Institutions, Geography and the Regional Development of Returns to Schooling in Mexico

JEL Classification: J31, F16, O18, O54.
Key words: wages; trade; institutions; regional disparities; returns to schooling.

Institutions, Geography and the Regional Development of Returns to Schooling in Mexico

Eduardo Rodríguez-Oreggia*
Instituto de Investigaciones sobre Desarrollo Sustentable y Equidad Social (IIDSES), Universidad Iberoamericana. Email: eduardo.rodriguez@uia.mx

* The author wishes to thank Alejandra Cox-Edwards, Gladys Lopez-Acevedo, Jose Pagan and Rodolfo de la Torre and also participants in the 2004 LACEA Meeting in Costa Rica, in the 2005 Eastern Economic Association Meeting in NYC and in the UNDP-Mexico seminar, where a draft of this paper was presented, for their comments. Research assistance was provided by Lilia Cortez, Martín Lima, Gabriela Martínez and Alberto Villalpando at different stages.

1a. edición, 2005

Prol. Paseo de la Reforma 880
Col. Lomas de Santa Fe
01210 México, D.F.

ISBN

Impreso y hecho en México
Printed and made in Mexico

La Serie Documentos de Investigación tiene como propósito difundir el trabajo realizado por el personal académico asociado o adscrito al Instituto, con el fin de explorar conocimiento útil para el diseño de políticas públicas y la toma de decisiones en organizaciones sociales.
Comentarios esta serie son bienvenidos. Referencias a esta serie deben tener en cuenta sr carácter de preliminar.
Para más información sobre esta serie, comunicarse a la siguiente dirección electrónica: sandra.robles@uia.mx

Institutions, Geography and the Regional Development of Returns to Schooling in Mexico

Eduardo Rodríguez-Oreggia

Abstract

Using microdata from national urban employment surveys, this paper seeks to trace the development of regional wage differentials in relation to schooling in Mexico and to gauge the effects of institutions and geography on those trends. It quantifies both returns to schooling and skills in various regions of Mexico from 1987 to 2002, and also applies panel data in order to explain regional differences, finding that the said returns to schooling increased at the end of the 1980s but decreased after the period 1993-94, with distance from production centers being the second most important factor, after labor institutions, in determining differences in wages and returns to schooling.

Institutions, Geography and the Regional Development of Returns to Schooling in Mexico

Eduardo Rodríguez-Oreggia

1. Introduction

Mexico has been through a wide-ranging process of trade liberalization that seems to have brought more benefits to the northern states close to the US border than to the southern ones, which continue to suffer from low income and low growth (Costa-Font and Rodríguez-Oreggia, 2005; Rodríguez-Oreggia and Rodríguez-Pose, 2004). The presence of wide disparities in social development and economic growth throughout the Mexican states may be a serious obstacle to the further adjustment of the country's economy to free trade agreements and to the global economy.

The development of wages and of returns to education -i.e. of the wage premium resulting from an additional year of formal education- is an important factor in the analysis of social and economic development. Such returns encourage individuals to acquire further education and are an incentive for lower-income households to risk embarking on labor activities which, under other circumstances, would be unprofitable. Moreover, returns to schooling may differ from area to area and may be affected by distance from production centers and institutional labor-market variations, among other things.

Regional returns to education have received special attention in recent years (Duranton and Monastiriotis, 2000; Azzoni and Servo, 2002). In Mexico, some studies have focused on calculations of nation-wide returns to schooling (Psacharopoulos et al., 1996; Bracho and Zamudio, 1989; Lächler, 1998; López-Acevedo, 2001). At the regional level, other research has focused on the wage structure resulting from trade liberalization (Hanson, 1997) or on comparative development vis-à-vis the US (Hanson, 2003). However, such analyses have not focused on the impact of institutions on differences, but rather on the impact of trade and geography. At the international level, few studies (e.g. Rodrik, 1999; Baier et al, 2004) have addressed such issues, 2004), concluding that institutional factors are more important than the effects of geography/trade.

This paper sets out to analyze the development of returns to schooling at the regional level in Mexico, and to determine the role played by geography/trade and institutional factors in producing such regional differences. It calculates a time series of returns to schooling at the national and regional level, using the National Urban Employment Surveys (Encuestas Nacionales de Empleo Urbano, ENEU) carried out from 1987 to 2002, applying a standard wage function for nine regions, and using panel-data methodology to try to explain such regional differences in the light of a set of geographical and institutional factors.

2. Why regional wages (and returns) differ.

Regional differences in wages in relation to returns to education may be explained by at least three different theories. Following Adam Smith, regional wages may represent compensating differentials which reward individuals for non-pecuniary differences across areas. Following Rosen (1986), higher regional wages should compensate for some "bad" characteristics of the areas which play a part in the utility function of workers. The aforesaid

"bad" characteristics may include crime rates, pollution, congestion, weather, etc., and workers living in such areas may be willing to accept compensation for these inconveniences.

In addition, cost-of-living differences may be an important determinant of the spatial distribution of human skills among areas. The observed wage differential might mirror the cost of moving from one region to another, and hence, after such costs have been taken into account, individuals would not receive any benefit from moving, although this effect should be measured in the light of the weighting given to individual characteristics. Some research -for example that of Azzoni and Servo (2002) for Brazil, that of Furtado (1996) for a few European countries, and that of Duranton and Monastiriotis (2002) for the U.K.- have found, after controlling for local prices, that wage inequalities are still high, while differences in education may be a more important explicator of regional disparities.

The findings mentioned above relate to our second explanation for regional wage differences, deriving from Human-capital Theory, which proposes that wage differentials are caused by heterogeneity in the average level and distribution of human capital among workers, or by other personal differences such as gender. According to Freije, López-Calva and Rodríguez (2003), during recent years factors such as labor participation and individual characteristics have reduced inter-regional wage inequalities in Mexico, and migration among states may be changing the composition of state-by-state labor distribution.

A third explanation is offered by the Theory of Segmentation or Polarized Development, which proposes that wage differentials stem from inequalities in the structure of the production system, in the institutional framework, in regional-development levels, and in access to technology.

The regional structure of production systems might lead to agglomerations of industry, thus generating external effects that enhance the productivity of firms within the geographical unit. Such concentrations of firms facilitate the spillover of learning and knowledge and are also affected by the intensity of trade. In this scenario, firms must compensate workers for congestion by paying them higher wages, which in turns drives up the price of land and of other amenities. The same applies in the case of concentration of government activities. Hanson (1997), for example, finds that, in the case of Mexico, distance from industrial centers affects relative regional wages. After controlling for distance, he finds that nominal wages are higher near industrial centers located in Mexico City and the areas near the U.S. border, which is in tune with increasing returns to scale in production and the location bias in government policies.

Furthermore, differences in institutional frameworks may also affect wage differentials. Variations in labor-market institutions such as minimum wages, firing regulations, unions, social-security regulations, unemployment benefits, labor taxation, etc., have an impact on wage differentials. Blanchar and Wolfers (2000) have shown how countries with higher rates of unemployment also have more wage inequality. Montenegro and Pagés (2003) and Bertola, et al (2002) illustrate how unions and other labor institutions push groups that are more elastic, such as women, old people and youths, out of the market. Koeniger, Leonardi and Nunziata (2004) found that institutions play a larger part, thus explaining the variance of wage differentials even after controlling for trade and technology. Rodrick (1999) and Baier, et al (2004) have found that institutions are more important determinants of wage differentials and returns to schooling than geography/trade.

In the light of those explanations, this paper initially attempts to determine the development of regional wage differentials, and especially of returns to schooling, going on to analyze the impact of institutional and geographical factors on wage differentials and returns to schooling. We then proceed to calculate returns to schooling for different regions of Mexico, using a standard Mincer equation and controlling for local prices. Finally, we implement panel-data for wages and returns in order to elucidate the dynamics underlying the differences, after controlling for institutions and distance from production centers.

3. The earnings function

The private rate of return will be calculated from an empirical function as proposed by Mincer (1974), and within Becker's (1975) framework:

$$w_i=\alpha+\beta_1 S_i+\beta_2 E_i+\beta_3 EE_i+\epsilon_i \qquad (1)$$

Where i is the individual, w is the log of earnings, S is the number of years of formal education of the individual, E is experience in the labor market, EE is squared experience, and ϵ is the error term - i.e. random effects and the effects of omitted variables. The coefficient S could be read as years of individual return to formal education or schooling. In other words, S allows for measurement of wage premia per additional year of formal education, compared to an individual with similar experience. A set of variables permitting control for individual variation could be added to the model, although this might lead to problems of endogeneity.

Another potential problem arising with this equation is that of sample selection, or self-selection, whereby individuals in the sample are not randomly chosen from the population. In a self-selection model, there is an interest in estimating the parameters of a regression equation from a set of observations of individuals who self-select into the sample on the basis of a criterion that is correlated with the dependent-variable-of-earning equation. Heckman (1979) proposed a solution whereby a decision equation is added to the wage equation. The resultant model consists of two equations:

$I^*=z^T\gamma+\delta$ decision equation

$W^*=x^T\beta+\epsilon$ outcome equation

Where I* is the unobserved propensity to select into the sample, z is a vector of explanatory observable variables, and δ is an unobservable-error term. The outcome equation is as in (1), but W* is thus denoted because it is not the observed dependent variable, but, rather, the potential dependent variable. W* is the potential level of earnings of a chosen individual, where W* is observed only for those who actually choose to work. Hence:

$$W = W^* \; I(I^*>0)=\begin{cases} 0 & \text{if} \quad I^*\leq 0 \\ W^* & \text{if} \quad I^*>0 \end{cases} \qquad (2)$$

That is, the potential-earnings W* and the observed W are equal only if the propensity to select into the sample is positive (I*>0). For those not selecting into the sample, I*<=0, W* is not observed and is equal to 0. Regarding the propensity to select into the sample, we are able to observe only whether it is positive (in the case I(I*>0|z)=1) or negative (in the case I(I*>0|z)=0). The self-selection problem arises if δ and ϵ are correlated - i.e.if the unobservable part of the decision to select into the sample is correlated with the unobservable part of the outcome in which we are intersted. The empirical application applies a probit model of the decision equation, calculating the inverse Mills ratio and including it in the outcome equation.

It should be noted, however, that there is some recognition that the Heckman correction for selectivity is often unidentified and could turn out to be sensitive to specifications of the function (see, e.g., Manski, 1989; Baker, et al, 1995). In order to tackle this problem, we will present results with and without selectivity correction in the following sections.

4. Data and methodology

We use the National Urban Employment Survey (ENEU), which is carried out quarterly by the National Institute for Statistics, Geography and Information (INEGI). We use only the third quarter in order to avoid any contamination of wage measurements by Christmas bonuses and yearly profit sharing. The ENEU is carried out in the main urban areas of the country and has become more widespread over the last few years, surveying 47 urban areas in 2002.

In order to include a stable sample of workers in the analysis, we take into account a set of workers aged 18+ who have positive earnings and have worked more than 20 hours a week throughout the year; We also exclude the primary sector.

We calculated hourly earnings by dividing the reported monthly wage by the reported number of hours worked in the last week, multiplied by 4.3. This measure may be the one most preferred, as it is not affected by how many hours the individual works (Card, 1999). Those individuals who reported their wages as multiples of minimum wages were assigned the average minimum wage in effect in the area multiplied by the multiples they report. Wages were deflated using the CPI by area (base 2002), in order to control for different prices in the regions. Other studies have used the National Survey of Income and Expenditure, which covers rural and urban areas. However, the ENEU is a specialized survey for the labor market

and reflects the development of wages and the returns to schooling more accurately. The Northern-Pacific and Southern-Pacific areas have only been included in the survey since 1992.

We estimate returns to schooling using a Mincerian wage equation as in Equation (1), using the log of the real hourly wage as the dependent variable and years of schooling (S), experience (E), squared experience (EE), and a dummy for gender (X, 1=male) as the independent variables. Experience was taken to be age minus years of schooling minus six, and, in the case of women, also minus 0.25 per number of children.

In further runs, we include three additional sets of dummies. However, it should be borne in mind that these variables could bring about potential endogeneity, and also may be influenced by education itself. The question of endogeneity, which has been an important issue for research during recent years, cannot be properly dealt with here since there is a lack of suitable instruments due to limitations in the ENEU, so the additional runs with extra variables should be handled carefully. The coefficients for the full models are displayed in Table A1 in the Appendices.

The first is a dummy for government workers (G). This variable is included because the government, which used to be a major employer, still remains an important job source despite budget and staffing cuts. The second is a dummy if covered by any scheme of social security regulations (C). This is because informal labor accounts for a large proportion of the labor market[2], providing an alternative source of employment. The third set consists of two dummies for occupations according to skills requirements. The P dummy P indicates the professional category, and the K one the skilled category, the base category being the one including unskilled occupations. Categories are explained in Appendix 1.

$$w_{ij} = \alpha + \beta_1 S_{ij} + \beta_2 E_{ij} + \beta_3 EE_{ij} + \beta_4 X_{ij} + \beta_5 G_{ij} + \beta_6 C_{ij} + \beta_7 P_{ij} + \beta_8 K_{ij} + \epsilon_{ij}$$

Where ϵ is the error term, i is the individual and j the region.

5. Results

Regressions were made using OLS and correcting by means of the Heckman two-step procedure (Heckman, 1979) in order to avoid possible sample-selectivity bias. For the latter, we ran a probit equation for the probability of being employed subject to schooling, experience, and squared experience. From this, we calculated the inverse Mills ratio, then including such term in the wage equation. However, it should be kept in mind that selectivity may also arise from other sources such as informal jobs or migration.

The results at the national level include a set of full regional dummies. Table 1 presents results for returns to schooling for equation (1) and its extensions. Table A1 in Appendix 1 shows the coefficients for the full extended model.

In Table 1, it can be seen that returns, which tended to increase from 1987 to 1992, thereafter decreasing, do not change their trend under any specific model. In general, the Mexico-City area has the highest levels of returns to schooling, the lowest ones being in the Central-Pacific, Southern-Pacific and Central regions. The development of returns is not linear over the period, achieving the highest rates in 1991-1992, and the lowest in 1994-1995, coinciding with the economic crises of that period.

2 According to the ILO (2000) approximately 40% of the Mexican labor markets is informal.

Table 1. Coefficients of schooling under different models

Variable	Region	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
A. Basic Mincer	National	9.28%	9.37%	9.06%	9.07%	10.03%	10.51%	10.84%	9.44%	9.32%	9.65%	9.64%	9.48%	9.08%	8.90%	8.59%	8.16%
	Capital	9.62%	9.79%	9.60%	9.42%	10.60%	11.09%	11.78%	10.09%	9.71%	10.12%	9.97%	9.94%	9.63%	9.80%	9.70%	9.07%
	Border	9.02%	9.41%	9.22%	9.45%	10.06%	10.42%	10.77%	9.51%	9.32%	9.69%	9.48%	8.91%	8.52%	8.18%	7.66%	7.42%
	Pacific North						9.14%	9.19%	8.51%	9.02%	9.47%	9.47%	9.01%	8.84%	7.71%	7.66%	8.01%
	Center Gulf	10.02%	9.14%	9.10%	9.63%	9.79%	10.68%	10.89%	10.17%	10.01%	10.93%	11.08%	10.55%	10.49%	9.18%	9.47%	9.58%
	Pacific Center	8.60%	8.75%	7.66%	7.74%	9.22%	9.48%	9.58%	7.37%	8.23%	7.95%	8.53%	8.37%	7.54%	7.93%	7.12%	6.71%
	Center	8.34%	7.64%	7.26%	6.72%	7.64%	9.35%	8.32%	8.26%	8.10%	8.52%	8.79%	9.05%	8.47%	8.42%	7.59%	6.99%
	Center North	9.17%	8.94%	9.14%	9.73%	10.17%	10.47%	10.45%	9.96%	9.75%	10.17%	9.85%	9.63%	9.33%	8.58%	8.39%	8.22%
	Peninsula	9.39%	9.08%	7.88%	10.97%	10.75%	10.98%	11.70%	10.94%	11.46%	10.46%	10.60%	10.58%	10.11%	8.98%	9.00%	8.68%
	Pacific South						9.62%	10.03%	9.52%	9.03%	9.89%	10.34%	10.08%	9.57%	8.88%	8.54%	8.25%
B. Mincer/Heckman	National	8.79%	9.26%	8.94%	8.25%	9.97%	10.41%	10.86%	8.45%	7.96%	8.86%	9.41%	9.30%	8.98%	8.76%	8.60%	8.16%
	Capital	9.10%	10.04%	9.65%	9.21%	10.75%	11.13%	12.26%	9.20%	7.92%	7.94%	9.26%	9.60%	9.46%	9.42%	9.76%	9.07%
	Border	8.85%	9.46%	9.51%	8.55%	10.30%	10.42%	10.85%	7.73%	6.70%	7.31%	8.80%	8.52%	8.26%	7.92%	7.71%	7.44%
	Pacific North						8.15%	8.25%	6.74%	6.01%	7.66%	8.63%	8.46%	8.20%	7.38%	7.71%	8.00%
	Center Gulf	9.72%	7.45%	8.38%	7.87%	9.13%	10.31%	10.45%	8.22%	5.79%	8.17%	10.49%	10.59%	10.15%	8.82%	9.52%	9.55%
	Pacific Center	8.70%	8.24%	7.37%	6.85%	9.10%	9.17%	8.46%	5.31%	4.63%	5.62%	7.91%	7.96%	7.27%	7.57%	7.20%	6.74%
	Center	8.19%	6.93%	7.05%	5.22%	7.63%	9.12%	8.19%	6.31%	4.86%	6.62%	8.30%	8.75%	8.31%	8.14%	7.62%	7.00%
	Center North	8.03%	7.66%	9.13%	9.74%	10.24%	10.62%	10.39%	7.30%	6.03%	8.09%	9.15%	8.98%	8.90%	8.34%	8.51%	8.22%
	Peninsula	8.51%	9.00%	8.06%	11.07%	10.95%	11.34%	11.38%	9.42%	8.28%	8.42%	9.80%	9.75%	9.69%	8.61%	9.06%	8.70%
	Pacific South						9.51%	9.62%	7.60%	7.22%	7.65%	9.51%	9.32%	9.11%	8.43%	8.59%	8.24%
C. B+government+formal	National	9.38%	9.16%	8.85%	8.52%	10.56%	11.81%	10.82%	7.84%	6.45%	6.94%	8.38%	8.52%	8.08%	8.12%	8.18%	7.59%
	Capital	7.70%	9.70%	9.32%	9.31%	10.23%	10.18%	11.35%	9.17%	7.80%	7.50%	8.64%	9.04%	8.63%	8.93%	9.35%	8.52%
	Border	7.38%	9.01%	8.65%	8.82%	8.41%	9.24%	9.33%	7.52%	6.44%	6.99%	8.49%	8.22%	8.01%	7.75%	7.56%	7.25%
	Pacific North						6.91%	7.53%	6.32%	5.45%	6.65%	7.47%	7.39%	6.99%	6.39%	6.86%	6.89%
	Center Gulf	7.27%	6.36%	7.91%	7.84%	8.72%	8.34%	8.73%	7.33%	5.05%	7.22%	8.81%	8.49%	8.17%	7.43%	7.92%	7.94%
	Pacific Center	8.80%	8.26%	8.06%	7.17%	8.91%	8.43%	7.44%	5.26%	4.42%	5.17%	7.41%	7.26%	6.82%	7.26%	6.81%	6.19%
	Center	7.14%	6.52%	6.60%	5.23%	6.42%	8.64%	7.07%	5.64%	4.56%	6.11%	7.64%	7.87%	7.15%	7.33%	6.87%	6.10%
	Center North	7.92%	8.11%	8.37%	9.66%	9.38%	9.18%	9.00%	6.90%	5.48%	7.35%	8.09%	8.00%	7.86%	7.54%	7.78%	7.49%
	Peninsula	7.38%	7.68%	7.36%	11.00%	10.36%	9.59%	9.89%	8.78%	6.03%	7.50%	8.54%	9.29%	9.44%	8.69%	8.72%	8.15%
	Pacific South						7.15%	8.49%	6.53%	5.99%	6.40%	7.66%	7.62%	7.12%	7.20%	7.22%	6.85%
D. C+skills	National	9.14%	8.83%	8.47%	8.52%	10.03%	10.45%	9.42%	6.88%	5.72%	6.06%	7.29%	7.49%	6.99%	6.97%	6.85%	6.54%
	Capital	7.48%	9.38%	8.99%	8.78%	9.74%	8.63%	9.77%	8.08%	6.90%	6.55%	7.50%	7.99%	7.40%	7.56%	7.64%	7.39%
	Border	7.04%	8.73%	8.36%	8.48%	8.09%	8.09%	7.99%	6.47%	5.76%	6.02%	7.41%	7.18%	7.01%	6.67%	6.49%	6.23%
	Pacific North						6.65%	6.80%	5.89%	5.09%	6.10%	6.52%	6.37%	6.34%	5.71%	5.87%	6.02%
	Center Gulf	7.15%	6.17%	7.15%	7.42%	8.19%	7.08%	7.69%	6.55%	4.52%	6.50%	7.65%	7.40%	6.34%	6.40%	6.63%	6.64%
	Pacific Center	8.55%	7.87%	7.57%	7.00%	8.52%	7.18%	6.66%	4.28%	3.66%	4.55%	6.32%	6.22%	5.87%	6.44%	5.55%	5.41%
	Center	7.01%	6.38%	6.26%	4.86%	5.91%	7.69%	5.81%	4.73%	4.04%	5.29%	6.74%	6.84%	6.09%	6.25%	5.81%	5.10%
	Center North	7.55%	7.87%	8.21%	9.40%	8.70%	8.15%	8.16%	6.25%	5.11%	6.55%	7.19%	7.04%	6.99%	6.52%	6.70%	6.49%
	Peninsula	7.10%	7.63%	6.91%	10.82%	10.09%	8.10%	9.25%	8.13%	5.58%	6.46%	7.75%	8.28%	8.38%	7.80%	7.77%	7.14%
	Pacific South						6.38%	7.72%	6.22%	5.91%	5.94%	6.80%	6.66%	6.06%	6.31%	6.22%	5.82%

* Statistically insignificant at 10%. Weighted OLS.

Previous nation-wide studies, using the National Household-Income-Expenditure Survey, which includes both urban and rural areas, have found returns of between three and eleven per cent according to educational level (Psacharopoulos, et al., 1996; Bracho and Zamudio, 1989; Lächler, 1998; López-Acevedo, 2001). In this study, we use the National Urban Labor Surveys, and our hourly-wage measure is deflated using the regional CPI.

If we compare the returns to schooling in each region with the national average using the Basic Mincer Results, we find that maximum/minimum range was 1.07/0.89 in 1987, compared with 1.22/0.86, in 1995 and 1.17/0.82 in 2002. Using the extended models, the dispersion trend is quite similar - i.e. the dispersion of returns to schooling among regions increased in the period before the 1995 crisis and the coming into effect of NAFTA, and has remained high since then. An attempt will be made, in the following section, to present some of the possible explanations for such differences.

What does, in any case, seem striking is the fact that returns to education have decreased in recent years, and the most likely explanation for this may be that the increasing spread in such returns means that investment in schooling has become riskier over time. If it is a matter of individuals who are averse to risk, higher risk alone should lead to lower levels of school enrollment. However, since enrollment rates remain high in Mexico, this is not a plausible explanation for the country-wide tendency. Moreover, it has been shown (de la Torre, 1997) that income inequalities have existed alongside remarkable progress in educational attainment, in terms either of educational coverage or of educational distribution.

A second possible explanation is that falling returns to education may indicate a pattern of "over-education" (Sicherman, 1991; Dolton and Vignoles, 1997) as higher education becomes more widely available and the number of educated workers who cannot find jobs in keeping with their university degrees increases. According to Freeman (1976), since the excess qualified work force has to settle for jobs that "don't require a degree", returns to education should plummet. This may be a more plausible explanation, since, during recent years, the mean level of educational achievement in the country has risen substantially, while many of the jobs created are in the informal sector of the economy, thus not affecting overall economic productivity.

Table A1 in the Appendices includes coefficients for other factors in a full extended Mincer model. Although rates of return can be seen first to increase, then to decrease, irrespective of whether other factors are controlled for or not, the skills coefficients continue to increase throughout the period, although not in a linear manner. At the national level, returns to high skilled increased from 17% in 1987 to around 40% in 2000, while returns to medium skilled increased from 11% to about 17% over the same period. In general, the highest returns are, again, in the Mexico City area, while the lowest returns are found in the Pacific Center and Peninsula areas.

The "gender" dummy shows a decrease in wage differentials favoring males, from 20% in 1987, to about 11% in 2001-2002. The highest differences are in the Central areas, while the lowest occur in the Mexico City and Peninsular regions. Experience is mostly of no significance. The differential pertaining to government employees shows a high level of return of about 15% in recent years.

Of interest are the coefficients pertaining to those covered by Social Security. According to the theory of equalizing differences (Rosen, 1986), workers with social security are willing to earn less than comparable workers without social security. Hence, if there are benefits, such as social security, directly linked to payroll contributions, workers should recognize that their job compensation consists of take-home pay plus a social-security benefit - i.e. the effect of the payroll contribution is that workers are willing to supply their labor in exchange for a lower net wage. However, in Table A1, the coefficients are generally positive at the national level, standing at about 10%, in favor of those with social-security benefits, in the final years of the period under consideration, which would mean that workers do not assign value to the benefits[3]. At the regional level, it is clear that border workers show a valuation (about 65% in the

3 The value might be calculated as payroll tax minus the wage differential between workers with coverage and ones without coverage (when in favor of those without coverage). The average payroll tax is about 16% from 1997 on. However, it should be mentioned that a precise valuation should also take into account employment and hours worked.

last three years) for social-security benefits, while, in regions such as the Pacific North, Peninsula and Pacific Center ones, it can be seen that valuation is shown only during the first years[4]. It should be mentioned that the Border area is characterized by a high proportion of 'maquiladora' industry, which often tends to avoid fully complying with regulations. Moreover, since the equilibrium wage depends on supply-and-demand levels, some disamenities, that are not social security benefits, do not necessarily have to be offset by higher wages - i.e., as people have different tastes, employers could attract enough workers without offering a compensating wage differential. If a larger subset of the population does not regard not having social security as a disamenity, they might not be rewarded with higher wages. This may constitute a reason for carrrying out a wide-ranging analysis of such issues.

6. Sources of regional differences in wages and returns

In order to ascertain some determinants of regional wage and return differentials, we will begin by applying a modified version of the methodology posited by Hanson (1997), who examined the link between regional wage differentials in industry and distance from agglomerated economies. The equation proposed by Hanson is as follows:

$$In\left(\frac{W_{it}}{W_{et}}\right) = \beta_0 + \beta_1 InMX_i + \beta_2 InUS_i + \delta_1 \Theta InMX_i + \delta_1 \phi InUS_i + \epsilon_{it}$$

where w_{it} is the average real wage for region i, at time t, MX and US are the distance from the regions, from Mexico City and from the nearest point on the US border respectively, as a proxy for transport costs, δ_t is a dummy variable taking a value of 1 if the year is in the NAFTA period (1994 onwards). The βs, Θ and ϕ are coefficients to be determined.

It is possible to allow for idiosyncratic local components that affect relative regional wages by using a fixed-effects approach such that the error term is:

$$\epsilon_{it} = \gamma_{it} + \eta_{it}$$

where γ_i is the fixed effect for state i and η_{ij} is an iid random-error term with zero mean and σ variance.

In the Hanson methodology, however, one cannot control directly for fixed effects, as the distance-based variables correlate highly with the dummy variables for regions.

Another shortcoming of Hanson's model is that he does not control for other factors besides distance to industrial centers, such as the supply of human capital or institutional differences between areas, which, as mentioned in Section 2, may have a bearing on regional differences (See, e.g., Rodrik, et al, 2004, for an example of the impact of institutions on growth).

Thus, the extended model will be:

$$In\left(\frac{W_{it}}{W_{et}}\right) = \beta_0 + \beta_1 InMX_i + \beta_2 InUS_i + \delta_1 \Theta InMX_i + \delta_1 \phi InUS_i + \beta_3 INS_{it} + \epsilon_{it}$$

where INS denotes a set of institutions (and supply of human capital) for region i in year t. In INS, we consider variables such as the ratio between the percentage of workers in the informal sector and the national average, the same ratio with regard to unemployment, and the number of strikes in the region, given that compliance with regulations is a good indicator of institutional status.

Though labor institutions can, usually, be defined as laws and entities meant to protect the interests of workers while guaranteeing a minimum standard of living (Botero, et al, 2003), regional institutions present some challenges, since, while federal regulations might well prevail, such institutions may, for example, have many ways of settling disputes in the courts. Hence, the yardsticks used in this paper may not be the best, but they do provide some insights into how efficiently the aforesaid regulations are applied at the regional level and how rigid local markets are - i.e. they make it possible to gauge, at least to some degree,

4 Garro, Meléndez and Rodríguez-Oreggia (2005) have shown that the valuation is about 65% at the national level. However, they broke the sample of workers down into 32 different categories, calculating a value for workers in large private companies, and showing that the composition of industry in Mexico is such that small and medium companies provide 78% of total employment.

the extent to which "ownership rights" and the rule of law prevail in the labor market.[5] Though the said variables may lead to some problems of endogeneity, we will use the lags in order, at the very least, to address such problems.

7. Results

Table 2 shows the results for the panel-data equation for the period 1987-2002, where the dependent variable is the log of the ratio between regional wage and national wage. Distance from the U.S. has a negative and significant coefficient. However, the distance-from-Mexico-City coefficient is not robust to the inclusion of institutional variables, as it not only becomes less significanct, but also changes sign, from negative to positive. Hence, distance from the U.S. has compressed regional-wage differentials, but the evidence taking distance from Mexico City into account is blurred.

Table 2

Regional wages relative to national ones

	(1)	(2)	(3)	(4)	(5)	(6)
In US	-0.1422***	-0.1239***	-0.0930***	-0.0866***	-0.0868***	-0.0953***
	(0.0102)	(0.0152)	(0.0151)	(0.0158)	(0.0159)	(0.0134)
In MX	-0.0031	-0.0230***	-0.0290***	0.0178	0.0280**	0.0398***
	(0.0040)	(0.0056)	(0.0065)	(0.0122)	(0.0150)	(0.0109)
In US NAFTA		-0.0275	-0.0191	-0.0124	-0.0152	
		(0.0315)	(0.0183)	(0.0177)	(0.0183)	
In MX NAFTA		0.0987***	0.0286***	0.0351***	0.0202	
		(0.0139)	(0.0079)	(0.0105)	(0.0151)	
In US NAFTA BD		0.0002				
		(0.0077)				
In MX NAFTA BD		0.0436***				
		(0.0066)				
Informal (lag)			-0.4115***	-0.2907***	-0.2837***	-0.2921***
			(0.0807)	(0.0825)	(0.0827)	(0.0791)
Unemployment (lag)				0.1127***	0.1034***	0.0980***
				(0.0422)	(0.0421)	(0.0416)
Strikes (lag)				0.0280***	0.0427***	0.0538***
				(0.0084)	(0.0157)	(0.0120)
Strikes (lag)-Time					-0.0015	-0.0027***
					(0.0012)	(0.0008)
Constant	0.7890***	0.7855***	1.0229***	0.3957***	0.3184*	0.3043***
	(0.0672)	(0.1111)	(0.1116)	(0.1642)	(0.1823)	(0.1370)
Annual dummies	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.2851	0.3819	0.3568	0.4268	0.4289	0.4255
Wald χ^2	609.95	1075.14	797.98	632.25	591.61	487.79
(p)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)

*,**,*** Significant at 10,5, 1%. Correlated panel-corrected standard errors in parentheses. N=134

5 The unemployment variable might also give some hint of the "wage curve" whereby worker remuneration is negatively affected by unemployment levels.

Following Hanson, we also have the distance variables interact with a dummy if the year falls in the NAFTA period (1994 onwards). Distance from the U.S. in the NAFTA period has become relevant in reducing relative wages. The evidence using distance from Mexico City is not robust, although it has a positive sign, and it becomes less significant when institutional variables are included in the regressions, which might mean that the structural break resulting from trade agreements was more significant in the mid-80s, as shown by Hanson (1997). Some tests carried out by us for coefficient equality show that these variables differ significantly from the logs of distance.

Moreover, though the interaction with the border-area dummy is significant and positive if distance from Mexico City is considered, a coefficient-equality test refutes the null hypothesis that the correlation of the border-area-dummy with the distance-from-the-U.S. variable differs from the former's correlation with NAFTA. Thus, up to now, we have evidence only that distance from the U.S. is a factor in wage-difference compression among regions.

We then proceeded to include variables proxied for labor institutions. Though the informality, unemployment and strike variables are all significant, both jointly and separately, their effects on regional wage disparities differ. The informality variable shows that, the higher the level of regional informality, the lower inter-regional wage disparities are. While informality tends to increase occupation levels, especially among poorer households, it also concentrates the employment in low-productivity activities, biasing skills distribution and tending to reduce average productivity levels in regions where it is higher.

The unemployment variable is significantly positive, which is to say that the higher the unemployment rate, the wider the regional-wage gap. In principle, we would expect a negative correlation in accordance with the "wage-curve" hypothesis. Although much more work needs to be done in the Mexican case regarding this issue, it seems that the negative relation for wages derives from informality. While most of the empirical evidence comes from developed countries, it can be affirmed that developing countries such as Mexico adjust their labor markets more through informality than through unemployment. Moreover, the definition of unemployment used by the official Mexican agencies presents many problems (see, for example, Garro and Rodríguez-Oreggia, 2002).

The strikes variable is positive and significant. Unions have the right to regulate wage and working conditions in cases where they are involved, and to call strikes wherever they feel that negotiation is needed. Although the variable for strikes is positive, showing that they tend to increase local wages to some extent, it is negative when correlated with time, since the power of the unions has decreased in recent years, a finding which concurs with some other findings for Mexico (Fairris, 2003).

Table 3 shows the results obtained when taking relative returns to schooling as a dependent variable In this case, distance from the US changes its sign in accordance with the set of institutional variables, while distance from Mexico City has a significantly negative effect on the first regressions, but becomes positive and insignificant when institutional variables are added. Based on these results, it is hard to draw any conclusions about the effects of trade on regional returns to schooling.

Table 3

Regional returns to schooling relative to national ones.

	(1)	(2)	(3)	(4)	(5)	(6)
In U.S.	-0.0193***	-0.0169	0.0279**	0.0376***	0.0376***	0.0528***
	(0.0075)	(0.0142)	(0.0151)	(0.0133)	(0.0133)	(0.0117)
In MX	-0.0201***	-0.0157**	-0.0243***	0.0183	0.0222	0.0154
	(0.0042)	(0.0081)	(0.0080)	(0.0194)	(0.0246)	(0.0172)
In U.S. NAFTA		0.0319	0.0177	0.0296**	0.0284**	
		(0.0305)	(0.0201)	(0.0154)	(0.0153)	
In MX NAFTA		0.0647***		-0.0072	-0.0131	
		(0.0182)		(0.0153)	(0.025)	
In US NAFTA BD		0.0101				
		(0.0097)				
In MX NAFTA BD		0.0508***				
		(0.0114)				
Informal			-0.5978***	-0.4865***	-0.4838***	-0.4704***
			(0.0659)	(0.0758)	(0.0739)	(0.0725)
Unemployment				0.1618***	0.1582***	0.1577***
				(0.0442)	(0.0453)	(0.0420)
Strikes				0.0214	0.0271	0.0205
				(0.0145)	(0.0264)	(0.0196)
Strikes-Time					-0.0005	0.0002
					(0.0021)	(0.0013)
Constant	0.0161	-0.0271	0.3178**	-0.3459**	-0.376**	-0.4416***
	(0.0674)	(0.1310)	(0.1447)	(0.1764)	(0.2055)	(0.1573)
Annual dummies	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.3313	0.4450	0.4383	0.5233	0.5236	0.5199
Wald χ^2	184.51	173.57	312.20	552.25	777.05	3003.95
(p)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)

*,**,*** Significant at 10,5, 1%. Correlated panel-corrected standard errors in parentheses. N=134

The variables for institutions are relevant, except for Strikes. The Informal variable is significantly negative, from which we might conclude that higher levels of informality tend to reduce returns to schooling and compress differences among regions. Since informality skews the distribution of workers' skills, it is not surprising that it also reduces additional remuneration for formal schooling, thus also negatively affecting the decision to undertake further education.

Unemployment has a significantly positive effect on returns to schooling. This is consistent with findings at the international level, which show an increase in returns to schooling from unemployment, given that people's expectations of future employment correlate with current economic conditions. (e.g. Nickell, 1979). However, the effect of this variable is lower than that of informality.

The idea that skills-biased technological change has begun to occur as returns rise still needs much further analysis. Although some research has suggested that the increase in wage inequality during the pre-NAFTA period in Mexico is due to changes in technology (Cragg and Eppelbaum, 1996; Esquivel and Rodríguez-López, 2003), other authors (e.g. Card and DiNardo, 2002) have argued that skills-biased technological change has, in general, proved to be a weak explanation for wage differences.

In general, it seems that the overall effects of labor institutions (proxies) are more important than variables in accounting for trade. Although the institutions variables may result in endogeneity, we have used lags. In addition, we have run the regressions using the institutional-variable estimators with regional dummies and growth lags. Results are similar to those presented in the Tables. The results presented in these sections may provide support for other research pointing to the importance of institutions in explaining differences among nations or regions, while trade has only a secondary effect (e.g. Rodrik, et al, 2004; Baier, et al, 2004). However, further efforts at understanding other mechanisms involving trade, institutions and local labor markets are needed. For example, the latter's effect on skills-level variation and income-distribution patterns needs to be determined, and much better local-institutions measures need to be constructed. These tasks will be undertaken in future research.

8. Conclusions

This paper has sought to analyze regional differences in wages and returns to schooling in Mexico, based on microdata from the National Urban Employment Surveys, 1987-2002. Having first calculated returns to schooling and skills by region, using a Mincerian equation, we then used a panel-data technique in order to determine the extent to which some factors -especially distance from production centers and institutions- have affected regional differences in wages and returns. We found that returns to schooling have decreased in recent years, with all regions following the same pattern, after a period in which they increased just before the implementation of NAFTA. Although more work is needed in order to understand this decline, a plausible explanation may be that there is a distortion in rewards because there is a lack of jobs suitable for those with "diplomas", while the jobs which are available do not necessarily call for a degree-type qualification obtained through formal education.

Although some researchers have suggested that the increase in returns may be the result of skills-biased technological change, Airola and Juhn (2003) found no evidence of such a tendency in Mexico. Moreover, since, at the regional level, the increase in skills seems to be compressed, even if we accept that the increase attests to skill-biased technological change, it still does not seem to be the case that areas which share borders with the U.S. have benefited from such change, even during the NAFTA period. Such benefits are obtained only if the transferred technology/capital is skill neutral or is transferred equally to all areas, which is not the case, given that foreign investment is highly concentrated in the border area.

The present research has also found evidence that institutions play a more important role in explaining regional differences in wages and returns than distance from centers of production. Unemployment and negotiating power as measured through strikes are relevant in explaining wage differentials between regions, although the latter have decreased in recent years. If we take informality to be a proxy for "property rights" and the rule of labor law in the job market, we can state that increased levels of informality tend to lower wages and reduce the number of returns to

schooling. This is the case in Mexico, where, though informality acts as a cushion for those who cannot enter the formal market by obtaining a job in keeping with their skills, it distorts the allocation of skills and reduces returns to formal schooling. Moreover, conclusions can also be drawn regarding the focus of social policy, since it can be seen that the provision of education, without a proper institutional and economic environment, may not be so effective in alleviating poverty and increasing overall income as it is thought to be.

Appendix 1
Description of Categories

Categories of Regions (32 states)
Capital: Mexico City, State of Mexico.
Center: Morelos, Guanajuato, Hidalgo, Puebla, Querétaro, Tlaxcala.
Central Gulf: Veracruz, Tabasco.
Central North: Aguascalientes, Durango, San Luis Potosí, Zacatecas.
Pacific North: Baja California Sur, Sinaloa, Nayarit.
Pacific Center: Colima, Jalisco, Michoacán.
Pacific South: Chiapas, Guerrero, Oaxaca.
Peninsula: Campeche, Yucatán, Quintana Roo.
Border: Baja California, Chihuahua, Coahuila, Nuevo León, Tamaulipas, Sonora.

Skills categories:

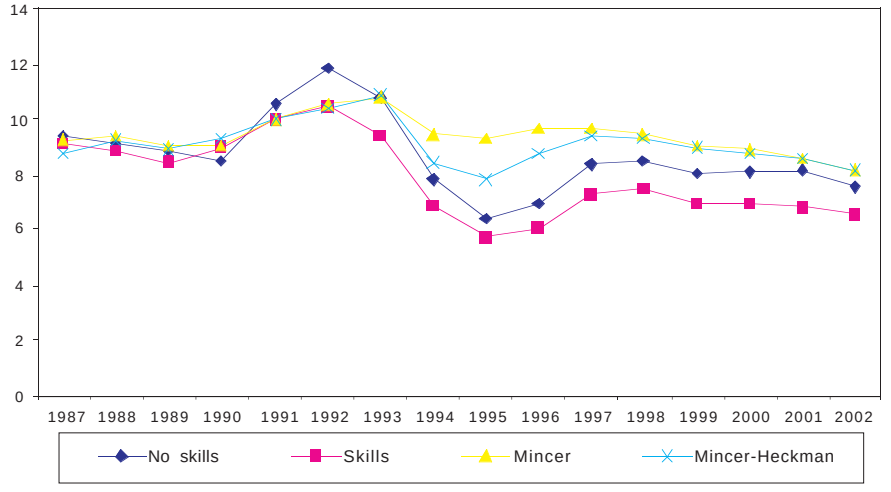
Professional: professionals, specialized technicians, managers and professionals in the public and private sectors.
Skilled: Educational workers, artists and performers, managers and foremen in control positions in industrial and craft production; craftsmen in the transformation industry and in maintenance; machine operators in continuous and industrial processes; assistants in industrial processes; drivers of mobile machinery; coordinators and supervisors in administrative and service activities.
Unskilled: Assistants in administrative activities; traders and assistants; travelling salesmen; personal-service workers; domestic-service workers; security-service workers.

Appendix 2
Returns to schooling in accordance with different models

Different regressions were carried out in order to calculate returns to schooling, including, in all of them, a set of dummies for regions when calculated at the national level. The results are presented in Figure A1. We started with a Mincer-type regression and continued to add variables.

Figure A1

Different models of returns to schooling



A. Mincer= schooling, experience, squared experience, gender, regional dummies. It averages 9.41 for the full years.
B. Mincer/Heckman= A +mills. Average =9.12
C. No skills= B + government + informal. Average=8.7
D. Skill= C + dummies for skills categories. Average=7.88

Results for the full model (skills) are presented in Table A1

Table A1. Coefficients for full model. Dependent variable: log of real hourly wage

Variable	Region	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Gender	National	20.58%	16.99%	13.95%	14.77%	17.62%	14.21%	10.45%	1.82%*	3.03%	-0.05%*	1.96%*	4.70%	8.45%	7.97%	11.02%	11.26%
	Capital	7.22%	13.21%	9.57%	9.38%	6.58%*	0.81%*	2.88%*	-1.93%*	-0.78%*	-4.62%	-1.94%*	1.33%*	4.45%	2.41%*	4.31%	6.80%
	Border	10.06%	14.15%	11.12%	14.18%	9.30%	8.16%	4.75%*	4.69%	7.51%	3.28%	2.75%*	6.62%	12.33%	12.46%	16.41%	14.44%
	Pacific North						10.52%	13.92%	7.14%	8.18%	7.50%	1.25%*	6.62%	11.71%	12.32%	15.22%	14.34%
	Center Gulf	26.42%	23.91%	23.96%	21.68%	19.67%	3.81%	7.045	4.28%	5.93%	7.38%	8.45%	17.65%	12.84%	14.39%	14.19%	14.59%
	Pacific Center	26.77%	21.61%	27.04%	20.68%	22.75%	8.84%	1.92%*	3.42%*	7.54%	6.13%	6.44%	3.53%*	4.48%	9.03%	15.05%	15.65%
	Center	25.20%	22.415	21.39%	23.36%	22.96%	15.84%	12.15%	7.14%	7.04%	6.99%	10.12%	10.35%	14.42%	13.43%	17.08%	13.35%
	Center North	22.01%	27.00	16.64%	22.76%	20.57%	12.77%	7.85%	2.89%*	4.30%	4.95%	5.07%	0.85%*	9.56%	11.69%	12.85%	14.51%
	Peninsula	22.86%	12.47%	17.70%	23.86%	20.87%	3.65%	0.325*	2.71%*	-2.38%*	-4.61%	-0.97%*	-6.85%	4.41%	2.03%*	8.89%	6.36%
	Pacific South						-1.35%*	6.32%	-1.57%*	-1.89%*	-5.95%	-6.49%	3.86%*	3.70%	1.69%*	8.03%	7.62%
Experience	National	4.13%	3.25%	2.78%	3.30%	4.34%	6.13%	3.30%	0.20%*	-0.39%*	-1.99%	-0.25%*	0.75%*	0.41%*	-0.26%*	0.30%*	0.58%*
	Capital	-0.30%*	3.33%	2.64%	3.18%	2.38%	1.32%*	2.21%*	1.34%*	1.23%*	-1.48%*	-0.67%*	0.49%*	0.44%*	-1.24%*	0.14%*	1.47%*
	Border	0.75%*	2.94%	2.16%	2.38%	1.03%	1.51%	0.77%*	-0.32%*	-0.25%*	-2.08%	-0.33%*	0.59%*	0.12%*	0.12%*	0.13%*	0.56%*
	Pacific North						0.41%*	1.14%*	0.22%*	0.33%*	0.45%*	-0.89%*	0.27%*	-1.28%*	1.12%*	0.72%*	-0.78%*
	Center Gulf	0.57%*	0.70%*	1.95%*	1.75%*	3.09%	0.57%*	1.17%*	0.16%*	-1.63%*	-0.50%*	1.56%*	3.18%	0.46%*	1.00%*	1.38%*	-0.39%*
	Pacific Center	4.40%	3.07%	4.17%	2.05%*	2.58%	0.75%*	-2.05%*	-1.81%*	-2.44%*	-2.68%	-0.41%*	0.18%*	-0.06%*	-0.66%*	-0.5%*	-0.59%*
	Center	1.67%	2.03%	1.90%	1.05%*	1.64%	2.95%	0.60%*	-1.38%	-1.24%	-1.02%*	0.42%*	1.73%	1.14%	0.08%*	1.48%	-0.59%*
	Center North	1.57%*	2.16%	2.37%	4.20%	2.69%	2.30%	17.66%	-1.66%	-1.34%	-0.71%*	0.38%*	-0.57%*	-0.75%	0.76%	-1.91%	-1.55%*
	Peninsula	1.37%	2.02%	2.56%	5.25%	4.28%	2.47%*	1.55%*	0.88%*	-1.89%*	-1.55%*	0.07%*	-1.82%	0.81%*	0.83%*	1.03%*	-0.58%*
	Pacific South						0.47%*	2.96%	0.03%*	1.57%*	-0.12%*	0.69%*	-0.82%*	0.22%*	-0.63%*	0.22%*	1.36%*
Squared experience (*1000)	National	-0.48	-0.37	-0.31	-0.38	-0.53	-0.80	-0.35	0.41*	0.76*	3.64	1.50	-0.22*	0.13*	1.43	0.33*	-0.28*
	Capital	0.23*	-0.37	-0.27	-0.36	-0.53	-0.03*	-0.15*	-0.89*	-1.33*	3.20*	2.37*	0.59*	0.49*	3.34	1.09*	-1.32*
	Border	0.00*	-0.32	-0.22	-0.36	-0.04*	-0.09*	0.02*	0.71*	0.20*	3.26	1.38*	-0.58*	0.23*	0.51*	0.20*	-0.32*
	Pacific North						0.11*	-0.01*	0.66*	33.64*	0.12*	2.35*	0.33*	2.26*	-1.41*	-0.74*	1.63*
	Center Gulf	0.05*	-0.04*	-0.20*	-0.16*	-0.34*	0.09*	-0.02*	0.47*	-1.63*	1.76*	-1.16*	-3.78	0.34*	-0.83*	-1.53*	1.29*
	Pacific Center	-0.55	-0.38	-0.57	-0.16*	-0.28*	0.04*	0.49	2.83*	3.25*	4.54	1.20*	0.45*	0.35*	1.64*	0.72*	0.90*
	Center	-0.15*	-0.24	-0.21	-0.11*	-0.14*	-0.33	0.03*	2.60	2.17	2.00	0.30*	-1.68	-1.10*	0.70*	-1.69	-0.64*
	Center North	-0.11*	-0.21	-0.25*	-0.50	-0.23*	-0.24*	-0.16*	2.96	1.75*	1.34*	0.28*	1.36*	1.72*	-0.52*	3.52	2.72
	Peninsula	-0.13*	-0.29*	-0.34*	-0.68	-0.52	-0.28*	-0.82*	-0.76*	2.38*	2.77*	1.26*	3.40	-0.39*	-0.40*	-0.89*	0.95*
	Pacific South						0.08*	-0.32	1.07*	-1.38*	1.19*	0.33*	2.32*	0.47*	2.22*	0.99*	-1.09*

Variable	Region	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Government	National	6.45%	2.79%	-2.47%	-4.08%	-7.52%	-3.16%	-0.79%*	4.95%	11.02%	15.13%	18.64%	17.02%	19.63%	12.14%	12.14%	15.66%
	Capital	2.35%*	3.85%	-3.02%*	-5.11%	-9.56%	-6.31%	-4.13%*	-2.64%*	4.29%*	12.18%	16.02%	12.47%	21.07%	11.72%	10.60%	14.55%
	Border	9.62%	2.66%	-0.41%*	-2.40%*	0.26%*	2.74%*	7.53%	14.84%	16.39%	15.83%	17.20%	16.62%	15.08%	10.91%	10.53%	11.98%
	Pacific North						6.39%	13.85%	20.68%	28.96%	33.36%	28.01%	28.83%	28.94%	30.86%	25.69%	29.21%
	Center Gulf	23.76%	21.86%	19.53%	10.21%	9.74%	17.36%	20.25%	28.94%	40.41%	37.25%	42.59%	50.70%	51.47%	43.41%	44.37%	42.67%
	Pacific Center	6.75%*	-1.42%*	-5.74%*	-16.23%	-18.36%	-17.77%	-12.23%	2.49%*	12.47%	17.70%	22.32%	23.16%	18.77%	14.40%	14.78%	21.66%
	Center	8.15%	9.77%	-6.96%	-6.17%	-5.97%	-0.95%*	-0.84%*	9.11%	15.86%	16.45%	18.65%	18.66%	21.69%	15.07%	18.23%	23.00%
	Center North	13.08%	10.24%	12.90%	4.41%*	10.87%	11.40%	16.44%	18.36%	25.61%	27.42%	30.34%	30.78%	29.94%	24.82%	20.34%	20.46%
	Peninsula	26.69%	16.34%	9.08%	9.38%	16.77%	18.47%	7.95%	12.06%	20.45%	22.29%	31.02%	24.37%	24.55%	19.87%	20.69%	20.41%
	Pacific South						16.57%	20.25%	26.73%	31.38%	29.38%	42.05%	37.87%	39.36%	27.41%	31.49%	36.95%
Social Security	National	6.95%	-0.68%*	-4.20%	-6.36%	-0.66%*	1.57%*	2.88%	7.98%	13.25%	16.44%	15.98%	15.94%	14.79%	11.74%	9.78%	8.77%
	Capital	12.27%	0.39%*	1.75%*	-1.40%*	7.13%	7.47%	6.92%	8.50%	14.14%	20.31%	21.00%	17.82%	16.22%	15.06%	12.16%	10.04%
	Border	-7.97%	-10.05%	-16.16%	-18.68%	-15.81%	-12.61%	-5.31%	0.41%*	4.19%	2.47%	-1.02%*	-2.27%	-6.73%	-9.97%	-10.43%	-10.97%
	Pacific North						-17.77%	-11.62%	-9.17%	-0.37%*	1.64%*	8.71%	9.00%	9.73%	0.60%*	1.72%*	5.80%
	Center Gulf	12.59%	2.80%*	-13.52%	-14.36%	-4.19%*	2.92%*	8.40%	13.68%	18.24%	26.34%	21.90%	22.04%	21.56%	15.65%	14.41%	14.30%
	Pacific Center	-3.96%*	-4.77%*	-16.10%	-8.79%	-15.39%	-2.72%*	-9.07%	7.19%	9.68%	11.58%	5.51%	13.41%	8.10%	7.59%	5.37%	3.74%
	Center	13.16%	7.12%	5.35%	3.61%	4.44%	4.45%	7.93%	7.33%	16.06%	16.72%	16.62%	17.89%	16.40%	12.52%	10.02%	13.36%
	Center North	4.47%*	1.76%*	-13.31%	-10.05%	-11.72%	-5.19%	-3.95%	6.62%	12.02%	12.07%	13.57%	11.93%	11.88%	10.62%	10.78%	10.61%
	Peninsula	4.15%*	-9.20%	-19.31%	-17.57%	-8.05%	-3.59%*	0.47%*	9.66%	12.88%	15.76%	13.29%	15.99%	15.28%	11.55%	9.29%	7.81%
	Pacific South						3.76%	7.39%	7.20%	13.80%	17.42%	16.80%	16.20%	21.95%	11.96%	10.97%	6.55%
Mills	National	0.81	-0.01*	-0.58	-0.37*	1.23	3.57	0.29	-3.37	-3.09	-4.67	-3.27	-2.56	-2.79	-3.92	-3.12	-2.20
	Capital	-2.09	0.26*	-0.38*	-0.24*	-0.76*	-1.94*	-0.48*	-1.74*	-1.44*	-3.34	-2.87	-2.13	-1.78*	-4.22	-2.36*	-0.53*
	Border	-2.02	-0.69*	-1.78	-1.37	-3.30	-2.35	-2.37	-4.26	-3.36	-5.48	-4.11	-3.53	-4.22	-3.68	-3.66	-2.01
	Pacific North						-3.98	-2.77*	-3.94	-3.63	-3.60	-5.02	-4.15	-6.19	-3.32	-3.80	-5.60
	Center Gulf	-2.37	-2.88	-1.52*	-2.86	-1.10*	-3.96	-2.24	-3.95	-4.70	-3.86	-1.51*	0.71*	-2.44	-2.47	-1.98*	-4.10
	Pacific Center	0.67	-0.98*	0.33*	-2.57*	-1.65*	-3.50	-6.22	-6.03	-4.99	-5.71	-3.69	-3.54	-4.25	-4.61	-4.84	-5.04
	Center	-1.24	-1.42	-2.16	-4.01	-3.32	-1.30	-3.30	-5.76	-3.53	-4.77	-2.84	-1.11*	-2.23	-4.02	-1.64*	-1.90
	Center North	-1.02	-1.00*	-1.90*	0.06*	-1.57*	-2.52	-1.83	-5.81	-4.76	4.21	-3.75	-4.77	-5.06	-3.15	-7.39	6.47
	Peninsula	-2.45	-2.58	-1.40*	0.36*	0.17*	-1.71	-2.09*	-3.79	-5.43	-5.17	-3.56	-8.60	-3.88	-3.99	-3.84*	-5.87
	Pacific South						-5.10	-0.74*	-5.38	-1.93*	-4.94	-3.78	-4.93	-3.37	-5.77	-4.19	-2.27*
Professional	National	17.82%	15.79%	17.12%	19.68%	21.16%	42.34%	43.20%	37.64%	37.37%	37.44%	37.49%	38.03%	39.53%	41.03%	46.05%	38.19%
	Capital	16.07%	15.24%	16.01%	20.51%	19.28%	43.37%	46.13%	37.95%	38.53%	38.03%	35.09%	38.33%	41.84%	42.94%	51.86%	37.00%
	Border	10.21%	15.07%	15.13%	20.50%	20.89%	40.74%	45.81%	38.24%	37.71%	39.38%	40.54%	37.41%	35.27%	39.27%	37.60%	35.85%
	Pacific North						35.28%	36.20%	30.61%	31.97%	35.77%	33.88%	36.15%	27.78%	28.76%	38.83%	34.66%
	Center Gulf	9.24%	18.33%	30.33%	25.25%	27.56%	44.40%	42.09%	35.85%	36.70%	37.34%	37.34%	35.50%	38.87%	37.60%	42.99%	44.06%
	Pacific Center	10.80%	12.59%	16.31%	3.55%*	11.19%	37.58%	28.40%	33.45%	32.84%	25.90%	36.36%	36.86%	32.15%	30.36%	40.98%	28.20%
	Center	15.64%	16.96%	19.52%	27.15%	28.65%	38.65%	41.91%	38.91%	37.83%	37.82%	35.68%	39.88%	38.08%	40.61%	40.20%	38.71%
	Center North	23.60%	12.02%	4.28%*	11.35%	25.40%	38.87%	37.13%	33.93%	31.60%	33.65%	33.61%	35.12%	32.52%	39.08%	41.44%	40.22%
	Peninsula	21.78%	5.88%*	22.09%	9.15%*	14.60%	46.50%	38.39%	33.46%	35.06%	36.65%	30.72%	32.58%	36.34%	35.51%	37.19%	36.17%
	Pacific South						36.27%	39.00%	35.72%	30.01%	35.55%	35.25%	34.35%	37.78%	34.82%	39.12%	39.28%

Variable	Region	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Skilled	National	10.85%	5.09%	4.45%	1.49%*	2.84%	19.92%	14.35%	14.14%	14.91%	15.38%	15.09%	15.11%	15.90%	16.72%	17.79%	17.11%
	Capital	12.66%	4.37%	3.63%	0.71%*	0.64%*	13.52%	12.26%	11.16%	12.52%	15.17%	11.78%	11.65%	14.20%	14.11%	15.51%	14.20%
	Border	10.21%	4.83%	3.61%	5.00%	3.62%	11.35%	14.35%	11.54%	13.72%	10.29%	13.36%	12.53%	11.24%	12.34%	37.60%	12.06%
	Pacific North						26.78%	18.57%	20.24%	23.11%	25.16%	24.78%	19.26%	20.38%	22.55%	23.84%	25.69%
	Center Gulf	6.82%	9.61%	9.10%	3.69%*	7.41%	23.34%	20.40%	19.80%	21.33%	17.99%	21.62%	21.14%	21.67%	21.43%	26.09%	25.63%
	Pacific Center	0.76%*	-2.20%*	0.79%*	-1.75%*	-1.42%*	5.91%	7.02%	11.57%	10.57%	9.31%	13.12%	13.91%	11.48%	12.97%	14.04%	11.96%
	Center	8.53%	6.96%	3.33%	6.05%	8.38%	13.40%	10.11%	13.11%	14.30%	12.84%	13.22%	14.55%	11.84%	14.73%	13.24%	16.83%
	Center North	6.75%	3.04%*	-3.06%*	-3.18%*	2.41%	15.01%	18.14%	15.84%	17.26%	16.91%	14.75%	16.39%	13.65%	18.87%	20.12%	17.24%
	Peninsula	8.60%	4.51%*	6.03%	-0.08%*	4.23%*	16.17%	17.84%	19.07%	21.09%	19.20%	19.44%	20.46%	20.82%	22.33%	19.59%	18.57%
	Pacific South						24.83%	27.13%	27.81%	28.05%	30.08%	26.66%	26.43%	27.56%	25.28%	39.12%	28.96%
Constant	National	1.18	1.54	1.79	1.67	1.32	0.82	1.50	2.36	2.40	2.47	1.87	1.72	1.75	1.99	1.95	1.99
	Capital	2.17	1.44	1.71	1.66	1.71	1.93	1.66	2.19	1.90	2.28	1.88	1.70	1.61	2.05	1.82	1.67
	Border	2.28	1.85	2.16	2.07	2.46	2.27	2.36	2.74	2.57	2.79	2.18	2.14	2.20	2.88	2.37	2.35
	Pacific North						2.58	2.36	2.63	2.37	1.96	2.13	1.93	2.24	1.95	1.99	2.31
	Center Gulf	1.68	1.92	1.75	1.88	1.49	2.04	1.82	2.15	2.49	1.77	1.22	0.85	1.42	1.57	1.49	1.88
	Pacific Center	1.36	1.91	1.80	2.33	2.18	2.48	3.26	3.03	3.10	2.72	2.03	1.94	2.06	2.20	2.25	2.45
	Center	1.60	1.77	2.02	2.32	2.17	1.80	2.32	2.84	2.51	2.17	1.67	1.43	1.65	1.92	1.79	1.98
	Center North	1.46	1.52	1.77	1.31	1.58	1.77	1.85	2.75	2.56	2.05	1.68	2.00	1.92	1.73	2.34	2.34
	Peninsula	1.56	1.81	1.85	1.01	1.09	1.53	1.88	2.01	2.73	2.23	1.65	2.13	1.47	1.63	1.64	2.13
	Pacific South						2.10	1.40	2.14	1.57	1.82	1.45	1.83	1.50	1.81	1.67	1.56
R^2	National	0.25	0.26	0.25	0.25	0.25	0.31	0.30	0.35	0.35	0.39	0.40	0.38	0.38	0.34	0.36	0.34
	Capital	0.27	0.30	0.28	0.24	0.26	0.34	0.33	0.37	0.36	0.42	0.44	0.41	0.44	0.39	0.43	0.40
	Border	0.22	0.23	0.25	0.26	0.28	0.31	0.32	0.35	0.33	0.34	0.34	0.34	0.33	0.31	0.33	0.31
	Pacific North						0.29	0.28	0.36	0.38	0.43	0.43	0.38	0.38	0.33	0.36	0.36
	Center Gulf	0.32	0.34	0.32	0.32	0.33	0.38	038	0.42	0.44	0.48	0.51	0.50	0.49	0.44	0.46	0.47
	Pacific Center	0.20	0.23	0.22	0.20	0.26	0.25	0.22	0.29	0.35	0.35	0.39	0.37	0.31	0.32	0.30	0.29
	Center	0.31	0.26	0.25	0.22	0.25	0.30	0.27	0.34	0.34	0.38	0.40	0.40	0.36	0.34	0.32	0.32
	Center North	0.36	0.31	0.36	0.33	0.37	0.36	0.36	0.41	0.42	0.43	0.43	0.44	0.43	0.39	0.38	0.38
	Peninsula	0.38	0.34	0.35	0.40	0.41	0.43	0.34	0.43	0.45	0.49	0.45	0.45	0.47	0.38	0.38	0.37
	Pacific South						0.29	0.33	0.38	0.39	0.46	0.49	0.47	0.46	0.38	0.40	0.40

* Statistically insignificant at 10%. Weighted OLS. The base categories are: female, private occupations, without social-security coverage, and unskilled occupations.

REFERENCES

Airola, J., Chunhui, J. 2003. Wage inequality in post-reform Mexico. Mimeo, University of Houston.

Azzoni, C., Servo, L. 2002. Education, cost of living and regional wage inequality in Brazil. Papers in Regional Science 81, 157-175.

Baier, S. L., Dwyer, G. and Tamura, R. Factor returns, institutions and geography: A view from trade. Federal Reserve Bank of Atlanta, mimeo.

Baker. M. , Benjamin, D. Desaulniers, A., and Grant, M. (1995). The distribution of the male/female earning differential, 1970-1990. Canadian Journal of Economics, 28(3), 479-501.

Banco de México. 2003. Banco de datos, www.banxico.org.mx

Becker, G (1975). Human capital: A theoretical and empirical analysis, with special reference to education. University of Chicago Press, Chicago.

Bertola, G. Blau, F., Kahn, L. (2002). Labor market institutions and demographic employment patterns. NBER Working Paper 9043. NBER, Cambridge.

Blanchard, O. and Wolfers, J. (2000). The role of shocks and institutions in the rise of European unemployment: the aggregated evidence. Economic Journal, 110, C1-C33.

Birdsall, N., Behrman, J. 1984. Geographical aggregation causes overestimates of schooling returns. Oxford Bulletin of Economics and Statistics 46, 55-72.

Botero, J, Djankov, S., La Porta, R, Lopez-de-Silanes, F., Shliefer, A. (2004). The regulation of labor. Quarterly Journal of Economics, 119 (4), 1339-1382.

Bracho, T., Zamudio, A. 1994. Rendimientos económicos de la escolaridad en México, 1989. Economía Mexicana, 3, 345-377.

Baier, S., Dwyer, G. P., and Tamura, R, 2004. Factor returns, institutions, and geography: A view from trade. Federal Reserve Bank of Atlanta, mimeo.

Card, D. 1999. The causal effect of education on earnings. In: Ashenfelter, O., Card, D. (Eds.), Handbook of Labor Economics, Vol. 3. Elsevier, Amsterdam.

Card, D., DiNardo, J. 2002. Skill biased technological change and rising wage inequality: some problems and puzzles. NBER Working Paper 8769. NBER, Cambridge.

Costa-Font, J, and Rodríguez-Oreggia, E. (2005). Is the impact of public investment neutral across the regional income distribution? Evidence from Mexico. Forthcoming in Economic Geography.

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

De la Torre, R. (1997). Desigualdad, pobreza y polarización social en México. ITAM, mimeo.

Dolton, P. and Vignoles, A. (1997). Graduate overeducation: A European perspective. Higher Education in Europe, 22/4, 475-484.

Duranton, G., Monastiriotis, V. 2002. Mind the gaps: the evolution of regional inequalities in the UK 1982-1997. Journal of Regional Science 42, 219-256.

Esquivel, G., Rodríguez-López, J. A. 2003. Technology, trade, and wage inequality in Mexico before and after NAFTA. Journal of Development Economics 72, 543-565.

Fairris, D (2003). Unions and wage inequality in Mexico. Industrial and Labor Relations Review, 56(3), 481-497.

Freeman, R. 1976. The over-educated American. New York, Academic Press.

Freije, S., López-Calva, L.F., and Rodríguez, C. (2003). Origen de los cambios en la desigualdad salarial, nacional y salarial, en México. UNDP Paper for the Human Development Report Mexico 2002.

Furtado, A. (1996). Interregional wage differentials in the Eurpean Union: A cross-section analysis for Italy, Germany, Spain and the United Kingdom. Paper presented at the 36th European Regional Science Association Congress. ERSA, Zurich.

Garro, N., Meléndez, J. y Rodríguez-Oreggia, E.

(2005). Un modelo del mercado laboral mexicano con y sin seguridad social (IMSS). Instituto de Investigaciones sobre Desarrollo Sustentable y Equidad Social, Documento de Trabajo 7. Universidad Iberoamericana, México.

Garro, N. and Rodríguez-Oreggia, E. (2002). Los determinantes personales y regionales en el desempleo en el mercado laboral mexicano, un modelo logístico 1995-2000. El Trimestre Económico, 79 (276), 543-566.

Hanson, G. 1997. Increasing returns, trade and the regional structure of wages. The Economic Journal 107, 113-133.

Hanson, G. 2003. What has happened to wages in Mexico since NAFTA? Implications for hemispheric free trade. NBER Working Paper 9563. NBER, Cambridge.

Heckman, J. 1979. Sample selection bias as a specification error. Econometrica 47, 153-161.

ILO. 2000. World Labour Report: Income Security and Social Protection in a Changing World. ILO, Geneve.

INEGI. 2003. Economic database, www.inegi.gob.mx

Johnson, G. 1997. Change in earning inequality: the role of demand shift. Journal of Economic Perspectives, 11, 41-54.

Koeniger, W., Leonardi, M. and Nunziata, L. (2004). Labor market institutions and wage differentials. IZA Discussion paper 1291. IZA, Bonn.

Lächler, U. 1998. Education and earnings inequality in Mexico. Policy Research Working Paper 1949. World Bank, Washington.

Layard, R., Walters, P. 1978. Macroeconomic Theory. McGraw Hill, London.

Lopez-Acevedo, G. 2001. Evolution of earnings and rates of return to education in Mexico. Policy Research Working Paper 2691. World Bank, Washington.

Manski, C. 1998. Anatomy of the selection problem. Journal of Human Resources, 24, 343-360.

Mincer, J. 1958. Investment in human capital and personal income distribution. Journal of Political Economics 66, 281-302.

Mincer, J. 1974. Schooling, Experience, and Earnings. NBER, New York.

Montenegro, C. and Pagés, C (2003). Who benefits from labor market regulations? Chile 1960-1998. Research Department Working Paper 494. IADB, Washington.

Nickell, S. (1979). Education and lifetime patterns of unemployment. Journal of Political Economy, 87 (5), S117-S131.

OECD. 1997. Regional Development and Structural Policy in Mexico. OECD, Paris.

Psacharopoulos, G., Velez, E., Panagides, A., Yang, H. 1996. Returns to education during economic boom and recession: Mexico 1984, 1989 and 1992. Education Economics 4, 219-230.

Robertson, R. 2004. Relative prices and wage inequality: evidence from Mexico. Journal of International Economics, 64(2), 387-409.

Rodrik, D. 1999. Democracies pay higher wages. The Quarterly Journal of Economics, 114, 707-738.

Rodrik, D., Subramanian, A., and Trebbi, F. 2004. Institutions rule: The primacy of institutions over geography and integration in economic development. Journal of Economic Growth, 9, 131-165.

Rodríguez-Oreggia, E., Rodríguez-Pose, A. 2004. The regional returns of public investment policies in Mexico. World Development, 39(9), 1545-1562.

Rodríguez-Oreggia, E. 2002. Growth and disparities in the Mexican regions: a study on the effects of public investment, human capital and science and technology. Unpublished thesis, London School of Economics.

Rosen, S. 1986. Compensating wage differentials. In: Ashelfeter, O., Layard, R. (Eds.), Handbook of Labor Economics 1. Elsevier Science Publishers.

Sicherman, N. (1991). Overeducation in the labor market. Journal of Labor Economics, 9, 101-122.