	-0.273	0.023
Mex/US					0.118	0.274		-0.252	-0.001
Mexico				16+	0.021	0.129	South	-0.312	-0.142
Mex/US					-0.067	0.045		-0.285	-0.156

This table shows the mean change in real CPI wages for Mexico and for Mexico relative to the U.S. by age, schooling, and region of Mexico. The sample is the panel of synthetic cohorts. See Table 4 for details.

Table 6a: Change in Log Wages 1990-2000 for Synthetic Cohorts, Males

$W^{90,MX}/W^{90,US}$	**-0.027**	**-0.133**	**-0.015**	**-0.027**
	(0.06)	(0.07)	(0.22)	(0.17)
$W^{00,US}/W^{90,US}$	**1.276**	**1.202**	**-0.046**	**-0.132**
	(0.18)	(0.18)	(0.34)	(0.27)
$(W^{90,MX}/W^{90,US})$*Border	**-0.221**	**-0.067**	**0.05**	**0.008**
	(0.09)	(0.10)	(0.08)	(0.09)
$(W^{00,US}/W^{90,US})$*Border	**0.446**	**0.538**	**0.175**	**0.186**
	(0.31)	(0.31)	(0.25)	(0.23)
Border	**-0.256**	**0.033**	**0.391**	**0.099**
	(0.21)	(0.23)	(0.18)	(0.19)
North	**0.106**	**0.106**	**0.143**	**0.05**
	(0.05)	(0.05)	(0.03)	(0.04)
Center	**0.071**	**0.072**	**0.108**	**0.052**
	(0.04)	(0.04)	(0.03)	(0.04)
Capital	**0.105**	**0.098**	**0.122**	**-0.022**
	(0.04)	(0.04)	(0.03)	(0.04)
Yucatan	**0.006**	**0.005**	**0.003**	**-0.015**
	(0.05)	(0.05)	(0.04)	(0.04)
$W^{90,MX}$		**0.096**	**-0.277**	**-0.374**
		(0.03)	(0.22)	(0.18)
$(W^{90,MX})$*Border		**-0.139**	**-0.148**	**-0.133**
		(0.05)	(0.04)	(0.04)
Age Cohort 26-35			**-0.031**	**-0.014**
			(0.06)	(0.05)
Age Cohort 36-45			**-0.064**	**-0.032**
			(0.09)	(0.08)
Age Cohort 46-55			**-0.099**	**-0.069**
			(0.09)	(0.08)
Grades 5-8			**0.129**	**0.143**
			(0.04)	(0.03)
Grades 9-11			**0.232**	**0.264**
			(0.05)	(0.04)
Grade 12			**0.398**	**0.450**
			(0.11)	(0.09)
Grade 13-15			**0.631**	**0.697**
			(0.13)	(0.11)

Table 6a Continued

Grade 16			**0.708**	**0.818**
			(0.23)	(0.18)
State GDP Growth				**0.143**
1993-99				(0.14)
Mfg. Share of State GDP				**0.009**
1993-99				(0.16)
Agr. Share of State GDP				**-0.159**
1993-99				(0.32)
FDI Share of State GDP				**2.821**
1994-99				(1.12)
State Share of Maquila				**0.147**
Employment				(0.16)
Import Share of State GDP				**1.506**
1993-99				(0.75)
Km. to US Border				**-0.014**
				(0.01)
State-US Migration Rate				**3.281**
1955-59				(0.46)
N	728	728	728	728
R-Squared	0.239	0.254	0.595	0.667

This table shows regressions using as the dependent variable the 1990-2000 change in log wages for synthetic age-education-state cohorts of males in Mexico. Standard errors are in parentheses. All wage measures are in logs as is GDP used to calculate the 1993-1999 change in the variable. All share measures are entered in levels. See Table 5 for more details on the age and education definitions for the cohorts.

Table 6b: Change in Log Wages 1990-2000 for Synthetic Cohorts, Females

$W^{90,MX}/W^{90,US}$	**-0.452**	**-0.80**	**-0.237**	**-0.23**
	(0.05)	(0.08)	(0.25)	(0.23)
$W^{00,US}/W^{90,US}$	**1.972**	**2.046**	**0.256**	**0.266**
	(0.24)	(0.23)	(0.30)	(0.28)
$(W^{90,MX}/W^{90,US})$*Border	**-0.181**	**0.054**	**0.216**	**0.092**
	(0.10)	(0.13)	(0.11)	(0.11)
$(W^{00,US}/W^{90,US})$*Border	**-0.689**	**-0.683**	**-0.547**	**-0.62**
	(0.41)	(0.40)	(0.35)	(0.32)
Border	**0.234**	**0.669**	**0.90**	**0.611**
	(0.21)	(0.24)	(0.21)	(0.21)
North	**0.190**	**0.191**	**0.172**	**0.097**
	(0.04)	(0.04)	(0.04)	(0.05)
Center	**0.116**	**0.124**	**0.130**	**0.118**
	(0.04)	(0.04)	(0.03)	(0.05)
Capital	**0.198**	**0.199**	**0.211**	**0.119**
	(0.05)	(0.04)	(0.03)	(0.06)
Yucatan	**0.154**	**0.149**	**0.133**	**0.163**
	(0.06)	(0.06)	(0.04)	(0.05)
$W^{90,MX}$		**0.269**	**-0.471**	**-0.516**
		(0.04)	(0.25)	(0.24)
$(W^{90,MX})$*Border		**-0.167**	**-0.173**	**-0.156**
		(0.07)	(0.05)	(0.05)
Age Cohort 26-35			**0.011**	**0.029**
			(0.06)	(0.06)
Age Cohort 36-45			**0.023**	**0.044**
			(0.08)	(0.07)
Age Cohort 46-55			**-0.069**	**-0.048**
			(0.08)	(0.08)
Grades 5-8			**0.209**	**0.211**
			(0.03)	(0.03)
Grades 9-11			**0.361**	**0.373**
			(0.04)	(0.04)
Grade 12			**0.570**	**0.590**
			(0.10)	(0.10)
Grade 13-15			**0.870**	**0.897**
			(0.14)	(0.13)

Table 6b Continued

Grade 16			**0.893**	**0.925**
			(0.22)	(0.21)
State GDP Growth				**-0.069**
1993-99				(0.19)
Mfg. Share of State GDP				**-0.02**
1993-99				(0.20)
Agr. Share of State GDP				**0.459**
1993-99				(0.40)
FDI Share of State GDP				**4.208**
1994-99				(1.38)
State Share of Maquila				**0.211**
Employment				(0.21)
Import Share of State GDP				**-0.326**
1993-99				(0.90)
Km. to US Border				**0.011**
				(0.02)
State-US Migration Rate				**2.287**
1955-59				(0.73)
N	702	702	702	702
R-Squared	0.311	0.375	0.624	0.649

See notes to Table 6a.