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THE REASONS BEHIND THE INCREASING WAGE INEQUALITY IN MEXICO[1]

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1. Introduction

Increasing wage inequality in Mexico has been the subject of study for at least 10 years. The first reports of the rising wage dispersion in Mexico attracted the attention of several labor economics scholars in the US. Some of these analysts were predicting increases in wage inequality in their country, and expecting decreases in wage inequality in Mexico due to the deeper economic integration among the two countries brought about by NAFTA [Feenstra and Hanson (1997)].

With data from household and firm surveys, the studies agreed that the labor market changes in Mexico were similar to those happening in developed countries like the US and the UK, and that these changes were, on the aggregate, favoring highly skilled workers [see Cragg and Epelbaum (1995, 1996), Meza (1999), Robertson (2001), Airola and Juhn (2001) and Esquivel and Rodriguez (2003) among others].

In the literature, explanations of the increasing wage inequality in Mexico have concentrated on trade and financial liberalization, and skill-biased technological change. Regarding the first reforms, which increased economic competition, some analysts say they generated price changes that modified the relative prices of factors of production, favoring capital and skilled labor relative to non-skilled workers. The explanation of these price changes is that industries more exposed to foreign competition, where goods prices fell the most, were exactly those intensive in unskilled labor, and where protection was higher before the market oriented reforms [Robertson (2001), Feliciano (2001), Revenga (1997) among others]. Other analysts suggest these reforms deepened economic integration with the US economy, and that this created the conditions to replicate the labor market changes of the neighbor to the north. In this sense, foreign investment appears to have played a major role in increasing the relative demand for highly qualified workers [(Feenstra and

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Hanson (1997), Robertson (2000) and Hanson (2003)]. Regarding technological change, some authors say the world advancement in this area has pushed the demand for highly skilled labor upwards [Cragg and Epelbaum (1996) and Meza (1999), among others], causing an increase in its relative cost[3].

But trade and financial liberalization and technological change were not the only factors affecting Mexican labor markets during the 90s. In this decade Mexican society experienced a series of demographic and economic transformations and suffered the effect of a deep economic crisis, which altered the way local labor markets worked. All these changes may mask the real effect of trade and financial liberalization and technological change on wages, and can lead to erroneous conclusions about the effect of economic integration on labor markets. In this paper I try to explore the effect of different economic and demographic changes on the variability of local wage structures in order to reach more realistic conclusions about the sources of wage inequality in Mexico.

In developed countries, where increasing wage inequality has been a subject of study, some authors have tried to link changes in wage distributions to industrial, demographic and economic changes in local labor markets. These authors consider that local labor markets are not totally integrated, at least in the short run, and that their differences can be used to better understand the greater wage dispersion. Blanchard and Katz (1992), for example, show that local labor markets in the US are integrated in the long run due to the mobility of goods and factors, but that in the short run (less than 10 years), these markets experience idiosyncratic changes that affect the wage and employment structures at a local level. Following this idea, Karoly and Klerman (1994) use regional panel data to try to explain the increasing wage inequality in this country. They suggest that local changes in the relative supply of education, the local unemployment rate, and less unionization cause important changes in local wage structures, but that change in the industrial composition of total output does not. This result is controversial, because many other studies find that changes in the industrial composition of output have important effects on local labor markets [Murphy and Welch (1991), Borjas and Ramey (1993), Bernard and Jensen (1998), among others]. In Mexico, there has been little

[3] Other explanations of the increasing wage inequality have been the changes in labor market institutions that have lowered minimal wages and the proportion of unionized workers [Fairris (2001) and Feliciano (1998)].

analysis of local labor markets, despite the clear regional economic differences and the specific geographic characteristics that discourage short run integration of goods and factors markets. Robertson (2000) analyzes the degree of integration of Mexican and American local labor markets, estimating the effect of US wage shocks on Mexican wages at a city level. The author concludes that local wage shocks in the US greatly affect wages, especially in northern Mexican cities, but that it is precisely in these cities where Mexican wages move faster toward the level of US wages after a shock. Robertson argues that in the northern border region, cities with more foreign direct investment and with more emigration to the US are the ones experiencing more wage shocks related to US wage changes. In a related work, Hanson (2003) uses data from the 1990 and 2000 censuses and examines the role economic openness has played in Mexico's evolving wage structure, using measures of shocks to the regional economies. To analyze the effect on wages of economic integration to the US market, he runs relative wage equations at a state level, using as regressors the proportion of manufacturing and agriculture in state GDP, the share of net foreign direct investment flows in state GDP, and the share of national maquiladora employment, to respectively control for the regional specialization in tradable goods, for the attractiveness of the state to multinational enterprises and for the establishment of export assembly operations. The author finds that regional exposure to globalization accounts for a large proportion of regional wage differentials, and that wages decreased the least during the nineties precisely in states more integrated to the US markets.

Following Hanson (2003), but using wage differentials among groups of population within cities as dependent variables, instead of regional wage differentials, this work tries to understand the reasons behind the increasing wage inequality in Mexico during the 90´s, using data from local labor markets. I do not solely concentrate on the effect of economic integration on the changes in wage structures, but try to understand the role other economic changes could have played in the increasing wage inequality. In this paper I use annual data and define local labor markets at the city and not the state level because, even within Mexican states, one can find enormous differences among localities. My work tries then to find the demographic, industrial and macroeconomic local factors that influenced local wage changes in Mexico between 1988 and 1999. The data used come from 16 different Mexican cities with different population and industrial structures, and with different economic

cycles. The definition of the local labor markets in this paper is as arbitrary as in any other study of this kind. To define a local labor market I only assume perfect mobility of resources within and imperfect mobility among different markets. If these markets are not totally integrated with each other, at least in the short run, we can observe that demand and supply shocks have differentiated effects on these markets, and therefore differentiated effects on local wage structures.

This work is organized as follows: Section 2 shows the evolution of four aggregated wage inequality measures: two log hourly wage differentials and two education premia. Section 3 describes the time changes in my measures of wage inequality at a city level, for the whole 1988-1999 period. Section 4 presents the panel estimations of the determinants of the local wage inequality measures, and Section 5 presents the conclusions.

2. Wage inequality in Mexico between 1988 and 1999.

Changes in income inequality in Mexico are largely explained by changes in wage inequality because, for most Mexican workers, the main source of income is labor. There are many ways to measure wage inequality: the wage variance, the coefficient of variation of salaries, a Gini coefficient, differentials between average wages in different points of the wage distribution, or average wage differentials among different population groups. In this chapter I use four wage differentials to proxy aggregate wage inequality[4]: the 75-25 and the 50-10 log hourly wage differentials, and the college and high school education premia.

The data used come from the National Urban Employment Survey (ENEU), similar to the CPS in the US. This is a quarterly household survey collected by the National Institute of Statistics and Geography (INEGI). In this article, quarterly data is aggregated into annual data for the 1988-1999 period. The survey includes socio-demographic and economic information on all members in the household, and it is representative of the whole urban population of the country and of the population of each city included in the sample. The information refers to the week prior to the survey, and includes hours worked, salaries, occupation, industry, and education of the household members. To carry out the estimations, the sample was divided in two

[4] Calculations of wage inequality measures at a national level were carried out using annual wage-employed-male samples and weighted individual level data.

subgroups: the population in the labor force age group (16-65) and a wage-employed-males sample. The estimations that involve wages are calculated for the wage-employed-males sample only. The wage-employed-males sample includes men aged 16-65, who worked more than 30 hours the week before the survey and who declared having worked more than 50 weeks the year prior to the survey. Nominal salaries are deflated using the National Consumer Price Index base 1994. The rest of the estimations are carried out using the whole sample aged 16-65. The cities included in the analysis are the ones with information covering the whole period. The 16 cities are listed in table 1, along with their municipalities.

The inequality measures used in this section are all calculated using the wage-employed-male weighted sample. Graph 1 shows the time trend of the 75-25 and the 50-10 log hourly wage differentials, graph 2 shows the time trend of the college and the high-school education premiums for the period of analysis. The first graph shows the two wage differentials in two panels. In the first panel we observe a clear, long run increasing tendency in the 75-25 wage differential, although we also observe decreases in certain periods that suggest a declining-inequality-force taking place during the last part of the decade, when growth rates increased after the 1995 financial crisis. In the second panel a clearer long-run increasing trend is perceived although it is not as dramatic as in the other panel. A small decrease is again observed in the last part of the decade, but both panels in graph 1 suggest a clearly rising wage inequality during the 90s.

To analyze what happened to wage inequality in Mexico during the 90s we can also study the changes in wage differentials among groups of population defined by skills. In this paper I concentrate on changes in the returns to formal education. According to the ENEU data, in 1988 a male urban worker with more than 3 years of primary education in Mexico, working full time, was earning an average of 5.69 constant pesos per hour (base 1994). That same year, a male urban full time worker, with some college education, was earning an average of 21.74 constant pesos per hour. This means that in 1988, a male worker with some college education was making 3.82 times the salary of an average primary educated worker in urban areas. In 1999, the primary educated full-time urban workers were earning, on average, 4.87 constant pesos per hour, but the full-time male urban workers with some college education were earning an average of 21.96 constant pesos, that is, 4.5 times the average primary educated worker salary. This means that in a twelve

years span, the wage differential between college educated and primary educated workers increased about 18.5%. This is consistent with other authors' findings regarding an increasing return to college education in Mexico[5].

Graph 2 shows two different aggregate measures of the returns to education in Mexico for the 1988-1999 period. These returns to education are first measured by the differential between the average log hourly wage of the college-educated group and the average log hourly wage of the primary-educated group in the wage sample. They are then measured as the differential in the log average wage between the high school and the primary educated groups in the wage sample[6]. Many studies of the recent changes in the Mexican wage structure have emphasized the importance of the increases in the returns to college education as one of the main factors behind the increasing wage inequality in the country [Cragg and Epelbaum (1996) and Meza (1999), among others]. The graph certainly supports this idea and presents a sharp increase in the college education premium between 1989 and 1997. In 1997 we again observe a decline in inequality measured as the return to college education, suggesting again an important equalizing force taking place in the last part of the decade. The second panel in graph 2 is drawn using a different scale, and suggests a rising high-school premium just before the economic crisis of the mid 90s. It also suggests that this inequality measure was not very different in 1999 relative to what was observed in 1988. This contrasts with Hanson´s (2003) findings, using data from the Census. According to Hanson, college and high-school education received rising returns during the 90s in Mexico, relative to basic education. This suggests that when the calculations exclude rural and less developed urban communities, Hanson´s conclusion is not straightforward. This suggests very different patterns of wage changes within rural and urban labor markets.

The evidence presented so far shows an increasing aggregate wage inequality in Mexico during the 90s, at least until 1997. However, this might be masking variability at the local labor markets level and, if so, this variation can be exploited to better understand the reasons behind this phenomenon. The following section presents evidence of the changes in wage inequality observed between 1988 and 1999 in the 16 cities included in the sample.

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[5] For an excellent discussion about recent changes in the Mexican wage distribution see Esquivel and Rodríguez-López (2003).

[6] When returns to education are calculated through Mincer equations the same trends emerge.

3. Wage inequality in local labor markets.

Local labor markets in this study exhibit different demographic and industrial characteristics. Table 2 presents data on the average proportions of workers with certain observable characteristics in each of the cities included in the analysis. According to the data in table 2, the city with the highest proportion of college-educated inhabitants is Veracruz, followed by Monterrey, while the cities with the lowest proportions of college educated people are León and Ciudad Juarez. The city with the highest proportion of young inhabitants (16-25) is Leon, while the city with the highest proportion of older people (56-65) is Orizaba. Workers in large cities like Mexico City, Monterrey and Guadalajara seem to be concentrated in the service sector, and the city with the largest average unemployment rate during the whole period appears to be Monterrey.

I now proceed to analyze local wage structures. Table 3 shows some points of the wage distribution of the 16 cities included in the analysis, for years 1988 and 1999. The data suggest important wage differentials among cities in both periods. While the average hourly constant wage in Mexico City, Monterrey and Guadalajara, the largest cities in the country, was around 7 and 9 constant pesos in 1988, in cities in central and south Mexico (Puebla, León, San Luis Potosí, Torreón, Orizaba, Veracruz and Mérida) this average was around 4 or 5 pesos. From 1988 to 1999 we observe a sizeable drop in practically all wages, except for a few points in the upper part of some local wage distributions. In the largest cities, the average wage remains around 8 pesos per hour -except in Guadalajara, where the average wage increases because of the rise in the last decile of the distribution. On the other hand, average wages in the southern and coastal cities remain around 5.5 pesos per hour, suggesting a slight decrease in wage inequality among cities. In the northern border cities we observe a significant drop in the average wages, showing a very homogeneous trend in the region. When the wage changes are analyzed throughout the distribution, the regional trends disappear, and the data suggest the importance of local variables in the analysis.

Wages in the lower part of Mexico City's wage distribution seem to have dropped considerably in the 1988-1999 period, but this decrease is smaller the higher we move in the distribution. While in the first decile the average hourly wage decreased around 26% between 1988 and 1999, the average hourly wage in the median of the distribution decreased only 14.25% in the same interval.

In the third quartile of the distribution the average hourly wage increased around 20%, suggesting an important increase in wage inequality. Wages in the last decile of the distribution seem to have increased considerably, but other studies insist on the great volatility of wages in this part of the Mexican wage distribution (Meza, 1999).

Something similar is observed in Guadalajara, where wages in the lower part of the wage distribution decrease while wages in the upper part increase. However, in this case the rise in the highest salaries is considerably larger than in Mexico City, suggesting an even more important increase in inequality. In the other large city, Monterrey, the pattern of changes seems completely different, suggesting again the importance of local variables on the labor market changes. In this city the average hourly wage decreased almost 28%, because wages in practically the whole distribution dropped in the analyzed period. The magnitude of the changes suggests a decrease in wage inequality in this northern city, a phenomenon that contrasts with the changes reported at the aggregate level. Decreases in the labor demand, or increases in the labor supply could be behind this peculiar fact.

In cities near the Gulf of Mexico, changes in the wage distribution differ slightly from what we observe in the largest cities. First, the wages in the middle part of the distribution seem to have dropped more than wages in the extreme parts of the distribution, suggesting a decrease in wage inequality in Tampico, Orizaba and Matamoros. In all these cities, average hourly wages in all points of the distribution fell between 1988 and 1999, like those reported for Monterrey. These cities are beginning to lose population, and this emigration could be the result of a decrease in the demand for certain kinds of labor.

Along the US border, the wage changes greatly differ among cities, confirming the importance of the analysis at a city level. For example, in Tijuana, Matamoros and Ciudad Juárez, hourly wages at all points of the wage distribution fell between 1988 and 1999, suggesting deterioration in local labor conditions, while in Nuevo Laredo and Chihuahua we observe wage changes leading to a greater wage inequality. In these last two cities, wages fell in the lower part of the distribution and increased in the upper part, and the increase is larger the higher we move in the distribution. The different patterns of wage changes among cities throughout the 90s can be explained by different degrees of economic integration with the world economy, different migration patterns and different local demographic and industrial structures.

Table 4 includes different wage inequality measures for the 16 cities in the first and last years of the analysis. The data on the standard deviation of wages in different cities give us an idea of the changes in wage dispersion throughout the decade. The cities where the variance increases the most are located in central and southern Mexico, while the cities where the variance of wages decreases are mainly located in the north. At first glance it may appear that inequality decreased in the cities more integrated with the US economy, and increased in the cities less integrated or at least less close to the US. The only medium size city in the traditional migration region (León) also presents a decrease in inequality, suggesting trends worth studying. Analyzing other inequality measures, the same trend emerges (see table 5 which includes two different measures of returns to education, for all 16 cities).

What explains the differentiated changes in wage inequality in cities facing the same national macroeconomic environment? Can local characteristics be behind them? And if so, what local characteristics are these? The following section includes an econometric analysis that tries to identify the local forces behind the changes in the three wage inequality measures.

4. Local labor markets and wage inequality in Mexico

Using cross section and time series data, this part of the work uses the local and temporal variability in three different wage inequality measures to deepen the analysis of the sources behind the increase in wage inequality in Mexico. This analysis is particularly interesting in a country like Mexico, where different regions have been exposed to different policies and where homogeneous data for the different regions is available. Specifically, this part of the analysis uses panel regressions to quantify the effect of demographic, industrial and macroeconomic changes on local wage inequality variability.

The basic model is a linear regression of the average log hourly wage of a certain population group "a", divided by the average log hourly wage of a population group "b". This rate is regressed on a vector of variables that change either locally or temporarily or both, and that are thought to influence the analyzed wage inequality measures.

$$\log\left[w_{a,kt} / w_{b,kt}\right] = \alpha_{ab} + \beta_{ab} X_{kt} + u_{ab,kt}$$

where k is the geographic unit, and t is the time period. The geographic units are the 16 cities included in the analysis, and the time units are the 12 years included in the 1988-1999 time span. Vector X_{kt} includes yearly variables at a local level.

When the dependent variable is the hourly wage differential between two groups of workers defined by a certain observable characteristic, like schooling, one of the regressors is defined as the relative supply of the analyzed group with respect to the group used in the definition of the dependent variable. Specifically, when the left hand side variable is the relative wage of college educated workers with respect to primary educated workers, one of the independent variables is the supply of college educated people relative to primary educated people. In that case, the estimated regression is:

$$\log\left[w_{a,kt} / w_{b,kt}\right] = \alpha_{ab} + \gamma_{ab}\left[n_{ij} / n_{kj}\right] + \beta_{ab} X_{kt} + u_{ab,kt}$$

where $[n_{ij}/n_{kj}]$ represents the local supply of college educated people, relative to primary educated, for each one of the t years included in the analysis. We expect that increases in the relative supply of college-educated labor will decrease its relative price, so we expect γ to be negative. This coefficient γ is interpreted as the elasticity of relative wages with respect to the relative supply.

The equations of this paper are estimated with four different specifications of the residuals. The regression residuals, for each one of the specifications, take the following form:

$$(1)\ u^1_{ab,kt} = e_{ab,kt}$$

$$(2)\ u^2_{ab,kt} = \mu_{ab,t} + e_{ab,kt}$$

$$(3)\ u^3_{ab,kt} = \eta_{ab,k} + e_{ab,kt}$$

$$(4)\ u^4_{ab,kt} = \eta_{ab,k} + \mu_{ab,t} + e_{ab,kt}$$

where $e_{ab,kt}$ represents the changes in wage inequality explained by time and local changes in unobserved variables. The term $\mu_{ab,t}$ represents the changes in wage inequality attributed to time changes in unobserved local variables,

while $\eta_{ab,k}$ represents the changes in wage inequality attributed to local changes in unobserved yearly variables.

The first one is a "pooling" specification and, in this case, each wage rate has an independent error term, either locally or yearly. Here the parameters of the regression are determined through the variation of the time series and the local cross sections. The second and third specifications include year and local fixed effects, respectively. In the second specification, the time effects on the wage inequality measures are absorbed in the year intercepts, therefore we can say this is similar to a cross section specification, while the third one is similar to a time series specification, where the local effects on the wage inequality measures are absorbed in the city intercepts. With the second specification we find the local variables affecting wage inequality, and with the third specification we find the national variables affecting wage inequality through time. The last specification includes both time and local fixed effects, and through a comparison with the second and the third specifications we can distinguish the secular from the local factors affecting our wage inequality measures.

Using data from the ENEU, the population within the 16 local labor markets included in the analysis is aggregated in different groups defined by observable characteristics like schooling, occupation, age or industry. Therefore vector X_{kt} includes, for each year of the analysis, the percentage of the local population with college education and the percentage without formal education (less than three years of primary education)[7]. It also includes the percentage of the local population within two different age groups: 16-25 and 56-65 years of age, and the percentage of local population occupied as white collar workers relative to blue collar workers[8]. The estimation of the effect of the changes in these proportions on our wage dispersion measures will shed some light on the way demographic and occupational variability affects inequality, either locally or nationally. Similarly, and to analyze how changes in the industrial local composition affected wage dispersion during the 90s, the local population is divided by industry. This gives us an idea of how changes in the composition of labor demand affect inequality. Therefore, for each year

[7] When the dependent variable is the return to college education, one of the regressors is the percentage of population with college education relative to primary educated people. In this case then, one of the independent variables is the relative supply of college educated population, as it was explained behore.

[8] White collar workers are those declaring to be occupied in directive positions and as professionals, while blue collar workers are handcrafters and domestic workers.

and each local labor market, I calculate the proportion of population in the agriculture and the service sector[9]. Population in the manufacturing industry is divided into durable and non-durable manufactures, to try to capture how the market structure affects inequality, assuming durable manufacturing industries are the most concentrated. To control for the effect of local economic cycles on wage inequality, the proportion of unemployed population is included as a regressor for each year and each local labor market[10]. The distance of each city from the northern border and from Mexico City is included in the last regressions to try to capture the effect of a different measure of "globalization" on wage inequality. In the last few years, the northern border region has been increasingly integrated with the US market, and the estimation of the effect of being a border city on the wage inequality measures could shed some light on the specific effect of some kind of integration on inequality. In these regressions, presented in table 9, only time fixed effects are included to avoid multicolinearity. Finally, given that in the dependent variable the highest salary is always placed in the numerator, a positive sign in the regressions represents a positive correlation with wage inequality[11].

4.1 The 75-25 log hourly wage differential

Table 6 shows the results of the regressions for the 75-25 log hourly wage differential. Columns 1, 2, 3 and 4 show the 4 different specifications for the residuals. The table shows that, when the estimation is carried out without local and temporal fixed effects (column 1), changes in the 75-25 wage differential are only correlated with the changes in the proportion of workers in the service sector. A comparison of column 1 and columns 2 and 3 suggests that this effect is significant only at a local level, meaning that increases in the proportion of local workers in the service sector are positively correlated with wage inequality in the middle part of the wage distribution. This result suggests that salaries are more dispersed in the service sector than in the rest of

[9] Although samples are restricted to urban areas, in all the cities included in the analysis I found a proportion of the population dedicated to agricultural activities. This proportion can help us understand the correlation between agricultural employment and relative wages, but the results should be taken with caution.

[10] It should be taken into account that this variable might be correlated with wages within cities, and cause an endogeneity problem in the estimation. However, as the dependent variables are wage rates of population groups, I considered it a valid independent variable.

[11] In our regressions the dependent variable is a rate, which is by definition limited, but regressions are still estimated as if the dependent variable was continuous. This is an observation of an anonymous referee.

the economy, and that terciarization of local economic activity entails more inequality.

Results in column 2 also suggest that increases in the relative proportion of highly skilled workers, where skill is defined either by schooling or by experience, are negatively correlated with the 75-25 log hourly wage differential. This effect disappears in columns 3 and 4, suggesting a local phenomenon12. This result appears to indicate that highly skilled people are concentrated in the middle part of local wage distributions, and that they receive salaries similar to their counterparts in the same portion of the distribution. On the other hand, it also suggests that people in the upper part of the local wage distributions are characterized by something other than human capital. In fact, the significance, the sign and the size of the coefficient corresponding to white collar workers in the same regression suggests that executives and professionals are positioned mostly at the upper end of the local wage distributions, and that increases in the proportion of workers in these occupations are positively correlated with wage inequality. A comparison of columns 2 and 3 suggests that the positive correlation between white-collar workers and inequality is mostly local, and when city dummies are included in the estimation this effect disappears. In column 4, where the preferred model is presented, it appears that the only national force behind the increasing wage inequality is the transfer of labor to the agricultural sector, suggesting that wage inequality between cities may increase with the specialization of some local labor markets in the production of agricultural tradable goods.

It has been argued that the rising wage inequality in Mexico is very much related to changes in the occupational composition of industries, and that these adjustments in a recently liberalized economy signal the importance of skill-biased technological change as a main source of inequality [see Cragg and Epelbaum (1996), Meza (1999) and Meza (2001)]. Why? If only economic reforms were behind the rising inequality, we would observe that changes in the industrial composition of output -rather than in the occupational composition of firms - would be the main force correlated with it. The results in table 6 suggest that changes in the occupational composition of local labor markets are a more important source of local inequality than the changes in the

[12] Increases in local wage inequality (or inequality within cities) might well entail increases in inequality between cities if the effect of the rising local inequality is positively correlated with a measure of local inequality at the beginning of the period, this relationship deserves further research.

industrial composition of local output, but that at a national level, the changes in the industrial composition of output, and specially the increase in agricultural employment, constitute a more important force behind the rising wage inequality. Maybe the increasing inequality between regions that Hanson (2003) reports can be explained by economic reforms that change the industrial composition of local labor markets, but the increasing inequality within local labor markets reported in this article seems to be more correlated with local technological advancement.

Finally, column 2 in table 6 suggests that increases in the local unemployment rate are associated with peaking local wage inequality, meaning that higher economic growth rates at a local level entail less wage dispersion measured by the 75-25 wage differential.

Table 9, column 1, presents a regression similar to the one presented in table 6, column 2, but in this case the distance to the border and to the capital city are included as regressors. This estimation suggests again that the displacement of workers to the service sector and the increases in the opportunities for executives and professionals in local labor markets are positively correlated with wage inequality measured as the 75-25 log hourly wage differential. It also indicates that larger proportions of older and highly educated people in local labor markets are negatively correlated with this inequality measure, suggesting that skilled workers, when skill is defined either as experience or as schooling, are mainly concentrated in the middle part of the wage distribution. A result that is worth mentioning is the one regarding the transfer of employment to the agricultural sector. From this regression it appears that the displacement of workers to this sector decreases wage inequality and does not increase it as in the regression without the geographical variables. This suggests that agricultural activities near the capital city reduce inequality, but that this is not clear for other regions. The regression also suggests that increases in the proportion of handcraft and domestic workers are negatively correlated with inequality, implying that this kind of worker receives salaries around the median of the distribution, and that they are not very dispersed. Regarding geographical distance, it appears that closeness to Mexico City is negatively correlated with inequality, but closeness to the border region does not imply changes in wage inequality once other factors affecting it are taken into account. This result differs from what Hanson (2003) finds and implies that only a certain kind of economic integration with the world economy affects wage inequality.

4.2 The 50-10 log hourly wage differential

This wage inequality measure is especially interesting because it reflects the changes in the lower part of the wage distributions. Columns 1, 2, 3 and 4 in table 7 present the four different residuals specifications.

Table 7 shows that when the estimation is carried out without temporal or local fixed effects (column 1), the variations in the 50-10 wage differential are positively correlated with the displacement of workers toward the service sector, suggesting again that wages are more dispersed in this sector than in other sectors of the economy, even in the lower part of the distribution. As this result remains even when we change the specification of residuals we might conclude that this factor affects inequality both within and between cities; i.e., that cities where the service sector represent a higher proportion of GDP will present higher inequality, and that the transfer of workers to this sector will raise inequality at a local level. Column 1 also shows that increases in the proportion of highly educated, unskilled, and younger workers, are positively correlated with the 50-10 wage differential. Regarding the first group, it is interesting to point out that increases in the proportion of college educated workers seem to be positively correlated with the 50-10 wage differential, while they seem to be negatively correlated with the 75-25 wage differential. This suggests that highly qualified workers are positioned in the middle upper part of the local and temporal wage distributions, and that less educated workers are positioned in the lower part. As this result remains in column 2 we might conclude that this is mostly a local phenomenon.

The results in table 7 suggest again that executives and professionals are mainly positioned in the upper end of the local and temporal wage distributions because the changes in the return to these occupations do not seem to affect the 50-10 wage inequality, while they seemed to be positively affecting the 75-25 wage differential. Regarding young and unskilled labor, the results presented in column 1 suggest that their wages are more dispersed than those inside the 50-10 portion of the distribution, and that their insertion in local and national labor markets is, in many cases, at the expense of their salaries. The result about uneducated workers remains in column 2, suggesting a local phenomenon. Finally, column 1 of table 7 suggests that increases in the proportion of workers in the non-durable manufacturing industry are negatively correlated with the 50-10 log hourly wage differential, contradicting the evidence for the US where some scholars have found that the

transfer of employment to more competitive industries raises inequality [see Borjas and Ramey (1993)]. This could be more deeply analyzed comparing the wage distributions of durable and non-durable manufactures. If wage dispersion was smaller in the durable manufacturing industry, relative to the non-manufacturing, we might conclude that industries of this kind were using their monopolistic power to benefit less skill workers. Now, when time and local dummies are included in the estimation the result of peaking wage inequality when workers are displaced toward the non-durable manufacturing sector disappears, questioning its robustness.

In column 2 of table 7 we observe again a positive correlation between the proportion of highly educated and uneducated workers and the 50-10 wage differential, suggesting that wages of these population groups are more dispersed than the rest of the wages in this part of the distribution. It could also be the case that the former group is mostly positioned in the upper middle part of local wage distributions (around the median), and the later is positioned around the first decile of the distributions. When local dummies are included in the estimation (columns 3 and 4), these effects disappear, showing no-robustness. From this result it seems that the creation of jobs for mildly skilled workers is negatively correlated with local wage inequality. This same regression suggests, again, that the insertion of less skilled workers in local labor markets is done at the expense of their salary, and that the terciarization of local economic activity entails more inequality. This last result is quite robust because it remains true even with different specifications of the residuals. Finally, column 2 suggests that lower local economic activity implies more wage inequality in the lower part of the distributions, which supports the results regarding the 75-25 inequality measure but contradicts the empirical evidence presented in sections 1 and 2 of this work, where we observed decreasing inequality around the 1995 financial crisis and peaking inequality in the recovery periods. It could be possible that other factors causing more inequality were taking place at the same time of the crisis, and that these factors are masking the real effect economic activity has on wage dispersion.

Now, the regression in column 3 of table 7 can be compared to time-series estimation. The first result worth mentioning is the positive correlation between the insertion of younger workers in the national labor market and the 50-10-wage inequality measure. This seems to indicate, again, that younger workers are taking lower paid jobs, and that this insertion is positively

correlated with wage dispersion. On the other hand, column 3 shows that an increase in the proportion of handcraft and domestic workers in the national labor market is negatively correlated with the 50-10-wage differential, suggesting that these workers are more commonly found in this part of the distribution. It is also possible that other workers in the lower part of the wage distribution earn wages similar to handcraft and domestic workers. This suggests that the creation of jobs for this kind of worker may entail less wage inequality. Finally, column 3 shows that an increase in the proportion of workers in the durable manufacturing industry is negatively correlated with inequality, supporting the thesis that more concentrated industries present flatter wage distributions and pay higher salaries to less skilled workers.

Column 4 of table 7 shows again the negative relationship between the proportion of handcraft and domestic workers in the national labor market and inequality, suggesting that these and other workers with similar salaries are common in the lower part of the national wage distribution. Besides, it shows that increases in the proportion of output produced in the service sector are positively correlated with the 50-10 wage differential, and that increases in economic activity are negatively correlated with it. This is an interesting result that could be tested with a real time series estimation and suggests that, on average, the economic growth of the 90s mostly created jobs with salaries similar to those offered in the lower part of the wage distribution, but that the jobs that reduce wage inequality are mostly out of the service sector.

The second column of table 9 presents a regression similar to the one presented in table 7, column 2, but in this case the distance to Mexico city and to the border region are included as regressors. The regression shows again the positive relationship between the 50-10 log hourly wage differential and the displacement of workers to the service sector, suggesting this is an important force behind the increasing wage inequality. It also suggests that increases in the proportion of uneducated workers are positively correlated with this measure of inequality, implying that these workers receive lower salaries than the average in this part if the distribution. The displacement of workers toward the durable manufactures seems to be also positively correlated with this measure of inequality, but this result is not robust and its sign change with the specification of the inequality equation. Another interesting result is that more local economic activity appears to entail less wage inequality, which supports the thesis that the economic activity of the 90s created jobs for the mildly skilled workers, mostly found in the lower part of the wage distributions.

Regarding the geographical variables, the results suggest again that closeness to the capital city is negatively correlated with wage inequality in the lower part of the wage distributions, but they also suggest that closeness to the border region is positively correlated with it. This result supports the evidence presented by Hanson (2003) regarding regional wage inequality and may signal the different economic paths of the Mexican regions. It is tempting to conclude that economic integration seems to be positively correlated with wage inequality, at least the one measured in the lower part of the wage distribution, but the evidence presented so far is not conclusive at all. From the other results I dare to conclude that the transfer of workers to the service sector seems to be a stronger force leading to increasing wage inequality than economic integration and the transfer of workers to the tradable goods sectors. The transfer of workers to the service sector can be caused by a series of factors and it is not directly related to increasing trade and foreign direct investment. To me, this is more a consequence of the reduction in the size of the government and of the privatization reform.

4.3 The college education premium.

Several authors have mentioned the rise in the return to college education as one of the main reasons behind the increasing wage inequality in Mexico. In this section I explore the determinants of the changes in this wage inequality measure.

Column 1 in table 8 suggests that increases in the proportion of younger workers in the economy are positively correlated with the return to college education. This seems to indicate that average young workers are not college educated, because if they were, increases in the relative supply of highly educated labor would decrease their relative price. The estimation also appears to indicate that higher proportions of older workers are positively correlated with wage inequality, suggesting again that the average schooling level of this kind of worker does not include any college education.

Increases in the proportion of workers occupied as executives and professionals seem to be positively correlated with the return to college education. This result is very robust and shows a very strong relationship between the two variables, which suggests that changes in the occupational structure of the national and local labor markets are a clear force behind the

increasing wage inequality in Mexico during the 90s. This is consistent with the idea that skilled biased technological change causes more inequality.

Table 8, column 1, also shows that increases in the proportion of people employed in the agricultural sector are negatively correlated with the return to college education. The results presented in other columns suggest this is a local phenomenon, and appear to indicate that the agricultural sector does not pay extra revenue to highly educated persons, which is consistent with the evidence presented in Hanson (2003) regarding the importance of the middle and low schooling levels in the Mexican rural sector. Additionally, table 8 shows that higher proportions of people employed in the durable manufacturing sector are negatively correlated with inequality measured as the return to college education, which is consistent with the idea that more concentrated industries pay better salaries to less educated workers, and that they have flatter wage structures. The first column of table 8 also suggests again that more economic activity decreases inequality.

When time fixed effects are included in the estimation (column 2), we observe that local increases in the relative supply of college educated people reduce the return to this kind of education. The coefficient of this regressor suggests that an increase of a 1 percentage point in the relative supply of highly educated labor decreases its return in 0.19%. Additionally, this column suggests, again, that the insertion of the younger labor force into local labor markets is at the expense of their salaries, and that this social group has, on average, a lower schooling level. It is likely, however, that there is a multicolinearity problem in this regression, because young and college educated workers are included in both groups.

Column 3 of table 8 includes local fixed effects and suggests that the increase in the relative number of executives and professionals increases the college education premium at a national level. The importance of the service sector in the rising wage inequality is shown again in this regression, as well as the importance of employment in the durable manufacturing sector.

Finally, column 4 shows again a positive relationship between a relative increase in the number of jobs for executives and professionals and the rise in the college education premium, but now at a national level, which again suggests the important role technological change has played in the rising inequality in Mexico. The result implies that cities which offer more opportunities for executives and professionals, either in the service sector or in

other sectors, are experiencing more wage inequality relative to those cities where other kind of workers have been benefited with increasing opportunities

Table 9, column 3, presents a regression similar to the one presented in table 8, column 2, but in this table the distance from Mexico City and from the border region are included as regressors. This regression shows that the return to college education decreases when the local proportion of highly educated population increases, which suggests that an effective way to reduce this kind of inequality is through education itself. The table also suggests that the young population is not achieving higher degrees of schooling, because increases in the proportion of younger workers seem to entail a higher return to college education. The positive and strong relationship between the college education premium and the proportion of workers occupied as executives and professionals is shown again in this estimation, suggesting that changes in the occupational composition of industries were strong sources of wage inequality in Mexico during the 90s. This appears to indicate the importance of technological change as a force behind the raising inequality measured as the return to higher education. Column 3 of table 9 shows too that the return to college education decreases if the number of jobs for handcraft and domestic workers increase, and suggests that these workers receive salaries similar to those paid to the college educated group. This is a strange result, but it may reflect the relative scarcity of this kind of unskilled worker in cities where the return to college education is high. Regarding agricultural employment, the regression suggests that the college education premium is negatively correlated with increases in the proportion of population occupied in this sector, even when the geographic distance to the capital city and to the border are included in the estimation. This suggests that agricultural employment does not pay a college education premium, and that the wage structure in this sector is relatively flatter than the structure that includes all workers in the employed-male-sample. Finally, the estimation in column 3 shows that the distance from Mexico City is negatively correlated with the higher education premium, but that the distance from the border region is not correlated with it.

5. Concluding Remarks

The rise in wage inequality in Mexico is very well documented, and has been the subject of analysis at many different levels. Scholars have used national, individual and firm data to try to understand the reasons behind this phenomenon, but local data have not been exploited consistently for this purpose. This work tries to explain the reasons behind the increasing wage inequality in Mexico during the 90`s, using data from local labor markets, defining local labor markets at a city level. The paper then tries to find the demographic, industrial and macroeconomic local factors that influenced local wage changes in Mexico between 1988 and 1999 and, through different specifications of residuals, tries to distinguish the local and the national forces behind the increasing wage inequality.

Local labor markets are not totally integrated in the short run because of limited mobility of goods and inputs between them. Given this, local labor market differences can be used to better understand the greater wage dispersion observed at a national level.

This work shows that aggregate wage inequality increased in Mexico during the 90s, at least until 1997, when it started to decrease. This pattern, however, is not always observed in local labor markets. The evidence presented shows that wage inequality has increased mostly in central and southern cities, while it has decreased in northern cities like Monterrey and Tijuana.

The observed variability in local wage structures changes during the analyzed period is here exploited to better understand the sources of the changes in the aggregate Mexican wage structure during the 90s. Wage inequality is here proxied by the 75-25 log hourly wage differential; the 50-10 log hourly wage differential, and the return to college education. Several generalized least squares regressions were run for this purpose, and the first important conclusion that seems to emerge from the analysis is that the transfer of employment to the service sector raises local and national wage inequality, while the transfer of employment to the agricultural sector decreases national wage inequality. It then appears that inequality between cities is affected by the specialization of the local economic activity in the production of certain kind of goods and services. It seems that wages in the service sector are more dispersed than in the rest of the economy, and that wages in the agricultural sector are less dispersed. It is likely that employment

in cities where wage inequality is declining is becoming concentrated in the manufacturing and the agricultural sector, while the employment in cities where inequality is increasing is becoming concentrated in the service sector.

I also find that increases in local economic activity reduce inequality, suggesting that some other forces are correlated with the rising wage dispersion we observe in years of high economic growth. I hypothesize that one of these forces is the movement in the real exchange rate, but a more specific analysis should be carried out to confirm this conclusion.

Another interesting result is that increases in the proportion of the college-educated individuals are negatively correlated with wage inequality when it is measured by the 75-25 wage differential and by the college education premium. This implies that the government could decrease inequality by investing in higher education. It is worth mentioning though that increases in the proportion of college educated people seem to increase wage inequality in the lower part of the wage distributions, suggesting that highly educated workers are positioned in the middle upper part of the distribution, receiving wages above the median.

This paper also shows a positive and robust relationship between rising wage inequality and the changes in the local and national occupational structures. Specifically, the estimation suggests that increases in the proportion of the labor force occupied as executives and professionals are positively correlated with inequality, measured as the 75-25 wage differential and the return to college education. This supports the idea that skilled biased technological change is an important source of wage inequality, even in local labor markets, and that the occupational adjustments within firms and industries are correlated with changes in local wage structures that benefit the highly skilled population. In cities where wage inequality drops we would expect occupational changes that benefit mildly and less educated workers, and this hypothesis is somewhat supported by the results regarding handcraft and domestic workers and the returns to college education.

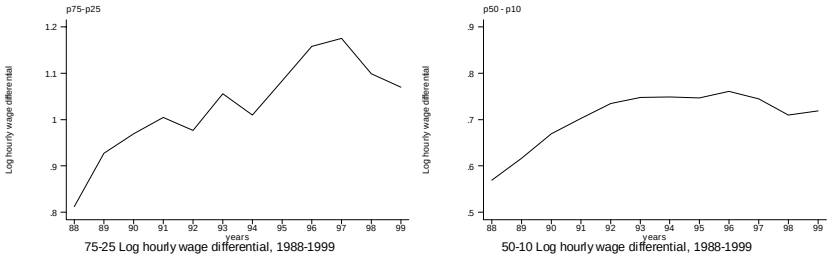
Regarding employment in the two different manufacturing sectors included in the analysis, the results suggest that increases in the proportion of workers employed in the durable manufacturing sector decrease inequality, at least in local labor markets. This result is not robust, but somewhat supports the hypothesis that more concentrated industries tend to have flatter wage structures and tend to pay higher salaries to less skilled workers.

The results in this paper also suggest that the insertion of younger and less skilled workers in local labor markets is done at the expense of their salaries, because this insertion seems to increase wage inequality in the lower part of the wage distribution, where they are very likely to be positioned. This suggests a lower insertion of this kind of labor in cities where wage inequality is declining, and a higher insertion of secondary educated workers. It also suggests higher employment rates for this kind of worker in cities where inequality is increasing.

When I include the distance from Mexico City and from the northern border region as independent variables the basic results remain, showing their robustness. The displacement of workers to the service sector still seems to be positively correlated with the three measures of wage inequality, while the transfer of labor to the agricultural sector appears to be negatively correlated with two of them. Increases in the proportion of the labor force occupied as executives and professionals appear to be positively correlated with two measures of wage inequality, and increases in the proportion of workers occupied as handcraft and domestic workers seem to be negatively correlated with the same two inequality measures. These results suggest that occupational adjustments within industries are important sources of changes in the inequality measures, and technological advancement is a good candidate to explain these changes. Regarding geographic distance, the results show that closeness to the capital city is negatively correlated with inequality, while closeness to the border region is not correlated with it.

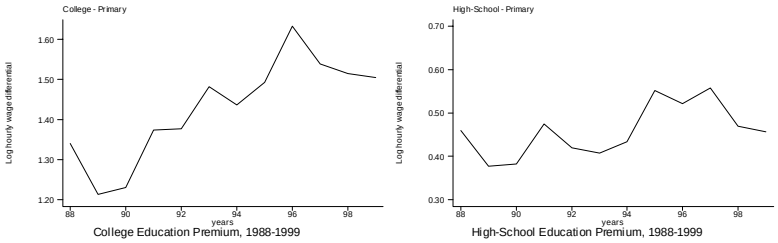
The findings of this paper can shed some light on the multiple reasons behind the rising wage inequality in Mexico during the 90s. They also show that wage inequality is not increasing in the whole country, but that the rise is concentrated in the central and southern cities. In fact, the paper shows that when inequality is declining, the labor conditions of workers in the lower end of the wage distribution are not improving, but the labor conditions of workers in the middle part of the distribution are indeed deteriorating. This is not good news, and demands further research and potential correction of policy implementation.

Graph 1



Wage Inequality Measures, 1988-1999

Graph 2



Higher Education Premia, 1998-1999

Table 1

City	Municipalities	City	Municipalities
1. Mexico City	Alvaro Obregón, D.F.	3. Monterrey	Apodaca, NL
	Azcapotzalco, D.F.		Garza García, NL
	Benito Juárez, D.F.		General Escobedo, NL
	Coyoacán, D.F.		Guadalupe, NL
	Cuajimalpa, D.F.		Juárez, NL
	Cuauhtémoc, D.F.		Monterrey, NL
	Gustavo A. Madero, D.F.		San Nicolás de los Garza, NL
	Iztacalco, D.F.		Santa Catarina, NL
	Iztapalapa, D.F.		Santiago, NL
	Magdalena Contreras, D.F.	4. Puebla	Amozoc, Pue
	Miguel Hidalgo, D.F.		Coronango, Pue
	Milpa Alta, D.F.		Cuautlancingo, Pue
	Tlahuac, D.F.		Juan C. Bonilla, Pue
	Tlalpan, D.F.		Puebla, Pue
	Venustiano Carranza, D.F.		San Andrés Cholula, Pue
	Xochimilco, D.F.		San Pedro Cholula, Pue
	Atizapán de Z., Edo Mex	5. Leon	León, Gto
	Coacalco, Edo. Mex		San Francisco del Rincón, Gto
	Cuautitlán de R.R., Edo. Mex	6. Torreón	Torreón, Coah
	Cuautitlán Izcalli, Edo. Mex		Lerdo, Dgo
	Chalco, Edo. Mex		Gómez Palacio, Dgo
	Chimalhuacán, Edo. Mex	7. San Luis Potosí	San Luis Potosí, SLP
	Chicoloapan, Edo. Mex		Soledad de Graciano S., SLP
	Ecatepec, Edo. Mex	8. Mérida	Mérida, Yuc
	Huixquilucan, Edo. Mex		Puerto Progreso, Yuc
	Tultepec, Edo. Mex		Kanazín, Yuc
	Jaltenco, Edo. Mex		Uman, Yuc
	La Paz, Edo. Mex	9. Chihuahua	Aquiles Serdán, Chih
	Naucalpan de J., Edo. Mex		Chihuahua, Chih
	Nezahualcóyotl, Edo. Mex	10. Tampico	Altamira, Tamps
	Nicolás Romero, Edo. Mex		Ciudad Madero, Tamps
	Tecamac, Edo. Mex		Tampico, Tamps
	Tepotzotlán, Edo. Mex	11. Orizaba	Amatlán de los Reyes, Ver
	Tlalnepantla, Edo. Mex		Camerino Z. Mendoza, Ver
	Tultitlán, Edo. Mex		Córdoba, Ver
	Atenco, Edo. Mex		Fortín de las Flores, Ver
	Isidro Fabela, Edo. Mex		Huiloapan, Ver
	Ixtapaluca, Edo. Mex		Ixtaczoquitlán, Ver
	Lerma, Edo Mex		Mariano Escobedo, Ver
	Metepec, Edo Mex		Nogales, Ver
	San Mateo Atenco, Edo Mex		Orizaba, Ver
	Toluca, Edo Mex		Rafael Delgado, Ver
	Zinacantepec, Edo Mex		Río Blanco, Ver
2. Guadalajara	Guadalajara, Jal	12. Veracruz	Boca del Río, Ver
	El Salto, Jal		Veracruz, Ver
	Tlajomulco de Zúñiga, Jal	13. Ciudad Juárez	Ciudad Juárez, Chih
	Tlaquepaque, Jal	14. Tijuana	Tijuana, BC
	Tonalá, Jal	15..Matamoros	Matamoros, Tamps
	Zapopan, Jal	16. Nuevo Laredo	Nuevo Laredo, Tamps

Table 2
Mean of Independent Variables, by City

City	% College Educated	% No Educated	% 56 - 65	% 16 - 25	% Durable Manufacturing	% Non Durable Manufacturing	% Service	% Agriculture	% Unemployed
Mexico City	17.35	3.92	7.80	34.27	6.74	37.65	50.42	0.64	1.47
Guadalajara	15.28	5.23	7.38	36.26	7.85	34.47	51.14	0.65	1.25
Monterrey	19.21	3.54	7.48	35.67	11.25	36.67	48.14	0.43	1.51
Puebla	18.55	4.40	7.74	36.03	6.57	45.46	41.88	1.62	1.00
Leon	8.76	9.80	6.96	37.66	3.11	39.00	36.47	0.57	0.60
Torreon	16.19	3.54	8.34	35.16	4.93	40.37	48.62	2.27	1.39
San Luis Potosi	18.26	4.88	6.95	35.98	7.11	42.61	46.63	1.36	0.85
Merida	13.87	4.40	8.77	33.71	2.55	43.68	49.34	1.64	0.73
Chihuahua	17.63	2.09	8.58	33.69	11.47	38.22	46.91	1.50	1.49
Tampico	19.97	3.76	8.60	33.72	7.20	40.09	50.69	1.78	1.49
Orizaba	15.66	6.51	9.77	33.22	3.27	46.76	45.61	3.73	1.14
Veracruz	21.16	4.57	9.29	31.94	3.25	38.61	55.85	1.39	1.29
Ciudad Juarez	11.04	3.42	7.53	35.74	21.16	32.97	41.64	0.39	0.59
Tijuana	12.93	4.54	7.44	36.16	11.33	35.76	48.52	0.23	0.38
Matamoros	13.59	4.73	7.50	36.64	20.51	34.67	41.94	0.99	1.27
Nuevo Laredo	12.82	4.85	7.58	36.11	10.19	38.30	48.78	0.71	0.80

Source: Author´s calculations using ENEU, several years.

Table 3

Statistics of wage distributions, in constant pesos, by city
1988-1999

	Mean		f10		f25		f50		f75		f90	
1.- Mexico	**1988**	8.11	**1988**	2.65	**1988**	3.36	**1988**	4.64	**1988**	7.46	**1988**	17.14
	1999	9.11	**1999**	1.96	**1999**	2.59	**1999**	3.98	**1999**	8.93	**1999**	1583.48
	Δ%	12.28	**Δ%**	-25.98	**Δ%**	-22.69	**Δ%**	-14.25	**Δ%**	19.57	**Δ%**	9140.58
2.- Guadalajara	**1988**	9.86	**1988**	2.66	**1988**	3.39	**1988**	4.77	**1988**	8.23	**1988**	26.95
	1999	25.19	**1999**	2.19	**1999**	3.11	**1999**	5.22	**1999**	1417.93	**1999**	1804.63
	Δ%	155.39	**Δ%**	-17.64	**Δ%**	-8.06	**Δ%**	9.23	**Δ%**	17138.58	**Δ%**	6595.25
3.- Monterrey	**1988**	9.91	**1988**	2.74	**1988**	3.24	**1988**	4.45	**1988**	8.23	**1988**	29.94
	1999	7.09	**1999**	2.54	**1999**	3.20	**1999**	4.36	**1999**	7.54	**1999**	22.70
	Δ%	-28.47	**Δ%**	-7.37	**Δ%**	-1.23	**Δ%**	-1.99	**Δ%**	-8.45	**Δ%**	-24.16
4.- Puebla	**1988**	4.52	**1988**	2.05	**1988**	2.79	**1988**	3.96	**1988**	5.91	**1988**	9.23
	1999	7.83	**1999**	1.82	**1999**	2.53	**1999**	3.74	**1999**	7.28	**1999**	1323.40
	Δ%	73.10	**Δ%**	-11.49	**Δ%**	-9.22	**Δ%**	-5.45	**Δ%**	23.19	**Δ%**	14234.89
5.- Leon	**1988**	5.10	**1988**	2.46	**1988**	3.03	**1988**	3.98	**1988**	5.54	**1988**	8.95
	1999	4.84	**1999**	2.23	**1999**	2.98	**1999**	3.89	**1999**	5.47	**1999**	9.34
	Δ%	-5.07	**Δ%**	-9.35	**Δ%**	-1.87	**Δ%**	-2.11	**Δ%**	-1.19	**Δ%**	4.37
6.- Torreon	**1988**	4.53	**1988**	2.26	**1988**	2.83	**1988**	3.71	**1988**	5.65	**1988**	9.40
	1999	4.40	**1999**	2.19	**1999**	2.76	**1999**	3.79	**1999**	6.00	**1999**	11.20
	Δ%	-2.83	**Δ%**	-3.11	**Δ%**	-2.44	**Δ%**	2.39	**Δ%**	6.26	**Δ%**	19.12
7.- San Luis Potosi	**1988**	4.25	**1988**	2.29	**1988**	2.81	**1988**	3.78	**1988**	5.83	**1988**	9.22
	1999	3.79	**1999**	1.81	**1999**	2.38	**1999**	3.38	**1999**	5.45	**1999**	9.73
	Δ%	-10.90	**Δ%**	-20.83	**Δ%**	-15.28	**Δ%**	-10.57	**Δ%**	-6.56	**Δ%**	5.52
8.- Mérida	**1988**	4.14	**1988**	2.31	**1988**	2.84	**1988**	3.87	**1988**	5.63	**1988**	8.78
	1999	3.97	**1999**	1.46	**1999**	1.96	**1999**	2.88	**1999**	5.67	**1999**	12.22
	Δ%	-4.23	**Δ%**	-36.93	**Δ%**	-30.89	**Δ%**	-25.47	**Δ%**	0.82	**Δ%**	39.26
9.- Chihuahua	**1988**	5.86	**1988**	2.89	**1988**	3.43	**1988**	4.72	**1988**	7.03	**1988**	12.15
	1999	8.80	**1999**	2.58	**1999**	3.28	**1999**	4.75	**1999**	8.79	**1999**	81.49
	Δ%	50.15	**Δ%**	-10.65	**Δ%**	-4.24	**Δ%**	0.64	**Δ%**	25.03	**Δ%**	570.48
10.- Tampico	**1988**	15.66	**1988**	2.79	**1988**	3.71	**1988**	6.04	**1988**	10.42	**1988**	11761.03
	1999	4.96	**1999**	1.79	**1999**	2.43	**1999**	3.74	**1999**	7.76	**1999**	14.79
	Δ%	-68.34	**Δ%**	-35.76	**Δ%**	-34.52	**Δ%**	-38.14	**Δ%**	-25.51	**Δ%**	-99.87
11.- Orizaba	**1988**	4.30	**1988**	1.61	**1988**	2.36	**1988**	3.55	**1988**	5.55	**1988**	9.04
	1999	3.21	**1999**	1.39	**1999**	1.90	**1999**	2.72	**1999**	4.52	**1999**	8.49
	Δ%	-25.25	**Δ%**	-13.49	**Δ%**	-19.63	**Δ%**	-23.17	**Δ%**	-18.56	**Δ%**	-6.11
12.- Veracruz	**1988**	5.55	**1988**	2.28	**1988**	3.02	**1988**	4.52	**1988**	7.89	**1988**	11.82
	1999	5.54	**1999**	1.55	**1999**	2.16	**1999**	3.40	**1999**	6.81	**1999**	17.30
	Δ%	-0.17	**Δ%**	-32.07	**Δ%**	-28.31	**Δ%**	-24.72	**Δ%**	-13.73	**Δ%**	46.38
13.- Ciudad Juarez	**1988**	6.21	**1988**	3.24	**1988**	3.76	**1988**	5.08	**1988**	8.13	**1988**	14.68
	1999	6.87	**1999**	2.85	**1999**	3.35	**1999**	4.38	**1999**	7.60	**1999**	17.65
	Δ%	10.71	**Δ%**	-12.26	**Δ%**	-11.07	**Δ%**	-13.80	**Δ%**	-6.56	**Δ%**	20.21
14.- Tijuana	**1988**	25.60	**1988**	3.93	**1988**	5.29	**1988**	8.21	**1988**	21.02	**1988**	11776.76
	1999	6.88	**1999**	3.56	**1999**	4.38	**1999**	5.72	**1999**	9.25	**1999**	18.24
	Δ%	-73.14	**Δ%**	-9.50	**Δ%**	-17.25	**Δ%**	-30.30	**Δ%**	-56.01	**Δ%**	-99.85
15.- Matamoros	**1988**	5.98	**1988**	3.18	**1988**	4.04	**1988**	5.56	**1988**	8.12	**1988**	12.92
	1999	5.27	**1999**	2.49	**1999**	3.28	**1999**	4.63	**1999**	6.88	**1999**	11.71
	Δ%	-11.88	**Δ%**	-21.61	**Δ%**	-18.67	**Δ%**	-16.69	**Δ%**	-15.35	**Δ%**	-9.39
16.- Nuevo Laredo	**1988**	8.34	**1988**	2.75	**1988**	3.18	**1988**	4.14	**1988**	7.08	**1988**	21.73
	1999	6.54	**1999**	2.49	**1999**	3.24	**1999**	4.65	**1999**	7.90	**1999**	15.36
	Δ%	-21.58	**Δ%**	-9.57	**Δ%**	2.12	**Δ%**	12.37	**Δ%**	11.63	**Δ%**	-29.28

Source: Author´s estimations using ENEU data.

Table 4
Wage inequality measures, by city, 1988-1999

	d7525		d5010		d7510		d9010		Standard Dev.	
1.- Mexico	**1988**	0.80	**1988**	0.56	**1988**	1.04	**1988**	1.87	**1988**	2.06
	1999	1.24	**1999**	0.71	**1999**	1.52	**1999**	6.69	**1999**	2.80
	Δ%	0.44	**Δ%**	0.15	**Δ%**	0.48	**Δ%**	4.83	**Δ%**	0.75
2.- Guadalajara	**1988**	0.89	**1988**	0.59	**1988**	1.13	**1988**	2.32	**1988**	2.37
	1999	6.12	**1999**	0.87	**1999**	6.43	**1999**	6.71	**1999**	2.83
	Δ%	5.23	**Δ%**	0.28	**Δ%**	5.30	**Δ%**	4.40	**Δ%**	0.46
3.- Monterrey	**1988**	0.93	**1988**	0.48	**1988**	1.10	**1988**	2.39	**1988**	2.36
	1999	0.86	**1999**	0.54	**1999**	1.09	**1999**	2.19	**1999**	1.59
	Δ%	-0.08	**Δ%**	0.06	**Δ%**	-0.01	**Δ%**	-0.20	**Δ%**	-0.78
4.- Puebla	**1988**	0.75	**1988**	0.66	**1988**	1.06	**1988**	1.50	**1988**	1.18
	1999	1.06	**1999**	0.72	**1999**	1.39	**1999**	6.59	**1999**	2.10
	Δ%	0.31	**Δ%**	0.07	**Δ%**	0.33	**Δ%**	5.09	**Δ%**	0.92
5.- Leon	**1988**	0.60	**1988**	0.48	**1988**	0.81	**1988**	1.29	**1988**	1.37
	1999	0.61	**1999**	0.56	**1999**	0.90	**1999**	1.43	**1999**	1.15
	Δ%	0.01	**Δ%**	0.08	**Δ%**	0.09	**Δ%**	0.14	**Δ%**	-0.22
6.- Torreon	**1988**	0.69	**1988**	0.49	**1988**	0.92	**1988**	1.43	**1988**	1.13
	1999	0.78	**1999**	0.55	**1999**	1.01	**1999**	1.53	**1999**	0.74
	Δ%	0.08	**Δ%**	0.06	**Δ%**	0.09	**Δ%**	0.11	**Δ%**	-0.40
7.- San Luis Potosi	**1988**	0.73	**1988**	0.50	**1988**	0.93	**1988**	1.39	**1988**	0.73
	1999	0.83	**1999**	0.62	**1999**	1.10	**1999**	1.68	**1999**	0.72
	Δ%	0.10	**Δ%**	0.12	**Δ%**	0.17	**Δ%**	0.29	**Δ%**	-0.01
8.- Mérida	**1988**	0.68	**1988**	0.51	**1988**	0.89	**1988**	1.33	**1988**	0.62
	1999	1.06	**1999**	0.68	**1999**	1.36	**1999**	2.12	**1999**	1.29
	Δ%	0.38	**Δ%**	0.17	**Δ%**	0.47	**Δ%**	0.79	**Δ%**	0.67
9.- Chihuahua	**1988**	0.72	**1988**	0.49	**1988**	0.89	**1988**	1.44	**1988**	1.18
	1999	0.98	**1999**	0.61	**1999**	1.22	**1999**	3.45	**1999**	1.86
	Δ%	0.26	**Δ%**	0.12	**Δ%**	0.33	**Δ%**	2.02	**Δ%**	0.69
10.- Tampico	**1988**	1.03	**1988**	0.77	**1988**	1.32	**1988**	8.35	**1988**	2.75
	1999	1.16	**1999**	0.74	**1999**	1.47	**1999**	2.11	**1999**	1.22
	Δ%	0.13	**Δ%**	-0.04	**Δ%**	0.15	**Δ%**	-6.24	**Δ%**	-1.52
11.- Orizaba	**1988**	0.86	**1988**	0.79	**1988**	1.24	**1988**	1.72	**1988**	1.40
	1999	0.88	**1999**	0.67	**1999**	1.18	**1999**	1.81	**1999**	0.94
	Δ%	0.02	**Δ%**	-0.12	**Δ%**	-0.05	**Δ%**	0.08	**Δ%**	-0.47
12.- Veracruz	**1988**	0.85	**1988**	0.68	**1988**	1.13	**1988**	1.64	**1988**	1.35
	1999	1.15	**1999**	0.79	**1999**	1.48	**1999**	2.41	**1999**	1.73
	Δ%	0.29	**Δ%**	0.10	**Δ%**	0.35	**Δ%**	0.77	**Δ%**	0.38
13.- Ciudad Juarez	**1988**	0.77	**1988**	0.45	**1988**	0.92	**1988**	1.51	**1988**	0.91
	1999	0.82	**1999**	0.43	**1999**	0.98	**1999**	1.82	**1999**	1.42
	Δ%	0.05	**Δ%**	-0.02	**Δ%**	0.06	**Δ%**	0.31	**Δ%**	0.52
14.- Tijuana	**1988**	1.38	**1988**	0.74	**1988**	1.68	**1988**	8.01	**1988**	2.78
	1999	0.75	**1999**	0.48	**1999**	0.96	**1999**	1.63	**1999**	0.67
	Δ%	-0.63	**Δ%**	-0.26	**Δ%**	-0.72	**Δ%**	-6.37	**Δ%**	-2.11
15.- Matamoros	**1988**	0.70	**1988**	0.56	**1988**	0.94	**1988**	1.40	**1988**	0.59
	1999	0.74	**1999**	0.62	**1999**	1.02	**1999**	1.55	**1999**	0.90
	Δ%	0.04	**Δ%**	0.06	**Δ%**	0.08	**Δ%**	0.14	**Δ%**	0.31
16.- Nuevo Laredo	**1988**	0.80	**1988**	0.41	**1988**	0.94	**1988**	2.07	**1988**	2.15
	1999	0.89	**1999**	0.62	**1999**	1.16	**1999**	1.82	**1999**	1.38
	Δ%	0.09	**Δ%**	0.22	**Δ%**	0.21	**Δ%**	-0.25	**Δ%**	-0.77

Source: Author´s estimations using ENEU data

Table 5
Returns to Higher Education, by city, 1988-1999

	College education premium		High School education premium	
1.- Mexico	**1988**	3.22	**1988**	0.89
	1999	5.77	**1999**	1.22
	Δ %	78.81	**Δ %**	36.83
2.- Guadalajara	**1988**	3.05	**1988**	1.16
	1999	3.38	**1999**	0.83
	Δ %	10.92	**Δ %**	-28.80
3.- Monterrey	**1988**	5.96	**1988**	1.31
	1999	4.00	**1999**	0.65
	Δ %	-32.91	**Δ %**	-50.67
4.- Puebla	**1988**	1.90	**1988**	0.59
	1999	3.37	**1999**	1.02
	Δ %	77.62	**Δ %**	71.58
5.- Leon	**1988**	2.55	**1988**	0.75
	1999	3.28	**1999**	0.52
	Δ %	28.63	**Δ %**	-31.12
6.- Torreon	**1988**	1.56	**1988**	0.53
	1999	1.65	**1999**	0.43
	Δ %	5.50	**Δ %**	-19.99
7.- San Luis Potosi	**1988**	1.40	**1988**	0.53
	1999	1.86	**1999**	0.54
	Δ %	33.21	**Δ %**	0.87
8.- Mérida	**1988**	1.26	**1988**	0.39
	1999	3.55	**1999**	1.02
	Δ %	182.75	**Δ %**	163.75
9.- Chihuahua	**1988**	1.91	**1988**	0.41
	1999	2.88	**1999**	0.77
	Δ %	50.85	**Δ %**	86.06
10.- Tampico	**1988**	2.81	**1988**	1.15
	1999	2.00	**1999**	0.57
	Δ %	-28.93	**Δ %**	-50.03
11.- Orizaba	**1988**	1.90	**1988**	0.62
	1999	1.86	**1999**	0.54
	Δ %	-2.27	**Δ %**	-12.69
12.- Veracruz	**1988**	1.70	**1988**	0.62
	1999	3.39	**1999**	0.72
	Δ %	99.03	**Δ %**	17.62
13.- Ciudad Juarez	**1988**	1.10	**1988**	0.44
	1999	3.74	**1999**	0.81
	Δ %	239.94	**Δ %**	84.95
14.- Tijuana	**1988**	1.53	**1988**	0.87
	1999	1.07	**1999**	0.41
	Δ %	-30.23	**Δ %**	-52.87
15.- Matamoros	**1988**	1.17	**1988**	0.47
	1999	1.60	**1999**	0.60
	Δ %	36.32	**Δ %**	29.19
16.- Nuevo Laredo	**1988**	3.73	**1988**	0.82
	1999	2.11	**1999**	0.59
	Δ %	-43.32	**Δ %**	-27.86

Source: Author´s estimations using ENEU data.

Table 6

Determinants of the 75-25 log hourly wage differential

Independent variables	(1)		(2)		(3)	(4)	
% higher education	**-5.0397**		**-11.5546**	**	**-4.9874**	**-1.4587**	
	(3.5270)		(3.9733)		(6.0026)	(6.5802)	
% no education	**-.4888**		**9.7235**		**-14.8434**	**-16.8779**	
	(6.9344)		(7.2521)		(11.7825)	(12.9533)	
% ages 16-25	**2.1129**		**.2373**		**-4.7709**	**-6.1313**	
	(5.0384)		(5.5579)		(6.4614)	(8.2603)	
% ages 56-65	**-16.1780**		**-27.9940**	**	**13.1912**	**22.6810**	
	(12.6426)		(13.5361)		(14.1986)	(16.7568)	
% executives and professionals	**10.1069**		**47.5740**	**	**-3.5969**	**.18.8156**	
	(9.9023)		(16.3262)		(11.5561)	(17.3187)	
% handcraft and domestic workers	**2.8199**		**2.5281**		**4.1107**	**4.3569**	
	(4.2227)		(4.3373)		(4.4449)	(4.6848)	
% agriculture	**7.4727**		**22.4884**		**24.3496**	**39.9894**	*
	(13.5774)		(14.1377)		(19.9677)	(20.9467)	
% services	**5.2931**	**	**6.9671**	**	**3.8137**	**2.6571**	
	(2.4580)		(2.5394)		(4.2800)	(4.8922)	
% durable manufactures	**-1.1908**		**1.5407**		**5.0324**	**7.7710**	
	(2.1831)		(2.5414)		(4.2987)	(5.8483)	
% non durable manufactures	**-2.8215**		**-2.2789**		**-.1050**	**-.9375**	
	(3.4496)		(3.6097)		(3.5974)	(3.8082)	
% unemployed	**1.8382**		**30.2328**	**	**5.8435**	**22.3144**	
	(7.7309)		(15.4586)		(7.0430)	(16.0431)	
Time Dummies			**X**			**X**	
City Dummies					**X**	**X**	
log likelihood	**-273.5219**		**-264.9292**		**-224.1995**	**-218.3088**	
AIC	2.9637		2.9888		2.6062	2.6594	
N	192		192		192	192	

Values in brackets are standard error

** indicates 5% of significance

* indicates 10% of significance

Table 7

Determinants of the 50-10 log hourly wage differential

Independent variables	(1)		(2)		(3)		(4)	
% higher education	**1.0899**	**	**.6638**	**	**-.07147**		**.1255**	
	(0.3045)		(0.3265)		(0.5141)		(0.5359)	
% no education	**1.9409**	**	**2.8728**	**	**1.1933**		**1.6161**	
	(0.5988)		(0.5960)		(1.0091)		(1.0550)	
% ages 16-25	**.9270**	**	**.3012**		**.8151**		**.8585**	
	(0.4351)		(0.4568)		(0.5534)	**	(0.6728)	
% ages 56-65	**.1757**		**-.1135**		**2.5834**		**1.6858**	
	(1.0918)		(1.1126)		(1.2161)		(1.3649)	
% executives and professionals	**.1564**		**1.3006**		**1.2439**		**.4254**	
	(0.8551)		(1.3419)		(0.9897)		(1.4106)	
% handcraft and domestic workers	**-.3174**		**-.4308**		**-.8325**	**	**-.8790**	**
	(0.3646)		(0.3565)		(0.3807)		(0.3815)	
% agriculture	**1.5259**		**1.6794**		**.3557**		**1.5266**	
	(1.1725)		(1.1620)		(1.7102)		(1.7061)	
% services	**.4853**	**	**.7364**	**	**.8737**	**	**.7546**	*
	(0.2122)		(0.2087)		(0.3665)		(0.3984)	
% durable manufactures	**-.1604**		**.2329**		**-.8318**	**	**-.5357**	
	(0.1885)		(0.2088)		(0.3681)		(0.4763)	
% non durable manufactures	**-.5020**	*	**-.1699**		**-.2070**		**-.2186**	
	(0.2979)		(0.2967)		(0.3081)		(0.3101)	
% unemployed	**.3618**		**5.4257**	**	**.0529**		**3.6804**	**
	(0.6676)		(1.2706)		(0.6032)		(1.3067)	
Time Dummies			**X**				**X**	
City Dummies					**X**		**X**	
log likelihood	**196.7323**		**214.8118**		**274.6392**		**263.1738**	
AIC	-1.9347		-2.0084		-2.3087		-2.3559	
N	192		192		192		192	

Values in brackets are standard error

** indicates 5% of significance

* indicates 10% of significance

Table 8
Determinants of College Education Premium

Inndependent Variables	(1)	(2)	(3)	(4)
log ni/nj	**-.0903**	**-.1971 ****	**-.0163**	**-.1386**
	(.08185)	(.0989)	(.1631)	(.1854)
% ages 16-25	**2.9735 ****	**3.3676 ****	**-.5080**	**1.6917**
	(1.2395)	(1.3824)	(1.3997)	(1.7472)
% ages 56-65	**5.7886 ***	**2.9494**	**2.3741**	**.4328**
	(3.1641)	(3.5186)	(3.0743)	(3.6295)
% executives & professionals	**11.2222 ****	**15.1372 ****	**5.9749 ****	**6.1916 ***
	(2.2230)	(3.9368)	(2.6917)	(3.9058)
% handcraft & domestic workers	**-1.2752**	**-1.7602 ***	**-.0554**	**-.4899**
	(0.9615)	(1.0091)	(0.9745)	(1.0303)
% agriculture	**-9.8251 ****	**-6.9790 ****	**3.3876**	**.9245**
	(3.3191)	(3.5152)	(4.2921)	(4.4340)
% services	**-.3916**	**-.1757**	**1.7012 ****	**1.0288**
	(.5445)	(.5616)	(.8039)	(.9079)
% durable manufactures	**-1.1061 ****	**-1.1122 ****	**2.4540 ****	**.6851**
	(.4502)	(.5023)	(.9238)	(1.3016)
% non durable manufactures	**-.4795**	**-.5913**	**.7849**	**.4712**
	(.8048)	(.8520)	(.7467)	(.8208)
% unemployed	**4.2692 ****	**8.8652 ****	**1.7615**	**.0841**
	(1.8792)	(3.5440)	(1.6410)	(3.5972)
Time Dummies		**X**		**X**
City Dummies			**X**	**X**
log likelihood	**-3.2891**	**4.2515**	**65.1665**	**72.2077**
AIC	.1384	.1744	-.4184	-.3771
N	192	192	192	192

Values in brackets are standard error

** indicates 5% of significance

* indicates 10% of significance

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Table 9
Determinants of 3 wage inequality measures, including geographical variables

Inndependent Variables	Diff 75-25		Diff 50-10		College Education Premium	
	(1)		(2)		(3)	
log ni/nj	**-**		**-**		**-.2960**	**
	-		-		(.1029)	
% ages 16-25	**.0958**		**.3090**		**2.5985**	*
	(5.5186)		(0.4355)		(1.3268)	
% ages 56-65	**-24.4512**	*	**.2641**		**3.5410**	
	(13.6565)		(1.0778)		(3.3274)	
% Higher education	**-15.2061**	**	**.2690**		**-**	
	(4.9253)		(0.3887)		-	
% No education	**-4.4677**		**1.8205**	**	**-**	
	(7.8309)		(0.6180)		-	
% executives & professionals	**13.4981**	**	**.6405**		**13.4981**	**
	(3.8608)		(1.3610)		(3.8608)	
% handcraft & domestic workers	**-2.0373**	**	**-.2225**		**-2.0373**	**
	(.9578)		(0.3395)		(.9578)	
% agriculture	**-8.7502**	**	**.7592**		**-8.7502**	**
	(3.3242)		(1.1192)		(3.3242)	
% services	**.6381**		**.8785**	**	**.6381**	
	(.5600)		(0.2055)		(.5600)	
% durable manufactures	**.0283**		**.5183**	**	**.0283**	
	(.5539)		(0.2097)		(.5539)	
% non durable manufactures	**-.7765**		**-.1902**		**-.7765**	
	(.8085)		(0.2893)		(.8085)	
% unemployed	**4.5711**		**4.0073**	**	**4.5711**	
	(3.7204)		(1.2860)		(3.7204)	
Mexico City Distance	**-.00037**	**	**-.000045**	**	**-.00014**	**
	(0.000170)		(0.000014)		(.000035)	
Northern Border Distance	**.00019**		**.000034**	*	**.000057**	
	(0.000240)		(0.000019)		(.000053)	
Time Dummies	**X**		**X**		**X**	
City Dummies						
log likelihood	**-260.5992**		**226.9438**		**17.2285**	
AIC	2.9645		-2.1139		.0601	
N	192		192		192	

Values in brackets are standard error

** indicates 5% of significance

* indicates 10% of significance

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THE REASONS BEHIND THE INCREASING WAGE INEQUALITY IN MEXICO

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SUMMARY

JEL classification: J310, R230, O540
Using data from the National Urban Employment Survey, 1988-1999, this paper tries to separate the local and the national forces behind the increasing wage inequality in Mexico. The paper analyzes the trend of 3 different inequality measures in 16 different local labor markets and shows that the rising Mexican wage inequality is concentrated in the southern and central cities, while northern border cities seem to have experienced significant drops in wage inequality. Using the variability in the inequality measures at a local level, the analysis combines cross section and time series data to understand the role that local demographic, industrial and economic characteristics have played in the rising inequality. Drops in local economic activity, employment in the service sector, and occupational opportunities for executives seem to be positively correlated with the rising wage inequality, while occupational opportunities for moderately educated workers seem to be negatively correlated with it. Specialization of the local economies in the production of tradable goods shows contradicting results and no conclusion can be drawn from them.
Key words: Wage Inequality, Local labor markets, Income distribution, Economic integration.